CADMUS

# 2021–2024 Conservation and Demand Management Framework: PY2024 Remote First Nations Energy Efficiency Program Evaluation Report

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# Acronyms and Abbreviations

| Acronym/Abbreviation | Definition |
|---|---|
| CDM | Conservation and demand management |
| EM&V | Evaluation, measurement, and verification |
| EUL | Expected useful life |
| GHG | Greenhouse gas |
| HVAC | Heating, ventilation, and air conditioning |
| IESO | Independent Electricity System Operator |
| ISR | In-service rate |
| kW | Kilowatt |
| kWh | Kilowatt-hour |
| LED | Light-emitting diode |
| LPM | Litres per minute |
| LUEC | Levelized unit energy cost |
| MAL | Measure Assumptions List |
| NEB | Non-energy benefit |
| NTG | Net-to-gross |
| PAC | Program Administrator Cost (test) |
| PPS | Probability proportional to size (sampling) |
| PY | Program year |
| RFNEEP | Remote First Nations Energy Efficiency Program |
| RR | Realization rate |
| SUPC | Supply and Use Product Classification |
| T&D | Transmission and distribution |
| TRC | Total Resource Cost (test) |
| TRM | Technical Reference Manual |

# Executive Summary

The Independent Electricity System Operator (IESO) contracted Cadmus, in partnership with its subcontractor Econoler, to evaluate the Remote First Nations Energy Efficiency Program (RFNEEP) 2024 program year (PY2024) energy and demand savings, cost-effectiveness results and processes. This executive summary section provides an overview of the program and evaluation objectives, a summary of impact and cost-effectiveness results and key findings and recommendations from the PY2024 evaluation.

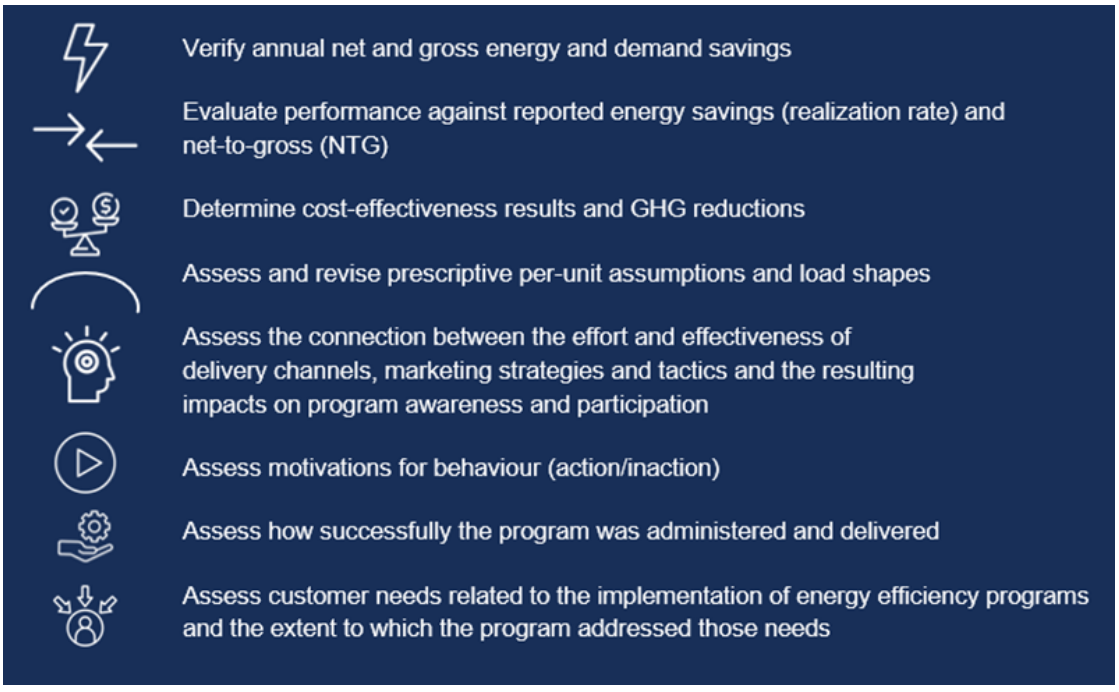
## Program Description

The RFNEEP provides funding support to eligible remote First Nations communities to implement energy efficiency projects that help them manage energy use more effectively, save on energy costs and increase the comfort of their facilities. The RFNEEP provides support to both homes and non-residential facilities in communities being energized through the Wataynikaneyap Transmission Project.

## Evaluation Objectives

The research objectives presented in Figure 1 guided the evaluation activities carried out under this assignment.

**Figure 1. PY2024 Evaluation Research Objectives**



# Summary of Results

This section presents a summary of the impact evaluation and cost-effectiveness results.

## Impact Summary

In PY2024,[1] the RFNEEP served 775 homes and installed 11,245 measures that generated energy savings. Table 1 presents reported and gross verified savings results along with realization rates. Overall, the RFNEEP produced total gross verified energy savings of 928,162 kWh and peak demand savings[2] of 76.14 kW, resulting in a 109% realization rate for energy savings and 122% for peak demand savings.[3] Compared to the PY2022 evaluation results of the pilot, both energy and demand realization rates increased in PY2024. Further details on realization rates are outlined in the *Detailed Findings* section. For the RFNEEP, the net-to-gross (NTG) ratio is assumed to be one, therefore gross savings are equal to net savings. Overall, 928,162 kWh and 76.14 kW savings will persist to 2026.

**Table 1. RFNEEP PY2024 Performance**

| Program | Reported Energy Savings (kWh) | Reported Peak Demand Savings (kW) | Energy Savings Realization Rate | Peak Demand Savings Realization Rate | Gross Verified Energy Savings (kWh) | Gross Verified Peak Demand Savings (kW) | NTG – Energy and Demand Savings | Net Verified Energy Savings (kWh) | Net Verified Peak Demand Savings (kW) |
|---|---|---|---|---|---|---|---|---|---|
| RFNEEP | 854,499 | 62.57 | 109% | 122% | 928,162 | 76.14 | 1.00 | 928,162 | 76.14 |

## Cost-Effectiveness Summary

Table 2 shows the Program Administrator Cost (PAC) and levelized-unit energy cost (LUEC) results for PY2024. To pass PAC, the program would need a ratio of 1, which is not expected of programs that serve disadvantaged communities. Additionally, as described in the Ministerial Directive on the 2021-2024 Conservation and Demand Management Framework,[4] support programs – such as FNCBRP – are explicitly not required to meet cost-benefit benchmarks. Though a ratio of 0.11 does not pass the PAC test, the RFNEEP, like most programs that serve disadvantaged, underserved communities, is not required to be cost effective. Discussed in more detail in the *Process Evaluation* section below (in particular, *Key Challenges in Program Implementation* the section), this program saw higher costs due to

[1] PY2024 included projects from calendar years 2022, 2023, and 2024. This is because no evaluation was conducted in PY2023 due to limited participation since PY2022. PY2022 only includes projects that had installations in 2022. Throughout this report, all PY2024 numbers include true-ups from 2022 and 2023.

[2] Throughout this report, peak demand refers to summer peak demand as defined in the IESO's Evaluation, Measurement and Verification Protocol.

[3] The RFNEEP had a net-to-gross (NTG) ratio of 1, resulting in net verified savings equal to gross verified savings.

[4] https://www.ieso.ca/en/Corporate-IESO/Ministerial-Directives/2021-2024-Conservation-and-Demand-Management-Framework

upfront costs that were additional to measure incentives, such as transportation costs and the higher-than-average measure level costs. Detailed further in the *Non-Energy Benefits* section, in addition to measure replacement, the program provides several key non-energy benefits to its participants, such as:

- Reduced financial stress
- Reduced environmental impact
- Resolution of an existing problem in the home
- Improved:
  - Thermal comfort
  - Indoor air quality
  - Lighting levels
  - Home safety
  - Shower water pressure
  - Food longevity in appliances

**Table 2. RFNEEP Cost-Effectiveness Test Results**

| Cost-Effectiveness Test | PY2024 |
|---|---|
| **PAC** | |
| PAC Costs ($) | $3,243,954 |
| PAC Benefits ($) | $368,176.23 |
| PAC Net Benefits ($) | -$2,875,778 |
| PAC Net Benefit (Ratio) | 0.11 |
| **LUEC** | |
| $kWh | $0.41 |
| $/kW | $5,028.63 |

## High-Impact PY2024 Key Findings and Recommendations

In this section, the Cadmus team presents the high-impact PY2024 key findings and recommendations. Further details and moderate impact key findings and recommendations are provided in the *Key Findings and Recommendations* section near the end of this report. The IESO responses to the recommendations are found in Appendix B.

### ***(High Impact) Key Finding #1:*** While the RFNEEP achieved 109% of reported annual energy savings, demonstrating overall good program performance, the Cadmus team found discrepancies among individual measures that may indicate larger concerns and areas of improvement.

Overall realization rates achieved for the program were 109% for energy savings and 122% for demand savings. The Cadmus team made no changes to the energy savings of 28% of the sampled measures, indicating verified savings matching reported values for almost a third of projects. Among measures with discrepancies (72% of measures), the Cadmus team found measure-level realization rates for energy savings that varied between 73% for LED A-Shape bulbs <17W and 289% for hot water pipe insulation. As discussed in more detail in the next finding, water conservation measures were consistently adjusted upward, which notably contributed to higher than 100% realization rates.

For some measures, such as lighting and refrigerators, this was due to the Cadmus team updating energy savings calculations to use the actual wattages of installed equipment, as opposed to the

assumed value used in IESO MAL assumptions. Discrepancies in the realization rates also resulted from errors in recording the quantity of measures installed.

**Recommendation #1:** Consider refining the associated assumptions of installed measures by integrating field verified data—such as equipment size and baseline efficiency—into the tracking system to help identify possible recurring issues like miscategorized equipment. These data fields can also support validation checks by flagging values outside the IESO MAL assumptions for further investigation.

### ***(High Impact) Key Finding #2:*** Realization rates for water conservation measures were higher than those for other measures due to more people living in households than initially assumed.

For hot water conservation measures such as low-flow showerheads and faucet aerators, energy savings are calculated using an estimated daily use value. This value is based in part on the average number of people living in a household, which is assumed in the IESO prescriptive savings calculations. As part of the project reviews, the team found that more people lived in participant households than the assumed average value. Adjusting this calculation to use the actual number of people living in the given household yielded an energy realization rate of 139% for hot water conservation measures.

**Recommendation #2:** To better reflect participant demographics for the RFNEEP, consider adjusting the average number of people in a household in the hot water conservation energy and demand savings calculations based on the average number found in the PY2024 RFNEEP project reviews.

### ***(High Impact) Key Finding #3:*** As trusted local representatives who play a central role in program operations, Community Coordinators enhance program credibility within their communities and are effective at encouraging community members to enroll.

In interviews with program staff, Community Coordinators were identified as playing a key role in program facilitation. In particular, Community Coordinators help build trust among other community members, which is a key barrier to First Nation program participation. Further, the survey results indicate that, out of 18 respondents total, Facebook (count = 6) and Community Coordinators (count =6) are the two most common ways program participants heard about the RFNEEP, highlighting that Community Coordinators are key points of contact for raising awareness about the RFNEEP and important in recruiting new participants. Enrollment is also driven by personal contact: notably, most participants said they signed up after an Energy Advisor came directly to their home (count=6), while five participants said they joined the program through a Community Coordinator, demonstrating the continued importance of personal contact and community relationships. However, program staff also noted that in some cases, Community Coordinators may become overwhelmed with all of their duties and struggle to keep up. This occasionally leads to implementation challenges and delays, as delivery agent staff are not as trusted within communities.

**Recommendation #3:** Continue building the skills of Community Coordinators by keeping open and regular communication, and by providing spaces for exchange, such as peer learning sessions and themed webinars, where Community Coordinators can share experiences, best practices, and solutions to challenges they have faced.

# Introduction

The Independent Electricity System Operator (IESO) contracted Cadmus, in partnership with its subcontractor Econoler, to evaluate the Remote First Nations Energy Efficiency Program (RFNEEP) 2024 program year (PY2024) energy and demand savings, cost-effectiveness results and processes. The evaluation research objectives guided the evaluation activities carried out under this assignment.

## Program Description

The RFNEEP provides funding support to eligible remote[5] First Nations communities to implement energy-efficiency projects that help them manage energy use more effectively to save on energy costs and increase the comfort of their homes and non-residential facilities. As presented in Table 3 below, the RFNEEP provides support to both homes and non-residential facilities. The first step of the program is a free energy audit for homes and non-residential facilities to assess how they use energy. Based on the results of the energy audit, qualified homes and non-residential facilities may receive no-cost, energy-saving measures to help them manage energy use, save on energy costs, and improve comfort. In PY2024, the program served 775 homes[6] and installed 11,245 measures that generated energy savings.

[5] Eligible Communities are listed on Save on Energy's website and typically consist of First Nations communities that are not, or were only recently, connected to the Ontario power grid. https://saveonenergy.ca/First-Nations-Energy-Programs/Remote-FN-Energy-Efficiency-Program#eligibility

[6] For clarity, no non-residential facilities participated in the program in PY2024.

**Table 3. Remote First Nations Energy Efficiency Program Measure Offerings**

| Participant | Measures |
|---|---|
| **Homes** | • ENERGY STAR® certified light-emitting diode (LED) bulbs<br>• Smart power bars<br>• Outdoor timers<br>• Water-saving measures:<br>  ○ Low-flow showerheads<br>  ○ Faucet aerators<br>  ○ Hot water tank wraps<br>  ○ Pipe insulation<br>• Refrigerators<br>• Chest freezers<br>• Window air conditioners<br>• Dehumidifiers<br>• Attic insulation<br>• Caulking around windows, weather stripping for doors and attic hatches<br>• Smart thermostats or programmable wall-mounted thermostats for baseboard heaters<br>• High-efficiency bathroom automatic exhaust fans and ducts |
| **Non-residential facilities** | • Commercial LED lighting retrofits<br>• Lighting control sensors<br>• Smart thermostats |

## Evaluation Research Objectives

To address the evaluation research objectives, the Cadmus team completed the evaluation tasks presented in Table 4.

