



Interim Framework Refrigeration Efficiency Program 2020 Evaluation Results

Submitted to IESO

September 14th, 2021

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Acknowledgements

The evaluation team would like to thank Jessei Kanagarajan, Alice Herrera, and Gavin Zheng at the Independent Electricity System Operator (IESO) for their assistance in coordinating this evaluation effort. With their support and guidance, the evaluation team was able to complete their activities as efficiently and successfully as possible.

The evaluation team would also like to thank all program implementers, assessors, and contractors that the evaluation team interviewed and surveyed. Their insights have been invaluable to the evaluation team's efforts to improve the Conservation Programs.

Finally, the evaluation team would like to thank the hundreds of participants that supported the evaluation team's impact self-assessments and telephone surveys. Their cooperation with the evaluation team's efforts has produced high quality data that will serve Ontario's conservation efforts for years to come.

Acronyms and Abbreviations

EM&V	Evaluation, measurement, and verification
EUL	Effective useful life
FR	Free-ridership
GHG	Greenhouse gas
HVAC	Heating, ventilation, and air conditioning
IDI	In depth interview
IESO	Independent Electricity System Operator
IF	Interim Framework
kW or kWh	Measurement of demand (kW) or energy (kWh) equivalent to 1,000 W or Whr
LED	Light emitting diode
MW or MWh	Measurement of demand (MW) or energy (MWh) equivalent to 1,000,000 W or Whr
NTG	Net-to-gross
REP	Refrigeration Efficiency Program
SO	Spillover

1 Executive Summary

The Independent Electricity System Operator (IESO) retained Nexant, Inc., and their sub-contractor, NMR Group, Inc., to conduct an evaluation of the Refrigeration Efficiency Program (REP) for the 2020 Interim Framework (IF) evaluation cycle. This Executive Summary provides a high-level overview of the impact and process evaluation results, key findings and recommendations for the REP Program during the January 1, 2020 through December 31, 2020 evaluation period.

1.1 Impact Evaluation

An impact evaluation was performed to analyze the outcomes of the program's improvements and quantify the savings realized as a result of implementing 749 REP projects during 2020 (Table 1-1 and Table 1-2). 2019 program results are also included in these tables to allow for comparison of REP results across the Interim Framework evaluation cycle.

Table 1-1: Energy Impact Results

Program Year	Reported Energy Savings (MWh)	Energy Realization Rate	Gross Verified Energy Savings (MWh)	Gross Verified Precision at 90 % confidence	Net-to-Gross Ratio	Net Verified 2020 Energy Savings (MWh)	Net Verified 2022 Energy Savings (MWh)
2020	2,836	87%	2,474	16%	94%	2,317	1,958
2019	769	94%	725	7%	96%	694	512

Table 1-2: Summer Peak Demand Impact Results

Program Year	Reported Summer Peak Demand Savings (MW)	Summer Peak Demand Realization Rate	Gross Verified Summer Peak Demand Savings (MW)	Gross Verified Precision at 90 % confidence	Net-to-Gross Ratio	Net Verified 2020 Summer Peak Demand Savings (MW)	Net Verified 2022 Summer Peak Demand Savings (MWh)
2020	0.36	103%	0.368	16%	103%	0.38	0.30
2019	0.04	210%	0.09	25%	140%	0.13	0.13

A cost-effectiveness (CE) analysis for the IF 2020 REP was conducted using the IESO's CE Tool V7.1. Cost-effectiveness results are presented in Table 1-3. The REP passed the Total Resource Cost (TRC) test but not the Program Administrator Cost (PAC) test. For 2019 and 2020 combined the program CE is trending towards at pass for the TRC test.