**Table 4. Evaluation Objectives and Tasks**

| Research Objectives | Annual Project Audits | Cost-Effectiveness Analysis | Program Staff Interviews | Participant Survey |
|---|---|---|---|---|
| Verify annual net and gross energy savings and peak demand savings [a] | ✓ | | | ✓ |
| Evaluate program performance against reported energy savings (realization rate) and net-to-gross (NTG) ratio | ✓ | | | ✓ |
| Determine cost-effectiveness results and greenhouse gas (GHG) emission reductions [b] | | ✓ | | |
| Assess and revise prescriptive per-unit assumptions and load shapes | ✓ | | ✓ | ✓ |
| Assess the connection between the effort and effectiveness of delivery channels, marketing strategies, and tactics and the resulting impacts on program awareness and participation | | | ✓ | ✓ |
| Assess motivations for behaviour (action/inaction) | | | | ✓ |
| Assess how successfully the program was administered and delivered to the market | | | ✓ | ✓ |
| Assess customer needs related to the implementation of energy efficiency programs and the extent to which the program addressed those needs | | | | ✓ |

[a] Including annual true-up projects as appropriate.

[b] GHG analysis was conducted as part of cost-effectiveness analysis.

# Methodology

This section summarizes the PY2024 methodology for the impact, cost-effectiveness and process evaluations. See *Appendix D. Methodology Details* for additional details.

## Impact Evaluation

Through the annual impact evaluation, the Cadmus team established gross verified savings and estimated net verified energy and peak demand savings using a methodical process based on the IESO's evaluation, measurement and verification (EM&V) protocols. Table 5 lists the steps the team used to conduct the impact evaluation.

**Table 5. Impact Evaluation Steps to Determine Gross and Net Verified Savings**

| Step | Action |
|---|---|
| 1 | **Review Tracking Database:** Validate the accuracy of the data in the participant database. |
| 2 | **Sample Program Population:** Randomly sample RFNEEP projects using probability proportional to size (PPS) sampling. |
| 3 | **Develop EM&V Workbooks:** Develop EM&V data-collection and analysis workbooks based on a review of sample project and measure data and the IESO substantiation workbooks. |
| 4 | **Perform Desk Reviews and Analysis:** Analyse collected sample project documentation to calculate gross verified energy and peak demand savings using methodologies outlined in the IESO substantiation worksheets. |
| 5 | **Calculate Gross Verified Savings:** Extrapolate realization rates from all sampled projects to the program population. |
| 6 | **Calculate Net Verified Savings:** Apply NTG ratios as applicable (for First Nations programs, NTG ratio is equal to 1). |

### Net-to-Gross Ratios

The Cadmus team estimated net savings, that is the savings directly attributable to the program, by multiplying gross verified energy savings by NTG ratios. The team applied an NTG ratio of 1.0 (100%) to RFNEEP participants in accordance with the IESO's EM&V protocols for agreed-upon NTG ratios applicable to First Nations programs.

## Cost-Effectiveness

The Cadmus team completed the cost-effectiveness analysis per the IESO Cost-Effectiveness Guide for Energy Efficiency and used the IESO Cost-Effectiveness Tool to calculate results. In the IESO Cost-Effectiveness Tool, the team used the 2024 Measure Assumptions List to obtain expected useful life (EUL), end-use load profile and incremental cost inputs. The team sourced first-year energy and peak demand inputs from the impact evaluation, and the IESO provided administrative costs and incentives. This report presents the following key cost-effectiveness outputs: Program Administrator Cost (PAC) test benefits, costs and ratio, as well as levelized unit energy cost (LUEC) by dollars per kWh and dollars per kW. The formulas and definitions for these tests and metrics are outlined in *Appendix D. Methodology Details.*

## Process

Through the process evaluation, the Cadmus team collected findings related to RFNEEP design; the effectiveness of delivery channels and program administration; and participant motivations, benefits,

needs and satisfaction levels. Cadmus also identified areas of success and opportunities for improvement. It is important to note that the questionnaire was administered right before wildfires disrupted northern Ontario in the summer of 2025, which made it more challenging to collect responses. Therefore, the team could not gather sufficient survey data for quantitative analyses. Table 6 lists the data-collection activities, target audience and data-collection method for the PY2024 RFNEEP process evaluation. Further details on the process activity methodology are provided in the

*Process* Evaluation section of *Appendix D. Methodology Details*.

**Table 6. Process Research Activities**

| Activity | Audience | Target | Completed |
|---|---|---|---|
| Interviews | RFNEEP IESO Staff | 1 | 1 |
| Interviews | Delivery Agent Staff | 1 | 2 |
| Survey | RFNEEP Participants | 70 | 17 |

## Non-Energy Benefits

The methodology to calculate non-energy benefits (NEBs) for RFNEEP is based on the IESO's CDM Cost Effectiveness tool.

As a supplemental analysis, the Cadmus team used the *Non-Energy Benefits Study: Phase II* report[7] to quantify certain NEBs based on their relevance to different program types. The Cadmus team assigned each RFNEEP measure a $/kWh value from that report, adjusted for inflation, based on its applicability to each quantified NEB. The team then analysed data from the participant survey to evaluate the relevance of the NEBs quantified in the report and to determine whether the IESO should quantify other NEBs to use in future First Nations program evaluations. A more detailed description of the NEB analysis methodology is provided in the *Other Energy Efficiency Benefits* section of this report.

## Job Impacts

The Cadmus team quantified the number of full-time equivalent (FTE) net job impacts and total net job impacts (both direct and indirect jobs) resulting from the investment and activities of each program. The team relied on primary and secondary data collection and Statistics Canada (StatCan) Input-Output (IO) modeling to quantify net jobs impacts. IO models are used to analyse the propagation of exogenous economic shocks throughout an economy. The models represent relationships, or flows, of inputs and outputs between industries. When an energy efficiency program such as RFNEEP is funded and implemented, it creates a set of "shocks" to the economy, such as demand for specific products and services and additional household expenditures made possible by energy bill savings. The shocks and their impacts can be measured as economic output and employment. A more detailed description of the jobs impact analysis methodology is provided in *Appendix D. Methodology Details*.

[7] Dunsky Energy Consulting, Non-Energy Benefits Study: Phase II – Quantified Benefits and Qualitative Insights, July 2021.

# Detailed Findings

This section presents the RFNEEP PY2024 impact findings, program and measure-level cost-effectiveness results and process findings.

## Impact Evaluation

The RFNEEP produced[8] total gross verified energy and demand savings of 928,162 kWh and 76.14 kW respectively, resulting in a 109% realization rate for energy savings and 122% for peak demand savings.[9] Energy savings came from 11,245 measures installed in 775 homes. It should be noted that only residential homes participated in the program in PY2024. To date, there has been low interest from non-residential facilities and as a result, non-residential facilities did not contribute to the gross savings in PY2024. Detailed impact findings are presented in the sections that follow, and *PY2022 and PY2023 True-Up Results* in *Appendix F* present true-up impact results. Since the RFNEEP has a deemed NTG ratio of 1 in accordance with the IESO's EM&V protocols for agreed-upon NTG ratios for First Nations programs, net verified savings for RFNEEP are equal to gross verified savings. Overall, 928,162 kWh and 76.14 kW savings will persist to 2026.

### Impact Findings

Table 7 highlights the energy realization rates for each measure type. Individual realization rates varied between 73% and 298%, with several measures achieving a realization rate of 100%. Table 8 highlights the demand energy realization rates which follow a similar trend.

**Table 7. RFNEEP Detailed Energy Realization Rates by Measure**

| Measure Name | Sampled Measures | Reported kWh | Verified kWh | Realization Rate (%) |
|---|---|---|---|---|
| <11W LED A Shape Bulbs | 294 | 10,816 | 10,207 | 94% |
| <17W LED A Shape Bulbs | 4 | 190 | 139 | 73% |
| <23W LED A Shape Bulbs | 2 | 123 | 120 | 98% |
| LED Nightlights | 62 | 1,820 | 1,867 | 103% |
| Indoor Clothes Drying Racks/Retractable Clotheslines | 35 | 3,084 | 3,069 | 100% |
| Efficient Aerators (Bathroom) | 33 | 1,116 | 1,623 | 145% |
| Efficient Aerators (Kitchen) | 37 | 5,100 | 7,382 | 145% |
| Efficient Showerheads | 38 | 5,344 | 7,629 | 143% |
| Weatherstripping (Doorframe/Sweep) | 4 | 225 | 225 | 100% |
| Weatherstripping (Foam/V-Strip) | 3 | 110 | 110 | 100% |
| Block Heater Timers | 35 | 8,367 | 8,157 | 97% |
| High-Efficiency Bathroom Exhaust Fans | 10 | 289 | 289 | 100% |

[8] PY2024 included projects from calendar years 2022, 2023, and 2024. This is because no evaluation was conducted in PY2023 due to limited participation since PY2022. PY2022 only includes projects that had installations in 2022. Throughout this report, all PY2024 numbers include true-ups from 2022 and 2023.

[9] The RFNEEP had a net-to-gross (NTG) ratio of 1, resulting in net verified savings equal to gross verified savings.

| Measure Name | Sampled Measures | Reported kWh | Verified kWh | Realization Rate (%) |
|---|---|---|---|---|
| Programmable Thermostats | 10 | 1,205 | 1,084 | 90% |
| Hot Water Tank Insulation | 15 | 1,368 | 1,276 | 93% |
| Hot Water Pipe Insulation | 15 | 81 | 233 | 289% |
| Refrigerator Replacements | 5 | 1,080 | 1,172 | 108% |
| Freezer Replacements | 1 | 35 | 35 | 100% |
| Advanced Power Strips | 38 | 8,892 | 8,424 | 95% |

**Table 8. RFNEEP Detailed Demand Realization Rates by Measure**

| Measure Name | Reported kW | Verified kW | Demand Realization Rate |
|---|---|---|---|
| <11W LED A Shape Bulbs | 0.76 | 0.72 | 95% |
| <17W LED A Shape Bulbs | 0.01 | 0.01 | 74% |
| <23W LED A Shape Bulbs | 0.01 | 0.01 | 98% |
| LED Nightlight | 0.00 | 0.02 | - |
| Indoor Clothes Drying Rack/Retractable Clothesline | 0.42 | 0.42 | 101% |
| Efficient Aerators (Bathroom) | 0.10 | 0.15 | 145% |
| Efficient Aerators (Kitchen) | 0.98 | 1.42 | 144% |
| Efficient Showerhead | 0.50 | 0.66 | 133% |
| Weatherstripping (doorframe/sweep) | 0.07 | 0.12 | 171% |
| Weatherstripping (foam/V-strip) | 0.03 | 0.06 | 163% |
| Block Heater Timer | 0.00 | 0.00 | - |
| High Efficiency Bathroom Exhaust Fan | 0.04 | 0.04 | 100% |
| Programable Thermostat | 0.01 | 0.01 | 96% |
| Hot Water Tank Insulation | 0.14 | 0.13 | 94% |
| Hot Water Pipe Insulation | 0.01 | 0.02 | 264% |
| Refrigerator Replacement | 0.14 | 0.15 | 108% |
| Freezer Replacement | 0.01 | 0.00 | 95% |
| Advanced Power Strip | 0.25 | 0.25 | 99% |

Understanding discrepancies at the measure level will help inform future program impacts. Table 9 provides explanations for several of the atypical measure-level realization rates.

**Table 9. Main Drivers of Realization Rates**

| | |
|---|---|
| **Discrepancies between quantities of tracked and installed products** | For nearly all product types, the tracked volume of products delivered to customers did not match what was actually installed on at least one occasion. In some instances, this was due to participants receiving but refusing the installation of measures and in other instances the discrepancy was due to simple errors in tracking accuracy. For some products (such as hot water pipe insulation), this resulted in a positive adjustment to savings, while for others (such as advanced power strips), it resulted in a negative adjustment to savings. |

| | |
|---|---|
| **Differences in installed bulb types and wattages** | During desk reviews of submitted documentation, the Cadmus team found that the installed lighting bulb types and wattages differed from the average efficient wattages assumed in the IESO's substantiation sheets. The IESO substantiation sheets assume an efficient wattage for installed products; however, the wattages of the models installed in participant homes varied slightly from the values in the substantiation sheets. The model of lighting products installed in participants homes was consistent across all participants. The Cadmus team calculated savings based on the ENERGY STAR LED Lights substantiation workbook methodology using the specific wattages for installed lighting products. This resulted in a lighting-specific realization rate of 95% and 97% for energy and demand savings respectively. |
| **Refrigerators realized greater annual energy and peak demand savings than the values reported** | Similarly to lighting products, the IESO standards assume specific wattages for installed new efficient refrigerators. The models and wattages of appliances installed in participant homes varied; therefore, the team based its savings calculation for each reviewed participant on the specific model. The Cadmus team then used the IESO methodology described in the substantiation workbook along with the actual wattage to determine savings. The wattages of installed products were generally lower than the average described in the substantiation workbook, meaning that less energy was actually consumed than was originally forecast. This resulted in realization rates of 108% for both energy and demand savings for refrigerators. |
| **The number of people living in individual homes was, on average, higher than the assumed number** | The savings calculation methods for hot water conservation measures rely on an estimated volume of daily water use to determine energy savings. This estimate is based on an assumed number of people living in a given household. As part of the equipment installation process, contractors collected information on the number of people living in each home and consistently observed that more people were living at each address than the number assumed in the IESO standards. This resulted in higher energy savings for hot water conservation products and, consequently, in energy and demand realization rates of 139% and 136% for these measures. |
| **Smart power bar savings assumptions remained unchanged** | Discrepancies between the tracked and installed number of units were the only differences that impacted the realization rates for these products in the PY2024 evaluation. In the PY2022 pilot evaluation, the team found that smart power bar savings calculations relied on outdated measure assumptions, which resulted in a high realization rate for energy savings, as presented in Table 10. The PY2024 evaluation results found that the savings assumptions were acceptable, so the team did not change these assumptions from the original value used in the IESO standards. |

Table 10 summarizes broad differences between the realization rates established in the PY2022 evaluation and those established in the PY2024 evaluation. Compared to PY2022 results, sampled projects from the PY2024 evaluation have a higher overall savings realization rate for both energy and demand savings (109% in PY2024 and 99% in PY 2022 for energy and 122% in PY2024 and 60% in PY2022 for demand).

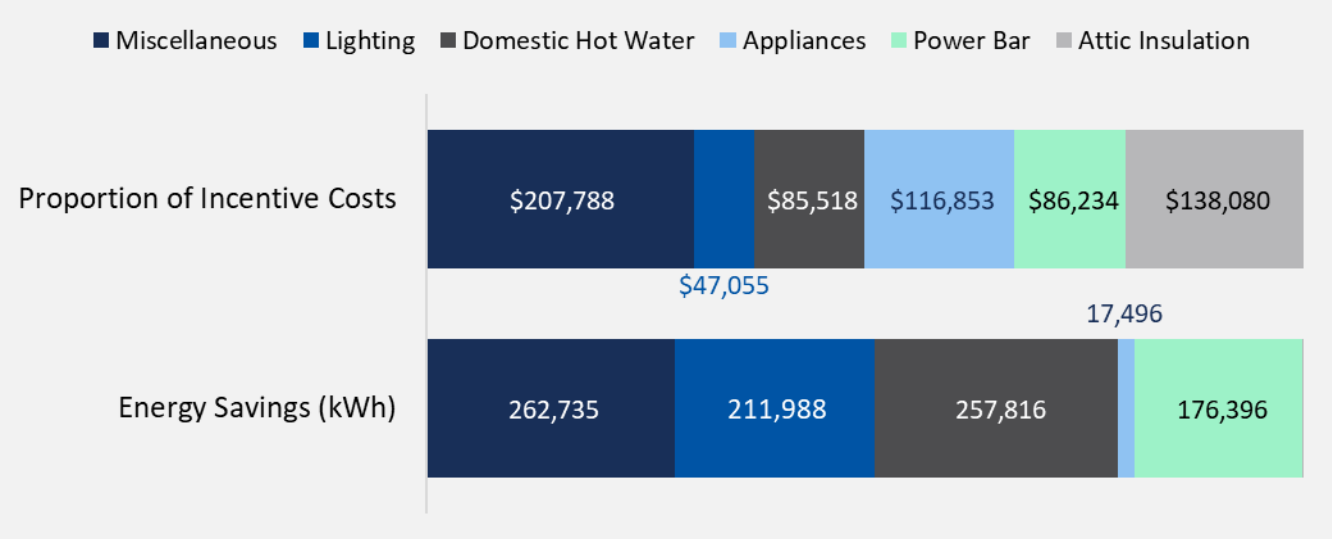
**Table 10. Comparison of Measure-Level Trends/Realization Rates, PY2022–PY2024**

| Measure | PY2022 Energy RR | PY2024 Energy RR | Change in Energy RR | PY2022 Demand RR | PY2024 Demand RR | Change in Demand RR |
|---|---|---|---|---|---|---|
| LED Lighting | 79% | 95% | 16% | 85% | 97% | 12% |

| | | | | | | |
|---|---|---|---|---|---|---|
| Appliances | 48% | 108% | 60% | 47% | 108% | 61% |
| Domestic Hot Water | 86% | 139% | 53% | 93% | 136% | 43% |
| Advanced Power Strips | 512% | 95% | -417% | 100% | 99% | -1% |
| Miscellaneous | 95% | 97% | 2% | 19% | 114% | 95% |

Figure 2 highlights the distributions of total savings and incentive costs by measure category respectively. Lighting and domestic hot water measures combined generated 51% of program energy savings while only accounting for 19% of total incentive costs. Conversely, appliances generated just 2% of total program energy savings but accounted for 17% of total incentive costs. Attic insulation was an even less cost-efficient measure, generating less than 1% of program savings while representing 20% of total incentive costs. While, appliances and attic insulation offer much lower energy savings than other measures per incentive costs, these measures provide additional NEBs to participants. As discussed in *Non-Energy Benefits* below, 59% of interviewed participants reported that their home is more comfortable, and 47% of interviewed participants reported that food lasts longer due to the upgrades provided as part of the RFNEEP. These benefits can reliably be attributed to attic insulation and refrigeration measures.

**Figure 2. RFNEEP Incentive Costs and Savings by Measure Type**




Source: IESO First Nations Programs Dataset for 2022-2024. Columns "Gross Energy Savings (kWh)" and "Measure Incentive ($)" This chart does not highlight the labour costs associated with each measure type or the costs of non-product-related measures, such as energy audits, as there are no direct energy savings associated with these measures.

## Net-to-Gross Evaluation

In accordance with the IESO's EM&V protocols, the savings generated through RFNEEP are not subject to a NTG evaluation. The Cadmus team therefore applied a NTG ratio of 1.0 (100%) to gross verified savings to calculate net verified savings for PY2024, as presented in Table 11. Since the RFNEEP has a deemed

NTG ratio of 1, net verified savings for RFNEEP are equal to gross verified savings. Overall, 928,162 kWh and 76.14 kW savings will persist to 2026.

**Table 11. RFNEEP PY2024 Gross and Net Verified Savings**

| Program | Gross Verified Energy Savings (kWh) | Gross Verified Peak Demand Savings (kW) | NTG Ratio | Net Verified Energy Savings (kWh) | Net Verified Peak Demand Savings (kW) |
|---|---|---|---|---|---|
| RFNEEP | 928,162 | 76.14 | 1.0 | 928,162 | 76.14 |

# Cost-Effectiveness Evaluation

This section outlines the findings from the cost-effectiveness analysis, including an overview of the PAC test and the LUEC results.

## Program Results

As shown in Table 2. above in the *Cost-Effectiveness Summary* section in the *Executive Summary*, RFNEEP obtained a PY2024 PAC ratio of 0.11 and a LUEC of $5,028.63 per kW and $0.41 per kWh. These results are detailed below:

- **PAC ratio of 0.11:** For every dollar spent, the program administrator earned 11 cents of benefits.
  - To pass PAC, the program would need a ratio of 1. Though a ratio of 0.11 does not pass, the program is not required to be cost effective due to the fact that it provides services to disadvantaged, underserved communities. This program saw higher costs due to upfront costs that were additional to measure incentives, such as transportation costs, and the higher-than-average measure-level costs.
  - Measure level results for PAC can be found in *Appendix G. PAC Measure Results Details.*
- **LUEC of $5,028.63 per kW:** For every kW saved, the program spent approximately $5,028.63.
- **LUEC of $0.41 per kWh:** For every kWh saved, the program spent approximately $0.41.

# Process Evaluation

As detailed below, process evaluation activities allowed the team to explore various aspects of the program, including program design and delivery, awareness, participation motivations and the customer experience. Figures for most survey questions are provided in *Appendix D. Methodology Details* as referenced throughout this section.

## Design and Delivery

The IESO and the delivery agent are the primary parties responsible for implementing all program activities. These include program promotion, application reviews, appointment scheduling, auditing and energy efficiency measure installation.

As part of program delivery, measures are implemented in two phases. A delivery agent first conducts an energy audit of the participant home, during which basic measures are installed (such as ENERGY STAR® certified LED bulbs, smart power bars, outdoor timers, indoor clothes drying racks, block heater

timers, faucet aerators, hot water tank wraps and pipe insulation). If the household qualifies for advanced upgrades, such as high-efficiency appliances or attic insulation, these are installed during a follow-up visit.

In addition, the IESO has signed agreements with 11 out of the 15 targeted communities, which is a significant step toward broader program coverage. In terms of measurable outcomes, the only quantitative target defined for the program is that it should achieve a 70% participation rate in each community. To date, the delivery agent has completed work in one participating community where it reached 100% of eligible households. Both the delivery agent and the IESO noted that the program has been slower to reach non-residential facilities compared to homes. As the delivery agent found that residential homes had a higher response rate, they decided to focus on that demographic first. In the future, the delivery agent plans to build on the program success in residential homes and adapt successful methods for the outreach towards non-residential facilities.

The IESO oversees implementation through regular check-ins with the delivery agent. Periodic reviews focus on assessing both program performance and marketing materials to ensure alignment with program objectives. The IESO RFNEEP team also participates in events organized by the delivery agent, such as training sessions and program launch events.

While the program is intended to improve the energy efficiency of homes and support better energy management, the IESO team noted that the program also helps reduce utility costs and significantly improve home comfort for residents of eligible remote communities. The delivery agent emphasized the positive impact of the measures on participants' health and also noted that they contribute to extending the lifespan and strengthening the long-term durability of homes.

## Program Requirements

The Cadmus team reviewed the document outlining program requirements to better understand RFNEEP design and implementation. The document provides an overview of the program, including its structure, offered services, eligible measures and participant eligibility criteria. It also outlines the steps participants need to follow to enroll in the program, such as providing consent and completing initial enrollment steps. The document includes a glossary to clarify program-specific terms and support overall understanding.

The document also details program guidelines related to health, safety and accessibility accommodations. It outlines provisions authorizing delivery vendors to make certain improvements in homes when these are necessary to install additional measures or to improve health and safety conditions. Such improvements must support energy efficiency or address urgent health or safety concerns. The total cost of such work may not exceed $2,000.

Overall, the program requirements document serves as a clear and detailed reference providing specific guidance on program implementation.

## Key Challenges in Program Implementation

The RFNEEP faces several challenges; this section outlines the main challenges identified during the interviews conducted with the IESO program team and the delivery agent team.

The first challenge relates to the difficulty of convincing residents in the target communities to participate. Remote community residents are not well informed about the benefits of energy efficiency and tend to be unresponsive to initiatives designed to provide them with this information. These residents are also reluctant to allow home visits, which makes energy audits difficult to schedule. For this reason, Community Coordinators, which comprises members of the community who are involved in the program delivery, play a key role in program facilitating. Their local presence helps build trust and encourages program participation.

The second challenge concerns the geographic location of target communities that are accessible only by air for most of the year, which makes logistics complex, especially for appliance and insulation deliveries. Deliveries often depend on the formation of ice roads during the winter season that is becoming shorter and during which the delivery of necessities is prioritized. As a result, certain installations of enhanced measures take several months to a year.

Finally, the program faces both budgetary and staffing constraints. Implementation activities, such as electrical work, are costly, and recruiting local labour remains difficult. Maintaining community staff motivation is also a challenge, especially among Community Coordinators who already manage multiple responsibilities within their communities. These issues have led the delivery agent to rely, when needed, on external support in the form of additional Energy Advisors (subcontractors) for energy audits.

## Program Awareness

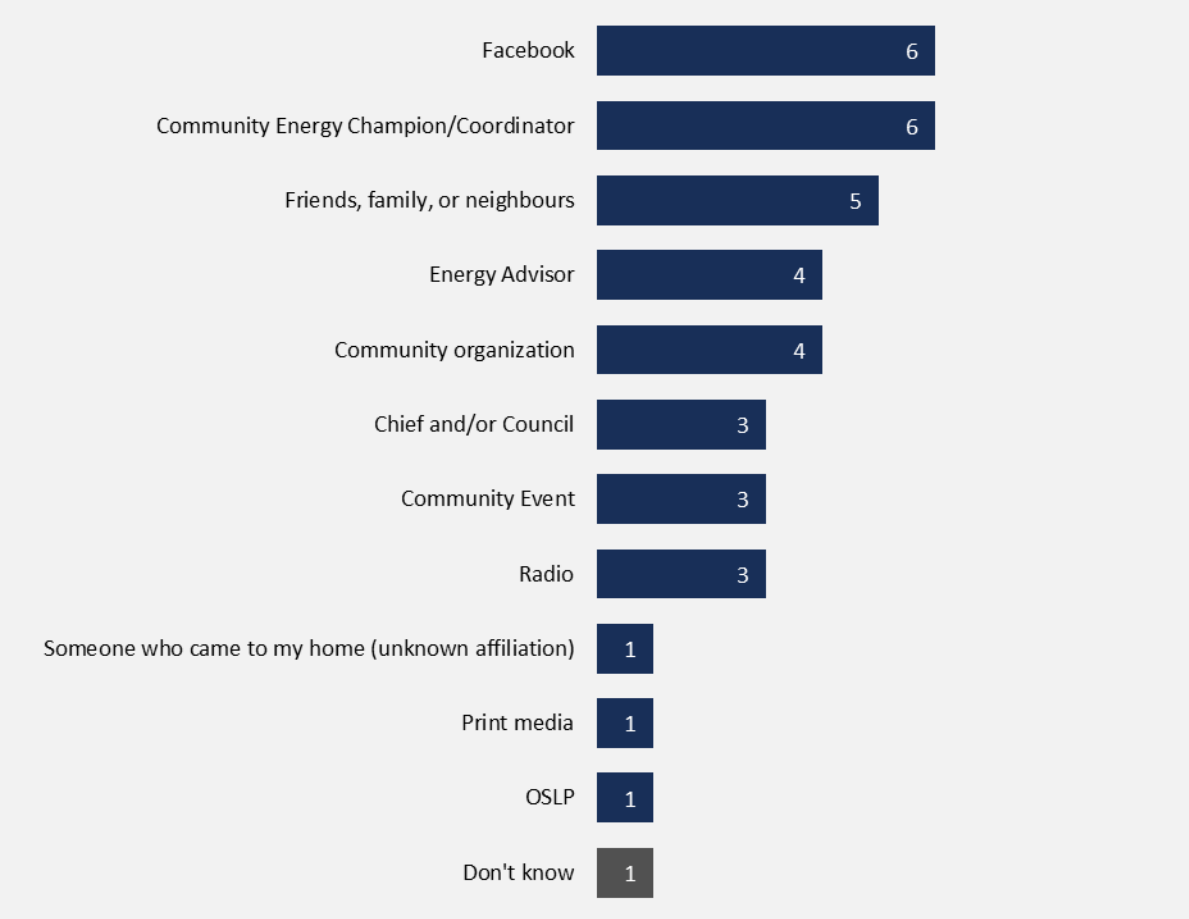
To understand the effectiveness of the various outreach and registration channels, the team asked survey participants how they first became aware of the RFNEEP and how they enrolled. This section details the findings from that survey.[10]

As shown in Figure 3, among participants (n=17), Facebook (count=6) and Community Coordinators (count=6) are the two most common sources from which program participants learned about the RFNEEP. These channels seem to play a key role in raising awareness among community members. Facebook offers accessible and ongoing visibility, while Community Coordinators act as direct and trusted points of contact within their communities.