Table 1-3: Cost Effectiveness Results

Cost Effectiveness Test	Value		
	2020	2019	2019 - 2020
Total Resource Cost (TRC)	2020	2019	2019 - 2020
TRC Costs (\$)	\$1,066,741	\$452,118	\$1,518,859
TRC Benefits (\$)	\$1,123,249	\$298,192	\$1,421,441
TRC Net Benefits (\$)	\$56,508	(\$153,926)	(\$97,418)
TRC Net Benefit (Ratio)	1.05	0.66	0.94
Program Administrator Cost (PAC)	2020	2019	2019 - 2020
PAC Costs (\$)	\$1,116,398	\$459,381	\$1,575,779
PAC Benefits (\$)	\$976,738	\$259,298	\$1,236,036
PAC Net Benefits (\$)	(\$139,659)	(\$200,083)	(\$339,743)
PAC Net Benefit (Ratio)	0.87	0.66	0.78
Levelized Unit Energy Cost (LUEC)	2020	2019	2019 - 2020
\$/kWh	\$0.06	\$0.09	\$0.07
\$/kW	\$451.22	\$508.69	\$466.59

1.2 Process Evaluation

To better understand the program design and delivery in 2020, a process evaluation was carried out. Primary data was collected to support this evaluation through interviews with the IESO staff and program delivery staff and surveys with assessors, installers, and participants. Key findings and recommendations from the process evaluation are summarized below and are presented in greater detail in Section 4.5.

Finding 1. Program free-ridership was moderately low, relative to historical results, in PY2020 at 14.6%

- **Recommendation 1a:** Maintain focus on minimizing FR. Key areas include:
 - identifying and targeting customers who would be unlikely to make upgrades without program support,
 - screening customers to ensure they have not already begun implementing measures, and
 - encouraging all participants to complete the evaluation surveys to ensure that the FR results are as representative of the true population of program participants as possible.
- **Recommendation 1b.** Encourage participants to install additional energy-efficient equipment or services beyond what is covered through the program if it is feasible for

them to do so (for example, identify additional opportunities during initial assessment). Doing so may lead to increases in the program's spillover (SO), which may in turn help offset FR and lead to an improved net-to-gross (NTG) ratio.

Finding 2: Satisfaction with the program and its elements were relatively moderate across the auditors and contractors, suggesting room for improvement.

- **Recommendation 2a:** *Consider developing program information sheets in several languages and working with trusted community representatives to share information about the program.*
- **Recommendation 2b:** *Consider expanding the program's marketing to improve customer awareness and reduce skepticism about the program's legitimacy.*
- **Recommendation 2c:** *Offer additional training opportunities to auditors and contractors on topics that will equip them with the knowledge needed to effectively support the program (for example, manufacturer product training).*

Finding 3: Satisfaction with the program and its elements was high overall among participants, but there is room for improvement.

- **Recommendation 3a:** *Provide more flexibility in scheduling the visits (for example, coordinate with participants to identify suitable times for the visit).*
- **Recommendation 3b:** *Offer additional training to auditors and contractors to ensure professionalism during assessments and contractor visits (for example, clearly explain work being performed, responsiveness to questions, politeness/business etiquette, respect for the company's time).*
- **Recommendation 3c:** *Ensure the products recommended through the program are appropriate for the specific business being served and are of high quality.*
- **Recommendation 3d:** *Reduce the time it takes to complete the contractor visits. Identify areas where additional program support or resources could assist the contractors in completing this task.*

Finding 4: There is customer interest in receiving additional assistance to identify other energy-efficiency opportunities.

- **Recommendation 4a:** *During the audit, if the program cannot cover additional upgrade opportunities, consider providing an itemized list of these additional upgrades to the customer for future consideration.*
- **Recommendation 4b:** *Assist customers who are interested in installing upgrades beyond those covered by the program by coordinating with participants and contractors*

regarding the possibility of having those upgrades performed concurrently with the program-qualified upgrades.

- **Recommendation 4c:** *If the additional upgrades that customers are interested in cannot be installed at the time of the program contractor's visit, identify additional ways to support the customers (for example, identify alternate programs the customers may be eligible for, put customers in touch with trusted contractors, and help customers identify other possible financing opportunities).*

Finding 5: Service maintenance contractors do not typically recommend energy-efficiency improvements to customers.