Some participants said they heard about the program through friends, family, or neighbours (count=5). This demonstrates that word of mouth remains an important way for the program to gain visibility within the target communities. A few participants mentioned learning about the program from an Energy Advisor (count=4) or a community organization (count=4).

[10] For more details on the survey approach, please see ***Error! Reference source not found.*** under the Process section in *Appendix DAppendix D. Methodology Details*

**Figure 3. Sources of Program Awareness**




Source: Cadmus Survey Question B1. "How did you hear about the Remote First Nation Energy Efficiency Program - RFNEEP?" (n=17)

Note: Numbers in the figure exceed the total sample because participants were allowed to select multiple responses.

When participants (n=17) were asked how they enrolled in the program, most surveyed participants (count=6) said they signed up after an Energy Advisor came directly to their home. This in-person approach was the most common reported, followed by enrolling in the program through a Community Coordinator (count=5), demonstrating the continued importance of personal contact and community relationships. Finally, three program participants signed up through a community event, and only one signed up by filling out a paper application as shown in Figure 4.

**Figure 4. Respondent Selected to Enroll**


Source: Cadmus Survey Question B2. "How did you sign up for the program?" (n=17)

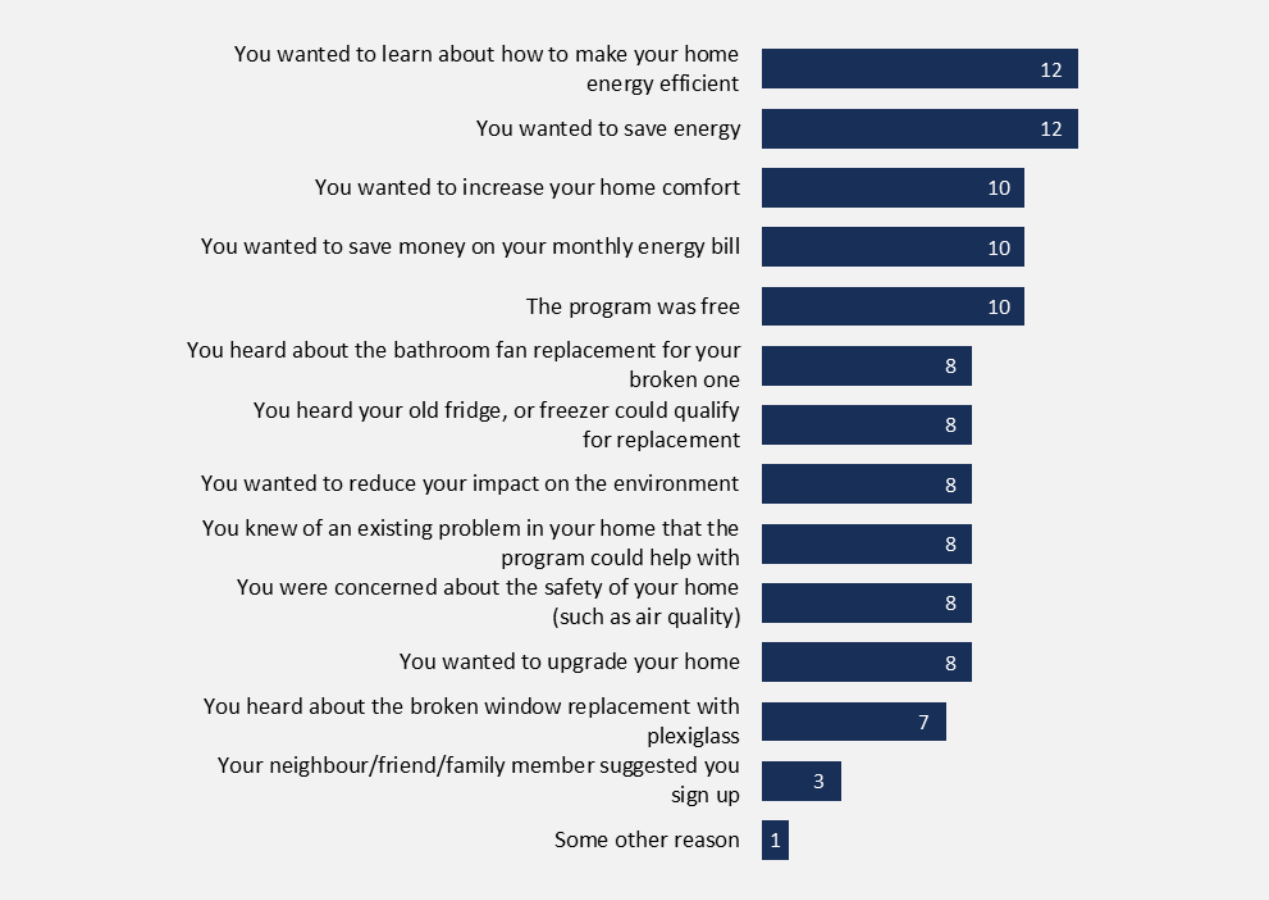
## Participation Motivations

This section details the findings on motivations for participation as reported by survey respondents, presented in Figure 5.

Participants (n=17) were asked about the most important reason for enrolling in the RFNEEP, and many participants mentioned wanting to learn how to make their home more energy efficient (count=12) and wanting to save energy (count=12), making these the most common motivations.

Participants also shared that they were motivated to make their home more comfortable (count=10), to reduce their monthly energy bills (count=10) and by the fact that the program was free (count=10). Many of the other motivations participants mentioned pointed to a general desire for improved comfort, such as fixing things at home or replacing a broken bathroom fan. Some participants also mentioned the opportunity to replace old appliances through the program, such as receiving a new freezer to replace a unit that was not in working condition. These responses suggest that both functional and financial factors play important roles in driving program participation.

**Figure 5. Motivations for Program Participation**




Source: Cadmus Survey Question B3. "Why did you sign up for this program?" (n=17)
Note: Numbers in the figure exceed the total sample because participants were allowed to select multiple responses.

## Participation Experience

In addition to awareness and motivations to participation, the Cadmus team explored key aspects of the participant experience, such as program benefits, satisfaction with the practical energy-saving information provided, and overall satisfaction.

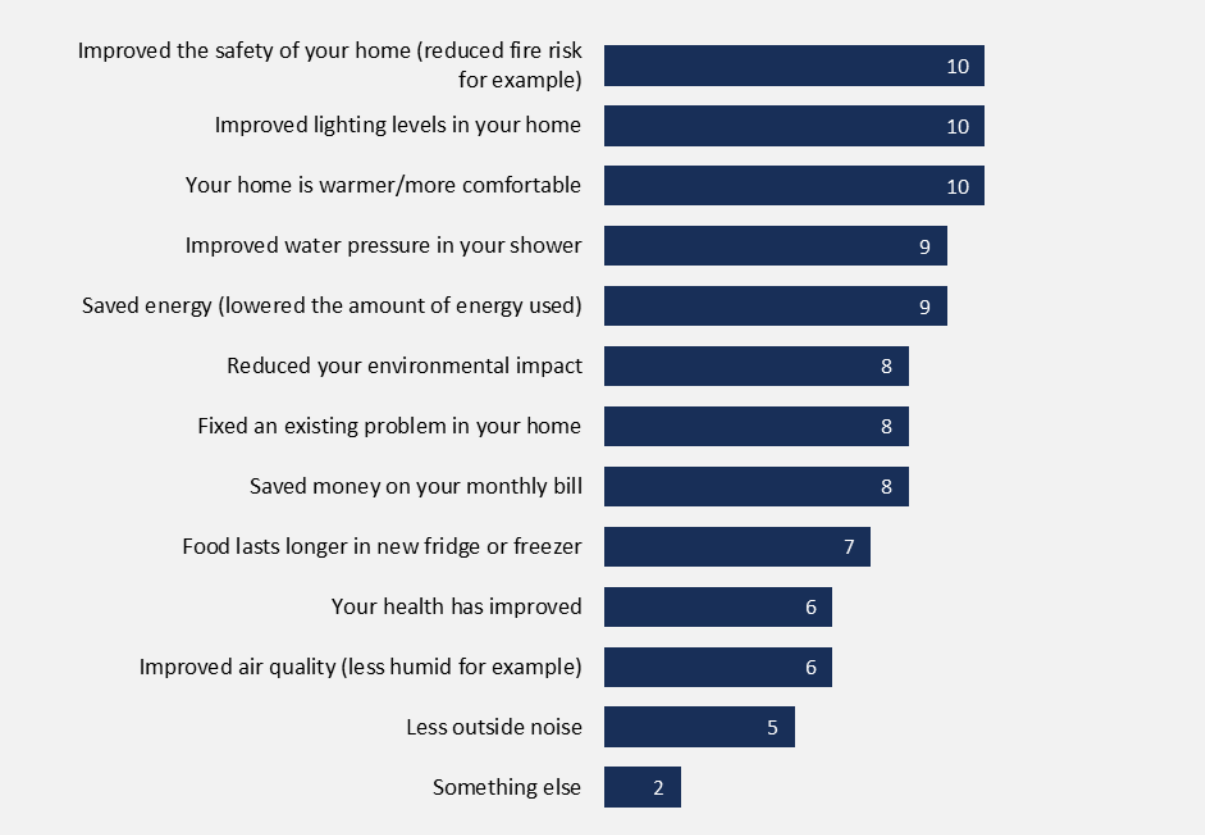
### Program Benefits

In addition to being asked about overall energy savings, participants (n=17) were asked which specific benefits they experienced from the upgrades made through the RFNEEP. The top three reported benefits were feeling safer at home due to reduced fire risk (count=10), having better lighting (count=10), and enjoying a warmer and more comfortable home (count=10). These highlight how the program addresses not only efficiency, but also fundamental aspects of daily living. Several participants also reported enjoying better shower water pressure (count=9) and using less energy (count=9).

Other participants mentioned reducing their environmental impact, fixing issues in their homes, or lowering their monthly bills (count=8). These benefits suggest that the program meets both practical household needs and ongoing financial pressures.

Some participants also mentioned positive effects on their health and improved home air quality such as reduced humidity levels (count=6). Figure 6 shows a breakdown of participants' responses.

**Figure 6. Benefits Experienced from Program Participation**




Source: Cadmus Survey Question C1. "Other than energy savings, we would like to know if you experienced the following benefits from the energy efficiency upgrades you implemented through the program." (n=17)
Note: Numbers in the figure exceed the total sample because participants were allowed to select multiple responses.

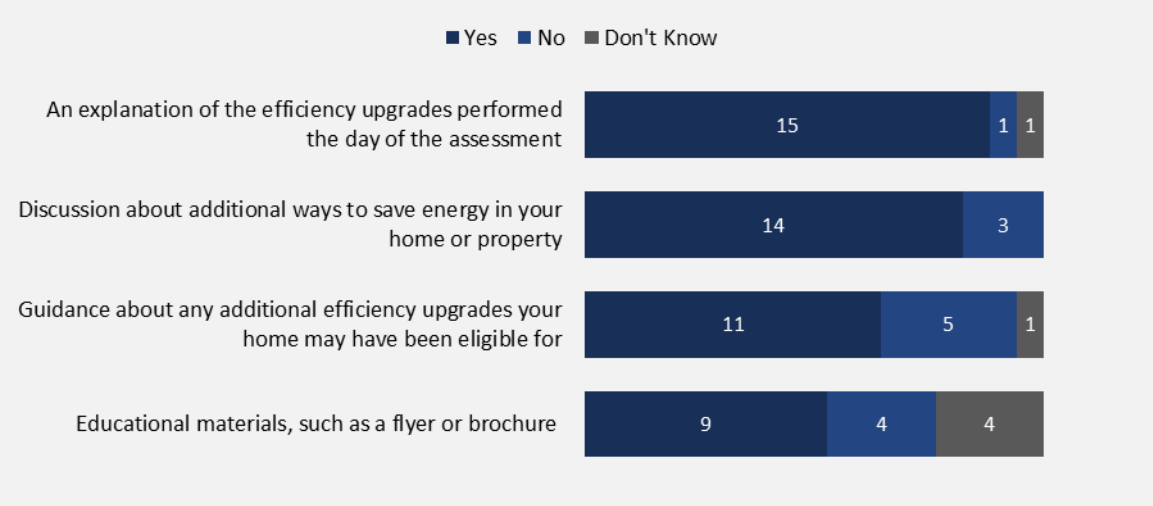
When participants (n=17) were asked to identify the most important benefit from RFNEEP participation, the top response was saving money on their monthly bill (n=3). This was followed by improved home safety (count=2), better lighting (count=2), improved air quality (count=2), a warmer home (count=2) and saving energy (count=2). Improved health, reduced environmental impact and improved shower water pressure were selected by one respondent each, as presented in Figure E-1.[11]

[11] Additional detailed process finding figures are provided in *Appendix E*.

## Educational Information and Materials

Program participants (n=17) were asked about the information and educational materials they received during their home energy assessment (energy audit). As shown in Figure 7, most participants shared that they were given explanations about the efficiency upgrades installed in their home (count=15) and that they discussed other ways to save energy at home with the Energy Advisor (count=14). Many participants also reported obtaining advice on additional upgrades for which their home might be eligible. Finally, more than half of survey respondents remembered receiving printed educational materials such as flyers or brochures (count=9).