- **Recommendation 5:** *Identify opportunities to engage service maintenance third-party contractors in discussions on the necessity of suggesting energy-efficiency upgrades to their customers.*

Finding 6. Additional cross-program promotion opportunities exist.

- **Recommendation 6.** *Continue to identify cross-program promotion opportunities, which can be achieved through two means. Firstly, promoting other program opportunities to all participating REP customers at both the start and end of the participation process. Secondly, ensuring that participating REP customers are aware of other programs that target small businesses, including the Small Business Lighting (SBL) program.*

2 Introduction

The Refrigeration Efficiency Program (REP) provides facility assessments to identify potential electricity savings opportunities and enables the installation of commercial refrigeration upgrades to reduce electricity consumption. Non-residential electricity customers with a General Service Account who use commercial product refrigeration and have an average annual peak demand of fewer than 250 kilowatts (kW) are eligible to participate in this program.

2.1 Participation

Peterborough Distribution Inc. administered the 2020 REP, and six additional local distribution companies (LDCs) participated in the program. A total of 749 projects were completed under the 2020 REP.

As illustrated in Figure 2-1, London Hydro implemented the majority of projects (29%), followed by Kitchener Wilmot Hydro (20%) and Oshawa PUC (15%). Projects with no reported addresses (11%) were categorized as “unidentified.” Completed Hydro One projects were dispersed around other REP LDC implementers’ territories, such as Waterloo Hydro and Oshawa PUC Networks.

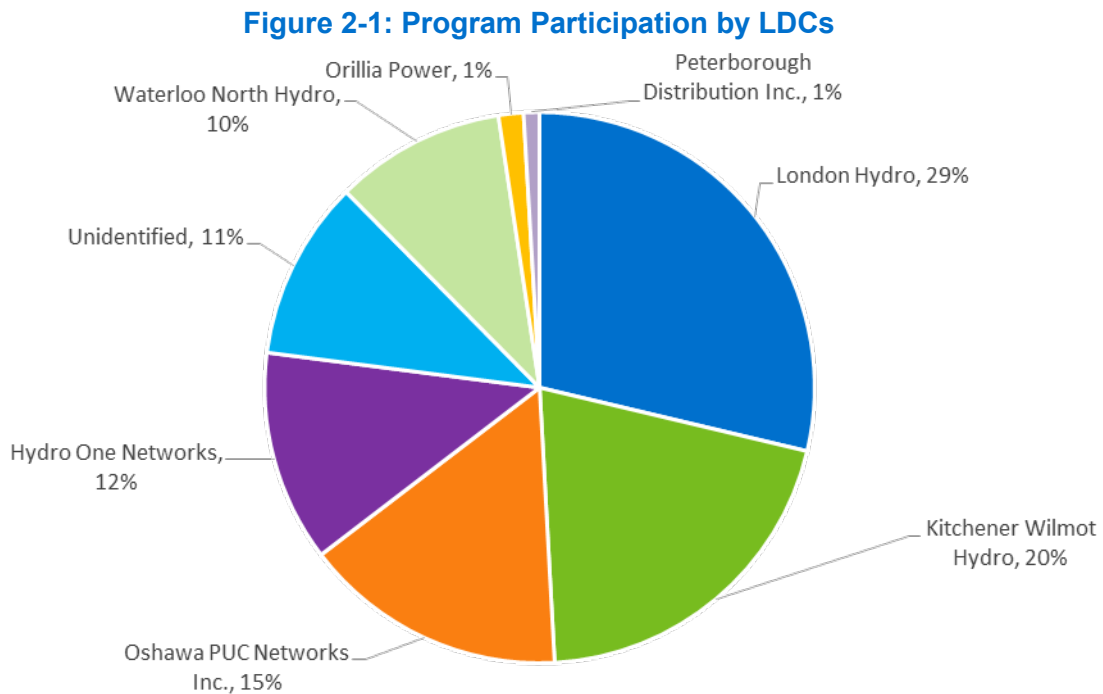
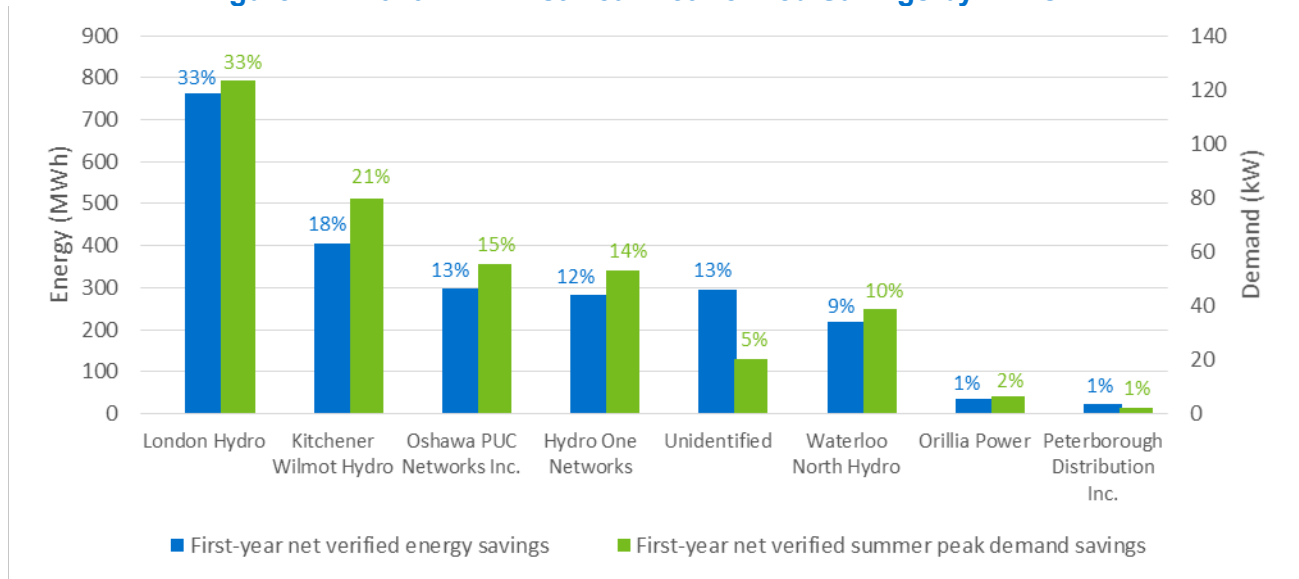


Figure 2-2 displays each LDC territory’s contribution to the 2020 REP in terms of the first-year net verified energy and summer peak demand savings. The London hydro service territory accounted for 33% of the program’s net verified energy and summer peak demand savings.

Figure 2-2: 2020 REP First-Year Net Verified Savings by LDCs

The LDCs are ranked from the highest first-year net verified energy savings to the lowest.

2.2 Goal and Objectives

The goals and objectives of the 2020 REP evaluation are as follows:

- Conduct audits of completed projects to verify the installation of equipment and evaluate operating parameters through desk reviews
- Verify energy and summer peak demand savings with a high degree of confidence and precision
- Assess free-ridership (FR) and participant spillover (SO) to determine an appropriate net-to-gross (NTG) ratio
- Conduct cost effectiveness and greenhouse gas quantification analyses using IESO's CE tool
- Provide recommendations for program improvements based on feedback obtained from the evaluations

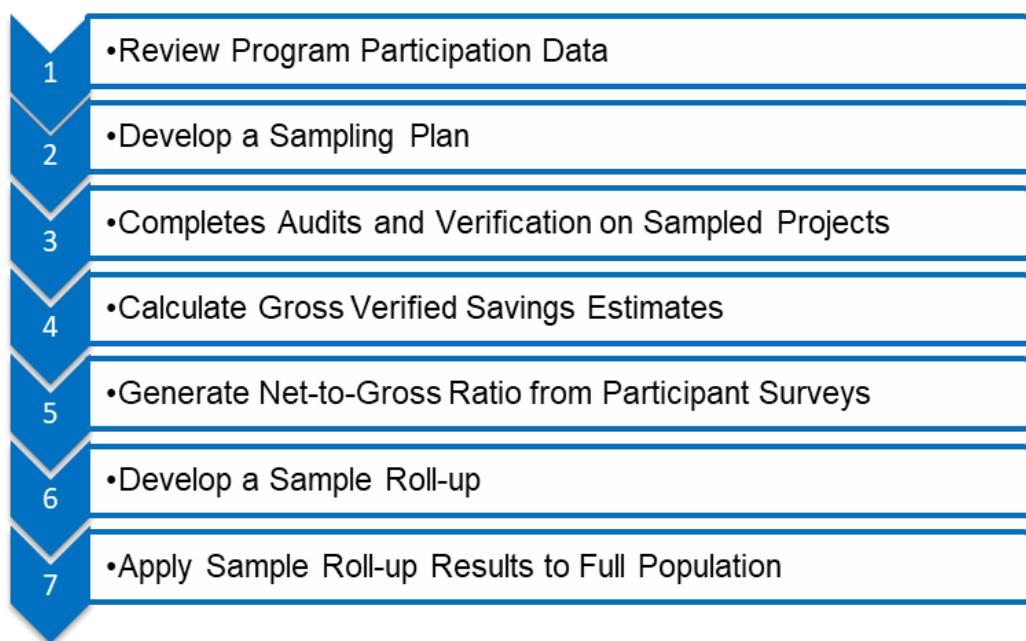
3 Impact Evaluation

An impact evaluation was performed to analyze the outcomes of the program’s improvements and quantify the savings realized as a result of the program during PY2020.

3.1 Impact Evaluation Methodology

The impact evaluation methodology is built upon a series of steps, as outlined in Figure 3-1. Additional detail can be found in Appendix A: Impact Evaluation Methodology and Appendix B: Detailed Net-to-Gross Methodology.

Figure 3-1: Impact Evaluation Methodology



3.2 Impact Evaluation Results

The first-year net verified impact results of the 2020 REP are presented in Table 3-1 and Table 3-2.

Table 3-1: Energy Impact Results

Program Year	Reported Energy Savings (MWh)	Energy Realization Rate	Gross Verified Energy Savings (MWh)	Gross Verified Precision at 90 % confidence	Net-to-Gross Ratio	Net Verified 2020 Energy Savings (MWh)	Net Verified 2022 Energy Savings (MWh)
2020	2,836	87%	2,474	16%	94%	2,317	1,958
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Table 3-2: Summer Peak Demand Impact Results

Program Year	Reported Summer Peak Demand Savings (MW)	Summer Peak Demand Realization Rate	Gross Verified Summer Peak Demand Savings (MW)	Gross Verified Precision at 90 % confidence	Net-to-Gross Ratio	Net Verified 2020 Summer Peak Demand Savings (MW)	Net Verified 2022 Summer Peak Demand Savings (MWh)
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2019	0.04	210%	0.09	25%	140%	0.13	0.13