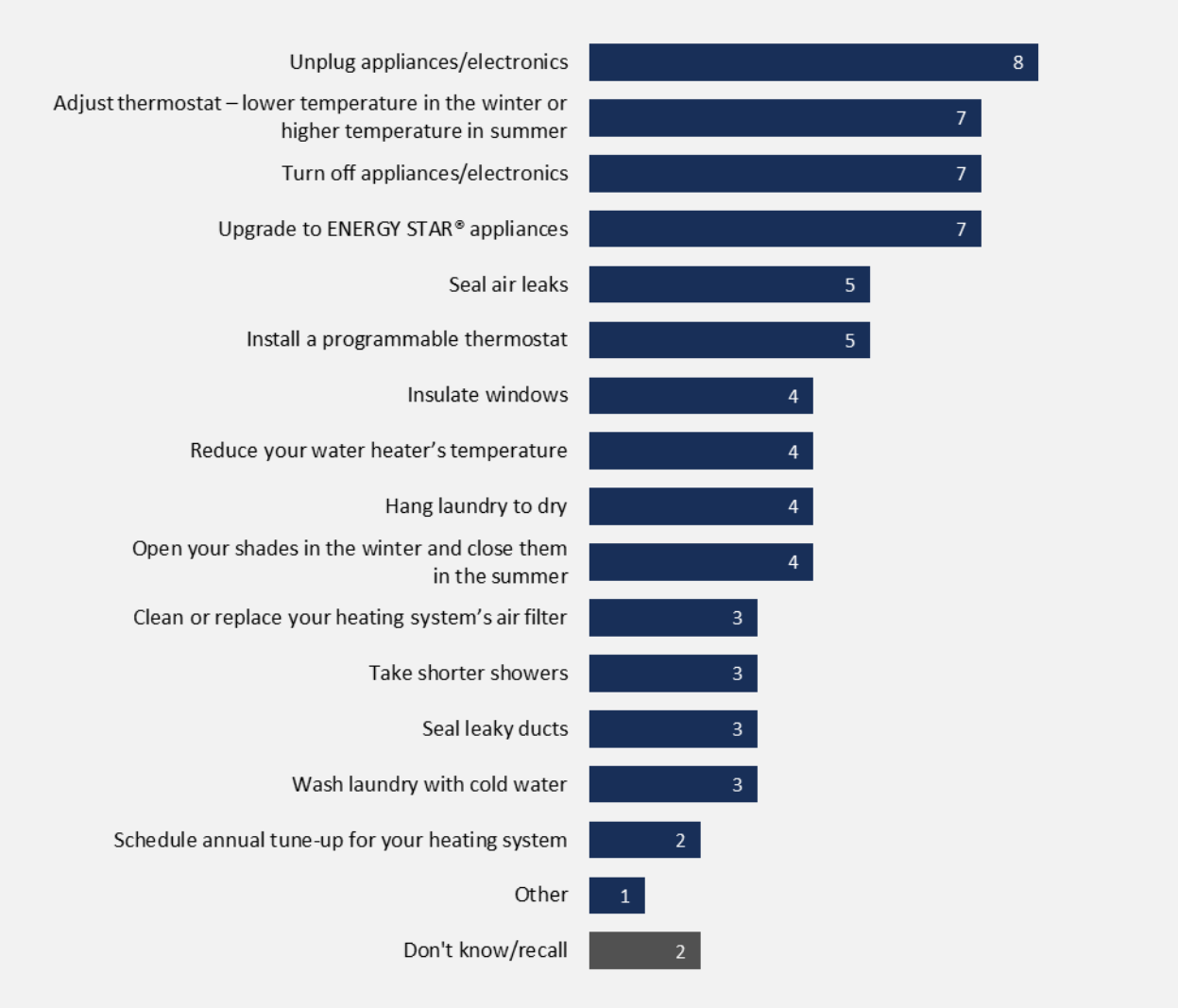
**Figure 7. Information and Educational Materials Received**




Source: Cadmus Survey Question E4. "At the time of the home energy assessment, did the staff person who performed the home energy assessment provide you with ...?" (n=17)

Program participants (n=14) who reported having discussed additional ways to save energy with their Energy Advisor during the home assessment were also asked about the energy-saving tips shared with them. Figure 8 shows that the most commonly mentioned tip was to unplug appliances/electronics when they are not being used (count=8). Many participants also recalled being encouraged to adjust their thermostats according to the season, turn off appliances and electronics and upgrade to ENERGY STAR appliances (count=7). Other less commonly shared tips included cleaning or replacing heating system air filters, taking shorter showers, sealing leaky ducts, and washing laundry with cold water (count=3). Few participants noted they were advised to schedule an annual tune-up for their heating system to keep it running efficiently (count=2).

**Figure 8. Shared Energy-Saving Tips**




Source: Cadmus Survey Question E5. "At the time of the home energy assessment, did the staff person who performed the home energy assessment give you any of these energy-saving tips?" (n=14)
Note: Numbers in the figure exceed the total sample because participants were allowed to select multiple responses.

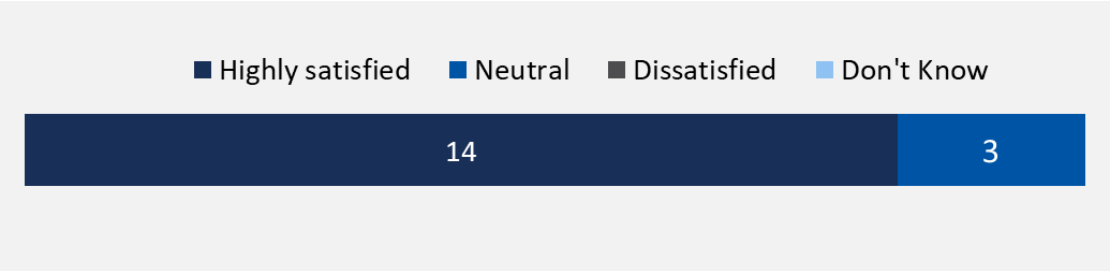
Out of the 16 participants who received information or educational materials during their home energy assessment, 15 said they found them helpful, with four describing them as *extremely helpful*, as outlined in Figure E-2[12] Only one participant said the materials were *not very helpful*. This overwhelmingly positive feedback suggests that the educational component of the program is well received and adds value to the overall program experience for most participants.

[12] Detailed process finding figures are provided in *Appendix E*.

## Program Satisfaction

Among participants (n=17), most reported being *highly satisfied* with the program (count=14). Few were *neutral* (count=3), and no one reported being *dissatisfied*. This distribution (shown in Figure 9) suggests a strong consensus regarding overall program satisfaction.

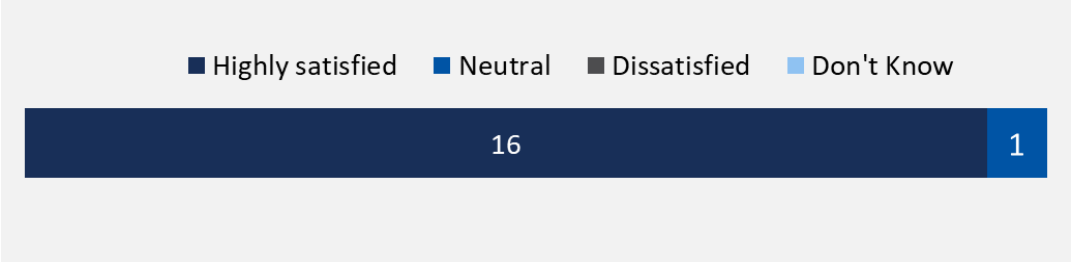
**Figure 9. Satisfaction with the Program**




Source: Cadmus Survey Question E1. "How would you rate your overall satisfaction with the Remote First Nation Energy Efficiency Program? Use a scale of 1 to 10, where 1 is extremely dissatisfied and 10 is extremely satisfied. 'Highly satisfied' represents scores of 8-10 on the scale. 'Neutral' represents scores of 5-7. 'Dissatisfied' represents scores of 1-4." (n=17)

Satisfaction levels were slightly higher with the registration process. Most participants described the process as easy and expressed high satisfaction (count=16), as outlined in Figure 10, while one was neutral about the ease of registering.

**Figure 10. Program Registration Ease – Level of Agreement**

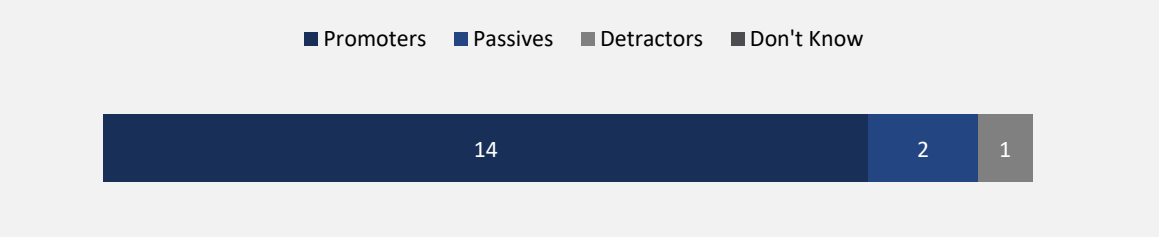



Source: Cadmus Survey Question E3. "Considering your experience, how would you rate your satisfaction regarding the ease of registering in the Remote First Nation Energy Efficiency Program? Use a scale of 1 to 10, where 1 is extremely dissatisfied and 10 is extremely satisfied. 'Highly satisfied' represents scores of 8-10 on the scale. 'Neutral' represents scores of 5-7. 'Dissatisfied' represents scores of 1-4." (n=17)

Participants (n=17) were asked to assess how likely they were to recommend the RFNEEP to others, using a scale from 0 to 10. Those providing a score of 9 or 10 are considered promoters (highly satisfied participants who are likely to speak positively about the program within their networks). Scores of 7 or 8 are classified as passives (generally satisfied but less likely to actively recommend the program). Scores between 0 and 6 identify detractors.

As shown in Figure 11, most participants viewed the program very positively, with 14 participants identified as promoters, reflecting both a high level of satisfaction and strong positive engagement with the program. Only one participant fell into the detractor category. This distribution suggests that the program benefits from largely favourable word of mouth within the target communities.

**Figure 11. Level of Recommendation**




Source: Cadmus Survey Question E2. "Considering your experience, how likely would you be to recommend the Remote First Nation Energy Efficiency Program? Use a scale of 0 to 10 where 0 means not at all likely and 10 means extremely likely." (n=17)

Among surveyed program participants (n=17), most did not have suggestions for changes or improvements (count=15), while one participant each mentioned *more smart power bars* and *more LED bulbs* as presented in Figure E-1. Less than half of participants expressed interest in further energy efficiency upgrades (count=7), as presented in *Appendix E*. Among those, several mentioned bathroom fans (count=3), some expressed interest in improvements to their heating or furnace system (count=2), and others mentioned window and freezer upgrades (count=1), as presented in *Appendix E*. These results indicate clear interest in expanding the range of program measures offered to address more participant needs.

## Other Energy Efficiency Benefits

This section provides a summary of the non-energy and GHG benefits attributed to the RFNEEP for PY2024.

### Non-Energy Benefits

This section provides the evaluation results of NEBs. Details regarding the NEB evaluation methodology can be found in the *Methodology* section of this report.

The IESO's cost effectiveness tool also calculates NEBs based on measure mix and quantity to quantify the following NEBs: reduced financial stress, improved thermal comfort, improved lighting levels and improved indoor and outdoor air quality. Through this, the RFNEEP program contributed $298,343 in NEBs in PY2024.

In an exploratory analysis, the Cadmus team analyzed participant survey responses using methodology from the *Non-Energy Benefits Study: Phase II*[13] report to quantify four NEBs for First Nations programs, as presented in Table 12 below.

[13] Dunsky Energy Consulting, Non-Energy Benefits Study: Phase II – Quantified Benefits and Qualitative Insights, July 2021.

**Table 12. NEBs Quantified in the 2021 Non-Energy Benefits Report**

| NEB Quantified in the 2021 Non-Energy Benefits Study | Applicable Measures | Assigned Value ($/kWh) |
|---|---|---|
| Reduced financial stress | All | 0.090 |
| Thermal comfort | HVAC, Envelope | 0.092 |
| Improved indoor air quality | HVAC, Envelope | 0.06 |
| Improved lighting levels | Lighting | 0.08 |

Certain measures allow participants to experience more than one NEB, so RFNEEP measures were assigned to the measure categories presented in Table 13. These measure categories were then given a $/kWh value.

**Table 13. RFNEEP Measure Categories and Assigned NEB Value**

| RFNEEP NEB Measure Categories | Assigned Value ($/kWh) |
|---|---|
| HVAC/envelope | 0.242 |
| Lighting | 0.17 |
| Other | 0.09 |

As presented in Table 14 below, RFNEEP participant survey responses were analysed to confirm whether the quantified NEBs were in fact experienced by participants and to identify other potential benefits participants had experienced that had not yet been quantified.

A total of 59% (count=10) of survey respondents (n=17) mentioned thermal comfort and improved lighting levels as the NEBs they experienced, while 47% of respondents (count=8) mentioned reduced financial stress and 35% (count=6) mentioned improved indoor air quality. Of the 13 options in the participant survey, these four quantified NEBs were ranked first, second, sixth, and tenth in terms of the number of responses.

Other than the ones already quantified, eight or more of the 17 survey respondents stated having experienced the following NEBs:

- Improved home safety (count=10)
- Improved shower water pressure (count=9)
- Resolution of an existing problem in the home (count=8)
- Reduced environmental impact (count=8)
- Increased food longevity in appliances (count=8)

**Table 14. Confirmation of Experienced NEBs by RFNEEP Participant Survey Respondents**

| NEBs Presented in Participant Survey | Participants Responded "Yes" | Percentage of Participants | NEB Quantified in the 2021 Non-Energy Benefits Study |
|---|---|---|---|
| Your home is warmer/more comfortable | 10 | 59% | Yes |
| Improved lighting levels in your home | 10 | 59% | Yes |
| Improved the safety of your home (reduced fire risk for example) | 10 | 59% | No |
| Improved water pressure in your shower | 9 | 53% | No |
| Fixed an existing problem in your home | 8 | 47% | No |
| Reduced your environmental impact | 8 | 47% | No |
| Food lasts longer in new fridge or freezer | 8 | 47% | No |
| Improved air quality (less humid for example) | 6 | 35% | Yes |
| Your health has improved | 6 | 35% | No |
| Less outside noise | 5 | 29% | No |
| Other | 2 | 12% | N/A |

## Job Impacts

This section provides job impact analysis results, calculated using the StatCan IO that analyses the propagation of exogenous economic shocks throughout an economy. Details regarding the job impact analysis methodology are provided above in the *Methodology* section.

### Input Values

Generally, the model is used to estimate the impacts of two economic shocks—one representing demand for energy-efficient products and services from a given activity and the other from increased household expenditures due to bill savings (and net of program funding). In the case of the RFNEEP, the second shock of increased household expenditure was considered negligible because the participants in the program were remote and not all were paying for their energy expenditures themselves. Table 15 presents the input values for the demand shock representing the products and services offered through the RFNEEP. Each measure installed as part of the RFNEEP was categorized according to the StatCan Input-Output (IO) Supply and Use Product Classification (SUPC).

**Table 15. Summary of Input Values for Demand Shocks**

| Category Description | Total Demand Shock (Thousand $) |
|---|---|
| Electric Lightbulbs and tubes | 47 |
| Other miscellaneous manufactured products | 309 |
| Small electric appliances | 209 |
| Other professional, scientific, and technical services | 312 |
| Major Appliances | 117 |
| Labour, admin and program administration costs | 1,233 |
| **Total** | **2,227** |

## Model Results

Impacts from the StatCan I-O model are generated separately for each shock and added together to calculate overall program job impacts. In the case of RFNEEP, direct, indirect and induced job impacts are calculated. Full time equivalent (FTE) and total jobs are calculated separately. FTE jobs only include those created for employed individuals, whereas total jobs include employees and independently employed individuals. Table 16 shows the total estimated job impacts by type. As a direct result of the program, 2.6 jobs were created, all based in Ontario. When considering jobs indirectly created or induced by the program, another 11.3 jobs were created in Ontario, and another 1.2 jobs were created elsewhere in Canada.

**Table 16. Job Impact from Demand Shock**

| Job Impact Type | FTE - Ontario (in person years) | FTE - Canada Wide (in person years) | Total Jobs - Ontario (in person years) | Total Jobs - Canada Wide (in person years) | Total Jobs per $1M investment |
|---|---|---|---|---|---|
| Direct | 2.5 | 2.5 | 2.6 | 2.6 | 1.2 |
| Indirect | 6.5 | 7.1 | 8.7 | 9.5 | 4.2 |
| Induced | 1.9 | 2.3 | 2.5 | 3.1 | 1.4 |
| **Total** | **11.0** | **12.0** | **13.9** | **15.1** | **6.8** |

Calculating relative program performance as a function of jobs created per $1 million of program budget is helpful in comparing different program years. RFNEEP was estimated to create 6.8 total jobs per $1 million of investment in 2024. In comparison, RFNEEP was estimated to create 7.4 total jobs per $1 million of investment in 2022.

## Greenhouse Gas Reductions

RFNEEP saved 171.99 tonnes of greenhouse gas emissions in the first year and will displace 1,903.97 tonnes over the measures' lifetime.

# Key Findings and Recommendations

The following section details the Cadmus team's high, medium, and low impact key findings and recommendations for PY2024. High impact findings and recommendations focus on key performance metrics that need action that will have an immediate impact on program performance. Medium impacts also focus on key performance metrics, but in places where improvements may be less imperative. Low impact findings do not include any recommendations and are more informative for the team. The IESO responses to the recommendations are found in *Appendix B*.

***(High Impact) Key Finding #1:*** While the RFNEEP achieved 109% of reported annual energy savings, demonstrating overall good program performance, the Cadmus team found discrepancies among individual measures that may indicate larger concerns and areas of improvement.

Overall realization rates achieved for the program were 109% for energy savings and 122% for demand savings. The Cadmus team made no changes to the energy savings of 28% of the sampled measures, indicating verified savings matching reported values for almost a third of projects. Among measures with discrepancies (72% of measures), the Cadmus team found measure-level realization rates for energy savings that varied between 73% for LED A-Shape bulbs <17W and 289% for hot water pipe insulation. As discussed in more detail in the next finding, water conservation measures were consistently adjusted upward, which notably contributed to higher than 100% realization rates.

For some measures, such as lighting and refrigerators, this was due to the Cadmus team updating energy savings calculations to use the actual wattages of installed equipment, as opposed to the assumed value used in IESO MAL assumptions. Discrepancies in the realization rates also resulted from errors in recording the quantity of measures installed.

**Recommendation #1:** Consider refining the associated assumptions of installed measures by integrating field verified data—such as equipment size and baseline efficiency—into the tracking system to help identify possible recurring issues like miscategorized equipment. These data fields can also support validation checks by flagging values outside the IESO MAL assumptions for further investigation.

### *(High Impact) Key Finding #2:* Realization rates for water conservation measures were higher than those for other measures due to more people living in households than initially assumed.

For hot water conservation measures such as low-flow showerheads and faucet aerators, energy savings are calculated using an estimated daily use value. This value is based in part on the average number of people living in a household, which is assumed in the IESO prescriptive savings calculations. As part of the project reviews, the team found that more people lived in participant households than the assumed average value. Adjusting this calculation to use the actual number of people living in the given household yielded an energy realization rate of 139% for hot water conservation measures.

**Recommendation #2:** To better reflect participant demographics for the RFNEEP, consider adjusting the average number of people in a household in the hot water conservation energy and demand savings calculations based the average number found in the PY2024 RFNEEP project reviews.

### *(High Impact) Key Finding #3:* The Community Coordinators play a central role in program operations. As trusted local representatives, Community Coordinators enhance program credibility within their communities and can play a decisive role in encouraging community members to enroll.

In interviews with program staff, Community Coordinators were identified as playing a key role in program facilitation. In particular, Community Coordinators help build trust among other community members, which is a key barrier to First Nation program participation. Further, the survey results indicate that, out of 18 respondents total, Facebook (count=6) and Community Coordinators (count=6) are the two most common ways program participants heard about the RFNEEP, highlighting that Community Coordinators are key points of contact for raising awareness about the RFNEEP and important factors in recruiting new participants. Enrollment is also driven by personal contact: notably, most participants said they signed up after an Energy Advisor came directly to their home (count=6), while five participants said they joined the program through a Community Coordinator, demonstrating the continued importance of personal contact and community relationships. However, program staff also noted that in some cases, Community Coordinators may become overwhelmed with all of their duties and struggle to keep up. This occasionally leads to implementation challenges and delays, as delivery agent staff are not as trusted within communities.

**Recommendation #3:** Continue building the skills of Community Coordinators by keeping open and regular communications, and by providing spaces for exchange, such as peer learning sessions and themed webinars, where Community Coordinators can share experiences, best practices, and solutions to challenges they have faced.

***(Medium Impact) Key Finding #4:*** Participants are not only realizing the benefits they initially sought from the program but also gaining unexpected advantages such as improved fire safety and other non-energy benefits that enhance overall value.

Participants (n=17) shared several motivations for participating in the program. For twelve survey respondents, the main driver was making their home more energy efficient. Others were motivated by a desire to improve home comfort or reduce their monthly bills, each mentioned by 10 participants. These initial motivations were also among the non-energy benefits (NEBs) survey respondents reported after participation. For example, among the 10 participants who wanted to improve home comfort, eight said their home feels more comfortable now. Similarly, of those who wanted to reduce their energy bills, six out of 10 confirmed they have seen that result. These responses demonstrate that the program meets participant expectations and provides concrete, tangible improvements that participants feel in their daily lives.

These results indicate that the program provides many benefits. Beyond measurable outcomes like energy savings, it also helps improve comfort, safety, health, and overall quality of life, improvements that hold real value to the target communities.

Participants (n=17) also described other valuable NEBs they experienced through the program. The top three reported benefits were feeling safer at home due to reduced fire risk (count=10), having better lighting (count=10), and enjoying a warmer and more comfortable home (count=10). These highlight how the program addresses not only efficiency, but also fundamental aspects of daily living. For some, it also helped resolve existing issues in their homes (count=8). Others reported improved water pressure (count=9) and positive effects on their health (count=6). Of the frequently reported NEBs, only four could be quantified in the PY2024 evaluation based on the *Non-Energy Benefits Study: Phase II* report.[14]

**Recommendation #4a:** Focus on showcasing program NEBs such as improved comfort, better health, and enhanced overall quality of life across all communication channels. Sharing authentic participant stories and testimonials can vividly illustrate these benefits, revealing the tangible changes people experience.

**Recommendation #4b:** Consider quantifying the NEBs most frequently reported by participants in the participant survey and that were not previously quantified in the *Non-Energy Benefits Study: Phase II* report.[14] Of these NEBs, improved home safety, increased shower pressure, resolution of an existing problem in the home and increased food longevity in appliances were deemed valuable enough to participants to be quantified in a future evaluation.

[14] Dunsky Energy Consulting, Non-Energy Benefits Study: Phase II – Quantified Benefits and Qualitative Insights, July 2021.

### *(Medium Impact) Key Finding #5:* In PY2024, all energy saving measures were installed in residential homes, and there was no program participation under the non-residential facilities stream.

Energy savings came from 11,245 measures installed in 775 homes. To date, there has been low interest from non-residential facilities and as a result, non-residential facilities did not contribute to the gross savings in PY2024.

Both the delivery agent and the IESO noted that the program has been slower to reach non-residential facilities compared to homes. As the delivery agent found that residential homes had a higher response rate, they decided to focus on that demographic first. In the future, the delivery agent plans to build on the program success in residential homes and replicate the outreach towards non-residential facilities.

**Recommendation #5:** Build on the program success and lessons learned under the residential stream to conduct an outreach campaign targeting non-residential facilities in the eligible communities. While this may be a smaller demographics, it is currently underrepresented in both program participation and results.

### *(Medium Impact) Key Finding #6*: Participants are significantly satisfied with the registration process and educational materials provided.

Overall satisfaction with the program is high, with most participants reporting that they are very satisfied and willing to recommend the program to others in their community (n=14). The registration process is also seen as straightforward and easy to complete (n=16).

During the energy audits, participants received a variety of educational materials and information, which they considered useful (count=15). These included clear explanations of the efficiency upgrades installed in their homes, practical guidance on other ways to save energy and printed resources such as flyers or brochures.

Participants were also given specific energy-saving tips from an Energy Advisor. The most frequently mentioned tip was unplugging appliances and electronics when not in use (count=8), followed by advice on how to adjust thermostats according to the season (count=7), turn off unused electronics (count=7), and upgrade to ENERGY STAR appliances (count=7). Less commonly reported but still valuable recommendations included sealing air leaks, cleaning or replacing furnace filters, taking shorter showers, and washing laundry in cold water.

While most participants did not suggest changes to the program (n=15), almost half expressed interest in expanding the range of measures offered (n=7). Ideas ranged from adding more quantities for some products, such as smart power bars and LED bulbs, to providing support for home repairs and offering additional energy efficiency upgrades, including heating systems, bathroom fans, windows, and freezers.

**Recommendation #6:** Continue to ensure that educational materials are provided to each participant by providing personalized explanations and practical advice as well as updated printed materials

during energy audits (such as providing a list of tips that can be posted to the fridge or easily kept and referenced by participants).

***(Medium Impact) Key Finding #7:*** Compared to the previous evaluation, program participation, energy and peak demand savings, and realization rates increased***.***

The last time the RFNEEP was evaluated was in PY2022, which was the pilot year for the program. In 2022, participants installed 1,104 measures, generating 93,942 kWh of energy savings and 6.41 kW of peak demand savings. In PY2024, 11,245 measures were installed generating 928,161 kWh of energy savings and 76.14 kW of peak demand savings. Realization rates in PY2022 were 99% for energy and 60% for peak demand, compared to 109% and 122% in PY2024.

***(Medium Impact)*** **Key Finding #8:** Though RFNEEP did not pass the Program Administrator Cost test, it continues to successfully contribute to GHG emissions reductions.

For PY2024, RFNEEP achieved a PAC ratio of 0.11. PAC costs amounted to $3,243,954, while benefits totaled $368,176.23. Concurrently, RFNEEP achieved a reduction in GHG emissions by 1,903.97 tonnes for the lifetime of its measures. In terms of LUEC, RFNEEP costs were $5,028.63 per kW and $0.41 per kWh.

***(Medium Impact) Key Finding #9:*** Some measures generated a small portion of program savings while showcasing a low cost-to-saving ratio since they represented a large portion of the program incentives. However, these measures provide additional NEBs to participants.

Compared to other measures such as lighting, which represents 23% of program savings and only 7% of incentive costs, refrigerators and attic insulation offer much less energy savings per incentive dollar spent. However, new appliances and attic insulation offer participants additional NEBs, as outlined in the participant survey results. 59% of interviewed participants reported that their home is more comfortable, and 47% of interviewed participants reported that food lasts longer due to the upgrades provided as part of the RFNEEP. These benefits can reliably be attributed to attic insulation and refrigeration measures.

# Appendix A. Energy and Peak Demand Savings

Table A-1 below presented the energy savings generated through the RFNEEP for the current Conservation and Demand Management (CDM) Framework (2021-2024). Prior to 2022, the program was at the pilot stage. All previous evaluation reports are available on the IESO website.[15]

**Table A-1. 2022-2024 CDM Framework RFNEEP Historical Savings**

| Evaluated Year | Verified Year | Net Energy Savings (kWh) | Net Peak Demand Savings (kW) |
|---|---|---|---|
| PY2022 | PY2022 | 93,900 | 6 |
| PY2022 | PY2021 | 0 | 0 |
| **PY 2022 Total [a]** | | **93,900** | **6** |
| PY2023 | PY2023 | 0 | 0 |
| PY2023 | PY2022 | 0 | 0 |
| PY2023 | PY2021 | 0 | 0 |
| **PY 2023 Total** | | **0** | **0** |
| PY2024 | PY2024 | 789,035.62 | 64.30 |
| PY2024 | PY2023 | 136,745.95 | 11.59 |
| PY2024 | PY2022 | 2,380.15 | 0.25 |
| PY2024 | PY2021 | 0 | 0 |
| **PY 2024 Total** | | **928,161.72** | **76.14** |
| **TOTAL** | | **1,022,062** | **82.14** |

[a] Results presented for PY2021 and PY2022 correspond to the Pilot Program.

[15] *https://www.ieso.ca/Sector-Participants/Energy-Efficiency/Evaluation-Measurement-and-Verification*, accessed July 31, 2025.

# Appendix B. PY2024 EM&V Key Findings and Recommendations with Responses from the IESO

Table B-1 shows the key findings and recommendations for PY2024 and captures the IESO's response to the recommendations.

**Table B-1. PY2024 Key Findings and Recommendations Status**

| No. | KEY FINDING | 2024 EM&V RECOMMENDATION | IMPACT | IESO RESPONSE |
|---|---|---|---|---|
| 1. | While the RFNEEP achieved 109% of reported annual energy savings, the Cadmus team found discrepancies among individual measures that may indicate larger concerns and areas of improvement. | Consider refining the associated assumptions of installed measures by integrating field verified data—such as equipment size and baseline efficiency—into the tracking system to help identify possible recurring issues like miscategorized equipment. These data fields can also support validation checks by flagging values outside the IESO MAL assumptions for further investigation. | High | The IESO will work more closely with the Service Providers to ensure proper quality assurance (QA) is done so that equipment quantity is accurately tracked. |
| 2. | Realization rates for water conservation measures were higher than those for other measures due to more people living in households than initially assumed. | To better reflect participant demographics for the RFNEEP, consider adjusting the average number of people in a household in the hot water conservation energy and demand savings calculations based the average number found in the PY2024 RFNEEP project reviews. If desired, this process could be repeated each year (or every other year), depending on the IESO's discretion. | High | The IESO updated the PY2025 measures savings to be more in line with the EAP measure savings update in the beginning of the calendar year 2025. For the next calendar year, the IESO will update the savings to be based on the average number of people in a home. |
| 3. | The Community Coordinators play a central role in program operations. As trusted local representatives, Community Coordinators enhance program credibility within their communities and can play a decisive role in encouraging community members to enroll. | Continue building the skills of Community Coordinators by keeping open and regular communications, and by providing spaces for exchange, such as peer learning sessions and themed webinars, where Community Coordinators can share experiences, best practices, and solutions to challenges they have faced. | High | The IESO will ensure Community Coordinators are aware of opportunities available to them through our DSM capacity building programs and the IESO's Indigenous Relations team. |
| 4. | Participants are not only realizing the benefits they initially sought from the program but also gaining unexpected advantages such as improved fire safety and other non-energy benefits that enhance overall value. | Focus on showcasing program NEBs such as improved comfort, better health, and enhanced overall quality of life across all communication channels. Sharing authentic participant stories and testimonials can vividly illustrate these benefits, revealing the tangible changes people experience. | Medium | The IESO will continue to build its marketing and leave behind materials to showcase testimonials of participants demonstrating the benefits of participating in the program. These materials will also increase representation of Indigenous peoples. |

| No. | KEY FINDING | 2024 EM&V RECOMMENDATION | IMPACT | IESO RESPONSE |
|---|---|---|---|---|
| | | Consider quantifying the NEBs most frequently reported by participants in the participant survey and that were not previously quantified in the *Non-Energy Benefits Study: Phase II* report. Of these NEBs, improved home safety, increased shower pressure, resolution of an existing problem in the home and increased food longevity in appliances were deemed valuable enough to participants to be quantified in a future evaluation. | | The IESO will seek to understand how additional NEBs can be quantified for the program. |
| 5. | In PY2024, all energy saving measures were installed in residential homes, and there was no program participation under the non-residential facilities stream. | Build on the program success and lessons learned under the residential stream to conduct an outreach campaign targeting non-residential facilities in the eligible communities. While this may be a smaller demographics, it is currently underrepresented in both program participation and results. | Medium | The IESO will review how best to service the non-residential buildings in these communities and will implement any changes required. |
| 6. | Participants are significantly satisfied with the registration process and educational materials provided. | Continue to ensure that educational materials are provided to each participant by providing personalized explanations and practical advice as well as updated printed materials during energy audits (such as providing a list of tips that can be posted to the fridge or easily kept and referenced by participants). | Medium | The IESO will work with the Service Provider to ensure educational materials are shared with the participant and band council. |

# Appendix C. Detailed Program Eligibility Requirements

Per RFNEEP program requirements, several elements may qualify Ontario First Nations people and their homes for the program.

## Residential Participant Eligibility

To be an eligible person under the RFNEEP, a resident must meet the criteria under either a or b below:

a. To be an Eligible Participant under the Residential Stream of RFNEEP, an individual must:
    i. Be an on-reserve First Nation individual who owns an Eligible Residence; or
    ii. Be an on-reserve First Nation individual who rents or leases an Eligible Residence and has the Building Owner's/Manager's consent to replace the Building Owner/Manager-owned equipment and receive Weatherization Measures.
b. For a Building Owner/Manager to be an Eligible Participant under the Residential Stream:
    i. The Building Owner/Manager must be the Building Owner/Manager of Band-Owned Housing;
    ii. The Building Owner/Manager must be responsible for payment of the electrical utility bill.
    iii. The Building Owner/Manager must agree not to increase the rent in any rental units within the Eligible Residence as a result of receiving Eligible Measures in accordance with the requirements of the Participation Agreement.

## Residence Eligibility

In addition to eligibility requirements for individuals, the given residence must also meet the following criteria:

a. Be the Eligible Participant's primary residence or be Band-Owned Housing;
b. Be located within the legal boundaries of a reserve of a First Nation that is participating in the RFNEEP as an Eligible Community.
c. Be used for residential occupancy;
d. Be a permanent building.

## Non-Residential Participant Eligibility

To be an eligible participant under the RFNEEP Non-Residential Stream, an individual must:

a. Be an on-reserve First Nation individual or an on-reserve First Nation-owned business;
b. Own, rent, or lease the Eligible Facility and be the primary or secondary account holder if the building is individually metered;
c. Not be a residential distribution customer for the Eligible Facility;
d. Have all required consents, rights, and authority to have the Eligible Measure(s) installed;
e. Agree to all the terms and conditions in the Participant Agreement;
f. Sign the Participant Agreement.

# Appendix D. Methodology Details

Appendix D presents the detailed methodologies for the impact, cost-effectiveness, and process evaluations.

## Impact Evaluation

### Step 1. Review Tracking Database

The Cadmus team reviewed the program tracking database to verify the accuracy of reported energy savings, number of participants, measure descriptions, and incentive dates. This included reviewing the PY2024 RFNEEP database for missing data, unrealistic values, inconsistencies, and anomalies. The team communicated all discrepancies to the IESO for review and resolved all database issues before sampling the population.

### Step 2. Sample Projects

The Cadmus team selected a random sample of projects using probability proportional to size sampling from the RFNEEP database and designing the sample to achieve ±10% precision at a two-tailed 90% confidence level. The team selected the sampled projects and requested the related project documentation from the IESO and its delivery vendors. Most participants implemented multiple measures as part of a single project, in which cases the delivery vendor provided the documentation for all measures implemented. The team evaluated and reviewed all measures with the rigour required to meet the confidence and precision sample targets at the program level, for a total of 48 projects. All sampled projects included a variety of measure types, including but not limited to LED Lighting, appliances, domestic hot water, and advanced power strips. The team sampled each measure type installed in PY2024.

### Step 3. Develop the EM&V Workbook

The Cadmus team reviewed the substantiation worksheets provided by the IESO for each RFNEEP measure. Initially, the team reviewed the overall savings calculation methodology and approach and compared the approach to similar measures in regionally relevant and updated technical reference manuals (TRMs), including the Illinois TRM (Version 11), the New York TRM (Version 10), the Mid-Atlantic TRM (Version 10), the Regional Technical Forum and Focus on Energy TRM (2023). When the approach was appropriate and followed best practices, the team then assessed the quality of calculation assumptions and inputs by reviewing the source documentation for each calculation assumption and input. If the calculation assumptions and inputs contained outdated information, the team provided updated values and the associated TRM source. Additionally, based on the data collected from the project documentation, the team made recommendations on calculation input and assumption updates.

### Step 4. Perform Desk Reviews and Analysis

The Cadmus team calculated gross verified energy and peak demand savings for each sampled project and measure using the data collected from the sampled project documentation. Hence, the team reviewed all project applications, pre-installation equipment photos, communication documents, home

energy audit reports, and equipment specification documents. The team also calculated savings for each measure for each sampled project based on the inputs, assumptions, and calculation methodologies outlined in the associated substantiation workbook. The team carried out the following tasks for each sampled project:

- Verified the installation and operation of incented equipment.
- Confirmed that installed equipment met program eligibility requirements.
- Verified that the number of installed measures and matched the value in the program documentation.
- Verified equipment specifications through manufacturer product cut sheets and the DesignLights Consortium Qualified Products Lists.[16]

### Step 5. Extrapolate Results

The Cadmus team aggregated the verified savings at the project level to determine a realization rate (verified savings divided by reported savings) for each sample project. To determine program gross verified energy and peak demand savings, the team applied the realization rate to the program population.

### Step 6. Calculate Net Savings

The Cadmus team estimated net savings, that is the savings directly attributable to the program, by multiplying gross verified energy savings by a NTG ratio. The team applied a NTG of 1.0 to program participants, in accordance with the IESO's EM&V protocols for NTG ratios for First Nations programs.

## Cost-Effectiveness Analysis

Table D-1 and this section present the results of the Program Administrator Cost (PAC) and levelized unit energy cost (LUEC) tests. These tests are calculated in accordance with the guidelines established in the IESO Cost-Effectiveness Guide for Energy Efficiency.

[16] DesignLights Consortium. Accessed July 2024. "Search the DLC Qualified Products Lists." DLC Qualified Products Lists - DesignLights.

**Table D-1. Components of the PAC and LUEC Tests**

| Components | PAC | LUEC |
|---|---|---|
| Avoided Electricity Supply-Side Resource Costs (ASCs) | Benefit | |
| Other Supply-Side Resource Benefits (ORBs) | | |
| Net Participant Costs (NPCs) | | |
| Incentive Costs (ICs) | Cost | Cost |
| Program Costs (PRCs) | Cost | Cost |
| Non-Energy Benefits/Externalities (NEBs) | | |
| Tax credits (TCs) | | |
| Energy and Peak Demand Savings (net present value [NPV] of annualized savings) | | Benefit |

The PAC formula is as follows:

$$PAC\frac{B}{C} = \frac{[ASC] * NTG}{[PRC + (IC * NTG)]}$$

Where NTG means net-to-gross.

PAC costs are defined as the following:

- Total expenses incurred by a program administrator to design and deliver CDM.
- The cost of providing incentives provided to participants to foster program participation.

PAC benefits are defined as the following:

- The electricity system-related costs that are no longer required because of the savings achieved by CDM, including:
  - Generation costs
  - T&D costs
  - Fuel costs
  - Operation and maintenance costs

The LUEC formula is as follows:

$$LUEC\frac{C}{B} = \frac{[(IC * NTG) + PRC]}{[NPVI]}$$

LUEC costs are defined as the following:

- Total expenses incurred by a program administrator to design and deliver CDM.
- The cost of providing incentives provided to participants to foster program participation.

LUEC benefits are defined as the following:

- Energy savings (kWh) over the lifetime of a CDM resource.
- Peak demand reduction (kW) over the lifetime of a CDM resource.

## Process Evaluation

Table D-2 presents the research objectives for the process evaluation commissioned by the IESO and the research questions designed to help develop key findings and recommendations based on RFNEEP evaluation results.

**Table D-2. Research Objective and Question Mapping**

| Evaluation Research Objective |
|---|
| **Assess the connection between the effort and effectiveness of delivery channels, marketing strategies, and tactics and the resulting impacts on program awareness and participation.** |
| **Corresponding Key Research Questions:**<br>• What are the program strengths, barriers, and improvement areas?<br>• How did participants hear about the program? What feedback do they have about the content they received (what was helpful and what was not)? What are the primary program benefits? |
| **Evaluation Research Objective** |
| **Assess motivations for behaviour (action/inaction).** |
| **Corresponding Key Research Question:**<br>• What were the initial expectations of participants? What was their primary driver to program participation? |
| **Evaluation Research Objective** |
| **Assess how successfully the program was administered and delivered to the market.** |
| **Corresponding Key Research Question:**<br>• What are the program strengths, barriers, and improvement areas?<br>• Are participants satisfied with the program? Do they find the registration process easy, and would they be willing to recommend the program.<br>• What information and materials do participants receive during the home energy assessment? Do they also receive energy-saving tips and, if so, do they find them useful? |
| **Evaluation Research Objective** |
| **Assess customer needs related to the implementation of energy efficiency projects and the extent to which the program addressed those needs.** |
| **Corresponding Key Research Question**<br>• What do participants think needs to be fixed in their home?<br>• Are there any ways to improve the program?<br>• Are participants interested in any energy-efficient equipment or upgrades and, if so, which ones? |

The Cadmus team conducted a participant survey as well as interviews with the IESO program team and delivery agent responsible for implementing the program. The evaluation methodology is detailed below for each task.

## Participant Survey

To analyse participant awareness, motivations, and benefits as well as whether program administration and market delivery were successful, the Cadmus team conducted a survey with program participants. Any residential participant who had measures installed, whose home energy use was audited, and who provided an email address or phone number was eligible for the participant survey. The results should be interpreted with caution given the small sample size and the limited representativeness of the different communities surveyed. The data collected primarily provide qualitative insights, helping to better understand certain perceptions, needs, and expectations, but results cannot be generalized and applied to all participating communities. It is also important to note that the survey process itself presented challenges. In particular, the period of data collection coincided with the wildfires, which made it more difficult for participants to complete the questionnaire. To address this, the team adopted a mixed-method approach, starting with an online questionnaire, then following up by telephone in order to optimize the response rate and get closer to the target number of respondents.

The Cadmus team fielded the PY2024 RFNEEP survey in June 2025. Ultimately, the Cadmus team had 17 completed surveys, as presented in Table D-3. Online Survey

**Table D-3. Online Survey**

| Activity | Audience | Target | Timing | Completed |
|---|---|---|---|---|
| RFNEEP Survey | Program participants | 70 | Between June 2 and July 8, 2025 | 17 |

## Program Materials Review

The Cadmus team reviewed materials related to the RFNEEP and provided by the IESO. These included the RFNEEP program requirements, the key findings and recommendation tracker, and the program database.

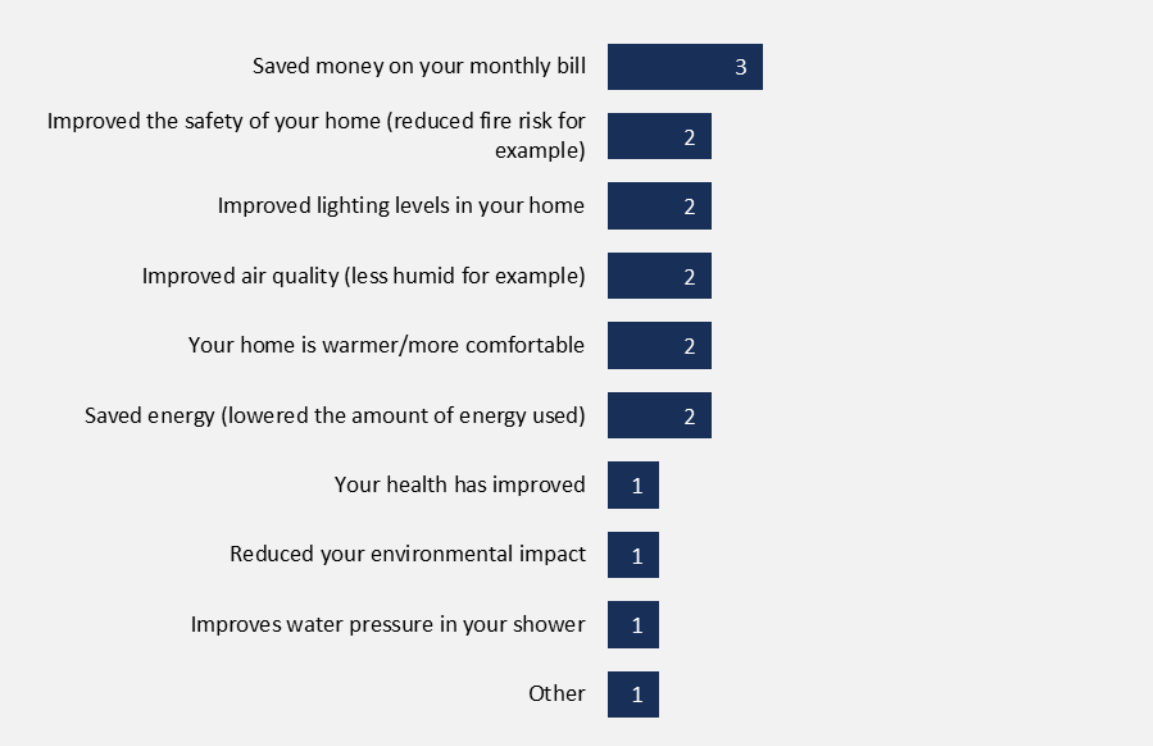
## In-Depth Stakeholder Interviews

In April 2025, the Cadmus team conducted in-depth stakeholder interviews with members of the RFNEEP program staff and the delivery vendor responsible for program implementation. The purpose was to document staff roles and responsibilities, program history and design, as well as program implementation, marketing, and outreach efforts. The team used the resulting findings to inform survey guide development and analysis.

# Appendix E. Process Figures

Figure E-1 below presents how many participants selected each response option for Cadmus Survey Question C2 (n=17), "Please rank the benefits you selected from the most important to least important. Please rank the benefits below, with the most important being #1, the next most important as #2, and the others following?"

**Figure E-1. Identifying the Most Important Benefit**




The team analysed only the benefit considered most important as participants had difficulty ranking the different benefits options in Cadmus Survey Question C1.

Figure E-2 below outlines how many participants selected each response option for Cadmus Survey Question E6. For participants who said "yes" to receiving educational information or materials shared (n=16) their response to, "How helpful was the education, information or material provided to you?"

**Figure E-2. Usefulness of Educational Resources**


Table E-1 below presents how many participants selected each response option for Cadmus Survey Question E8 (n=17), "What, if anything, could be done to improve the program?"

### Table E-1. Suggestions for Improvement

| Responses | Participants n=17 |
|---|---|
| More smart power bars | 1 |
| More LED bulbs | 1 |
| Help with roofs | 1 |
| Help all houses in the area | 1 |
| Nothing | 15 |

Note: Numbers in the table exceed the total sample because the participants could provide multiple suggestions for improvement.

Table E-2 presents the number of participants that selected each response option for Cadmus Survey Question D37 (n=17), "Were participants interested in any energy-efficient equipment or upgrades that were not installed through the program?"

### Table E-2. Interest in Additional Energy Efficiency Upgrades

| Answer Options | Participants n=13 |
|---|---|
| Yes | 7 |
| No | 7 |
| **Don't know** | 3 |

Table E-3 presents how many participants selected each response option for Cadmus Survey Question D37 (n=7), For participants who were interested in additional energy efficiency upgrades "What else should have been installed through this program?"

### Table E-3. Additional Energy Efficiency Upgrades

| Answer Options | Participants n=7 |
|---|---|
| Bathroom fans | 3 |
| Heating/furnaces | 2 |
| Windows | 1 |
| Freezers | 1 |

# Appendix F. PY2022 and PY2023 True-Up Results

Table F-1 summarizes the impact of the true-up results based on net verified first-year peak demand and energy savings.

**Table F-1. True-Up Results: Net Impact**

| | PY2021 | PY2022 | PY2022: PY2021 True-Ups | PY2023 | PY2023: PY2022 True-Ups | PY2023: PY2021 True-Ups | PY2024 | PY2024: PY2022 True-Ups | PY2024: PY2023 True-Ups | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| Energy Savings (GWh) | 0 | 0.09 | 0 | 0 | 0 | 0 | 0.79 | 0.002 | 0.14 | 1.02 |
| Peak Demand Savings (MW) | 0 | 0.006 | 0 | 0 | 0 | 0 | 0.06 | 0.0003 | 0.01 | 0.08 |

# Appendix G. PAC Measure Results Details

The following sections show PAC benefits, costs and ratios by each end use for PY2024. Certain measure results are grouped for clarity and presented in a range using this format: minimum-maximum value. NA denotes measures that had no participation or were not offered in the given year.

## Appliances

As shown in Table G-1, freezer and refrigerator appliance replacements did not pass PAC, with measure ratios ranging from 0.05 to 0.15.

**Table G-1. PAC Results for Appliances**

| Appliances | Year | PAC | | |
|---|---|---|---|---|
| | | Benefits per measure | Costs per measure | Ratio |
| Chest Freezers | 2022 | NA | NA | NA |
| | 2023 | NA | NA | NA |
| | 2024 | $51.38-$57.76 | $516.00-$1,166.99 | 0.05-0.08 |
| Refrigerators | 2022 | NA | NA | NA |
| | 2023 | NA | NA | NA |
| | 2024 | $81.94-$113.42 | $642.00-$1,377.00 | 0.07-0.15 |

## Water Heating

Measures installed in 2024 passed with ratios ranging from 1.12 to 6.05 (Table G-2). However, the hot water tank wrap and half-inch pipe wrap measures did not pass the PAC test, with ratios ranging from 0.20 to 0.7. Among all EAP measures, kitchen aerators achieved the highest PAC ratio of 6.05.

**Table G-2. PAC Results for Water Heating**

| Water Heating | Year | PAC | | |
|---|---|---|---|---|
| | | Benefits per measure | Costs per measure | Ratio |
| Bathroom Aerator | 2022 | $18.36 | $621.17 | 0.03 |
| | 2023 | $19.16 | $29.73 | 0.64 |
| | 2024 | $13.84 | $12.38 | 1.12 |
| Kitchen Aerator | 2022 | $49.54 | $471.87 | 0.10 |
| | 2023 | $53.51 | $33.24 | 1.61 |
| | 2024 | $70.66 | $11.68 | 6.05 |
| Handheld Showerhead | 2022 | NA | NA | NA |
| | 2023 | $78.19 | $51.20 | 1.53 |
| | 2024 | $57.28 | $17.80 | 3.22 |
| Standard Showerhead | 2022 | NA | NA | NA |
| | 2023 | $39.51 | $48.28 | 0.82 |
| | 2024 | $85.06 | $21.44 | 3.97 |
| Pipe Wrap | 2022 | $7.48 | $17.06 | 0.44 |
| | 2023 | $3.52-$6.55 | $10.61-$24.57 | 0.14-0.62 |
| | 2024 | $1.84-$6.38 | $8.90-$9.01 | 0.20-0.72 |

| Water Heating | Year | PAC | | |
|---|---|---|---|---|
| | | Benefits per measure | Costs per measure | Ratio |
| Hot water tank wrap | 2022 | $50.80 | $2,546.90 | 0.02 |
| | 2023 | $53.10 | $468.95 | 0.11 |
| | 2024 | $27.79 | $116.11 | 0.24 |

## HVAC Control

As shown in Table G-3, the programmable thermostat for baseboard heaters did not pass PAC with a ratio of 0.49.

**Table G-3. PAC Results for HVAC Control**

| HVAC Control | Year | PAC | | |
|---|---|---|---|---|
| | | Benefits per measure | Costs per measure | Ratio |
| Programmable Thermostat - Baseboard Heater | 2022 | NA | NA | NA |
| | 2023 | NA | NA | NA |
| | 2024 | $43.16 | $88.00 | 0.49 |

## Lighting

Lighting measures installed in 2024 passed the PAC test, with ratios ranging from 2.75 to 11.52 as shown in Table G-4.

**Table G-4. PAC Results for Lighting**

| Lighting | Year | PAC | | |
|---|---|---|---|---|
| | | Benefits per measure | Costs per measure | Ratio |
| 23W ENERGY STAR® Certified PAR | 2022 | NA | NA | NA |
| | 2023 | NA | NA | NA |
| | 2024 | $25.07 | $4.34 | 5.78 |
| 23W ENERGY STAR® Certified LED A Shape | 2022 | $29.82 | $102.55 | 0.29 |
| | 2023 | $31.27 | $38.35 | 0.82 |
| | 2024 | $32.43 | $11.77 | 2.75 |
| 11W ENERGY STAR® Certified LED A Shape | 2022 | NA | NA | NA |
| | 2023 | $20.16 | $21.16 | 0.95 |
| | 2024 | $19.48 | $5.58 | 3.49 |
| 16W ENERGY STAR® Certified PAR | 2022 | $39.64 | $7.72 | 5.13 |
| | 2023 | NA | NA | NA |
| | 2024 | NA | NA | NA |
| LED Nightlight | 2022 | NA | NA | NA |
| | 2023 | $9.90 | $87.93 | 0.11 |
| | 2024 | $8.41 | $0.73 | 11.52 |

## Weatherization

Attic insulation did not pass PAC with a ratio of 0.11 (Table G-5). Triple seal door sweep weatherstripping, and foam or V-strip weatherstripping installed in 2024 did pass with ratios of 2.99 and 12.40 respectively.

**Table G-5. PAC Results for Weatherization**

| Weatherization | Year | PAC | | |
|---|---|---|---|---|
| | | Benefits per measure | Costs per measure | Ratio |
| Attic Insulation | 2022 | NA | NA | NA |
| | 2023 | NA | NA | NA |
| | 2024 | $0.15 | $1.29 | 0.11 |
| Weatherstripping | 2022 | NA | NA | NA |
| | 2023 | $21.51-$41.45 | $25.11-$81.89 | 0.51-0.86 |
| | 2024 | $29.56-$45.43 | $2.38-$15.18 | 2.99-12.40 |

## Miscellaneous

Miscellaneous measures include a car block heater timer, Energy Saving Kit advanced power strips, and indoor clothes drying rack/outdoor retractable clothesline kit. As shown in Table G-6, car block heater timers and advanced power strips were the only measures that passed the PAC test, with a ratios of 4.09 and 2.47 respectively. Clothes drying kits did not pass the PAC test, with a ratio of 0.9.

**Table G-6. PAC Results for Miscellaneous**

| Miscellaneous | Year | PAC | | |
|---|---|---|---|---|
| | | Benefits per measure | Costs per measure | Ratio |
| Car Block Heater Timer | 2022 | NA | NA | NA |
| | 2023 | $88.78 | $32.56 | 2.73 |
| | 2024 | $116.69 | $28.50 | 4.09 |
| Energy Saving Kit Advanced Power Strips | 2022 | $37.81 | $8,337.77 | 0.00 |
| | 2023 | $40.28 | $130.31 | 0.31 |
| | 2024 | $47.76 | $19.32 | 2.47 |
| Indoor/Outdoor Clothes Drying Kit | 2022 | NA | NA | NA |
| | 2023 | $56.38 | $231.88 | 0.24 |
| | 2024 | $56.37 | $62.48 | 0.90 |

## Ventilation

High efficiency ventilation exhaust fans did not pass with a ratio of 0.05 (Table G-7).

### Table G-7. PAC Results for Ventilation

| Energy Savings Kit Type | Year | PAC | | |
|---|---|---|---|---|
| | | Benefits per measure | Costs per measure | Ratio |
| High Efficiency Ventilation Exhaust Fans | 2022 | NA | NA | NA |
| | 2023 | NA | NA | NA |
| | 2024 | $27.01 | $585.00 | 0.05 |