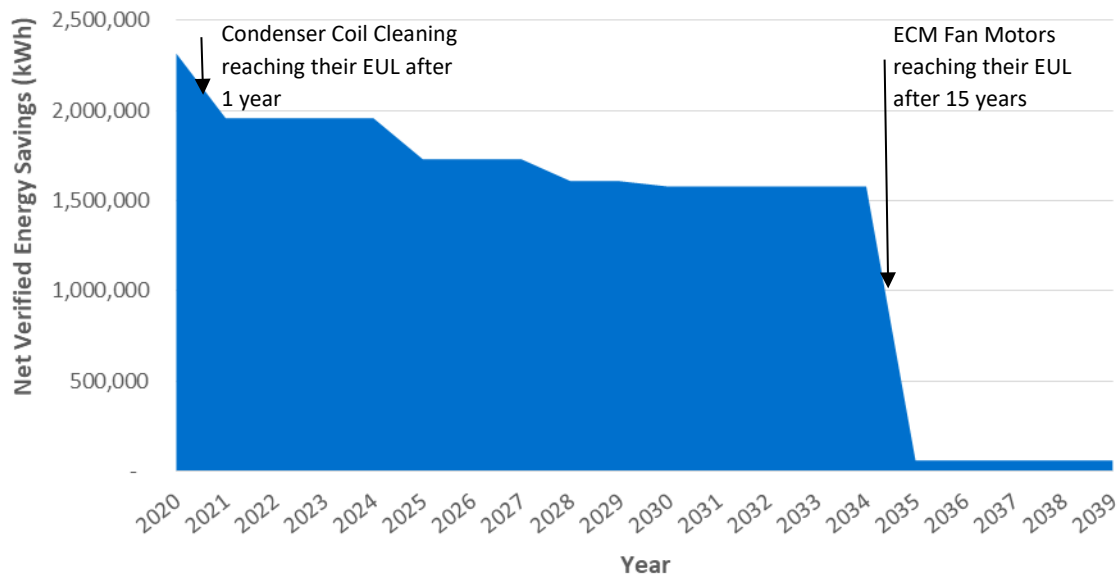
Compared to 2019, the net verified energy and summer peak demand savings in 2020 are substantially higher. Participation levels in 2019 were significantly lower than in 2020, given that it was the program's first year in the market. The net verified 2020 summer peak demand savings are considerably higher compared to 2019, where no demand savings were reported except for the ECM fan motor measure. The summer peak demand realization rate is considerably improved in 2020 as the ECM fan motor measure's reported demand savings improved. Reported demand savings for other measures also contributed to a better realization rate for the overall REP program.

The 2020 REP is expected to achieve 26,740 MWh of lifetime net verified energy savings based on the installed measures and their respective effective useful lives (EULs). 85% of the net verified energy savings are projected to persist until 2022. The difference between the savings in 2020 and 2022 is due to the condenser coil cleaning measure reaching the end of its expected life (1 year) before 2022. The program savings achieved in a given year can decrease as measures with shorter EULs fall out of use and stop accruing savings attributable to the REP. Based on the average rated life data provided in the program's authorized measures list, each measure in the program was assigned a EUL. The 2020 REP Measures' EULs are summarized in Table 3-3.

Table 3-3: REP Measures' EULs

Measure Type	EUL (years)
Condenser Coil Cleaning	1
Strip Curtains	5
Night Curtains	5
Door Auto Closers	8
LED A-19 Lamp	10
ECM Fan Motor	15
LED Case Lighting	20

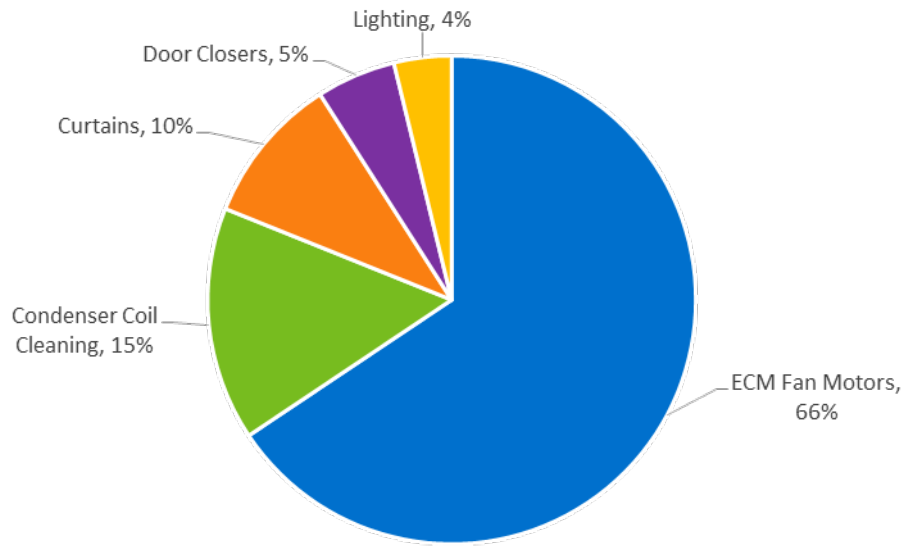
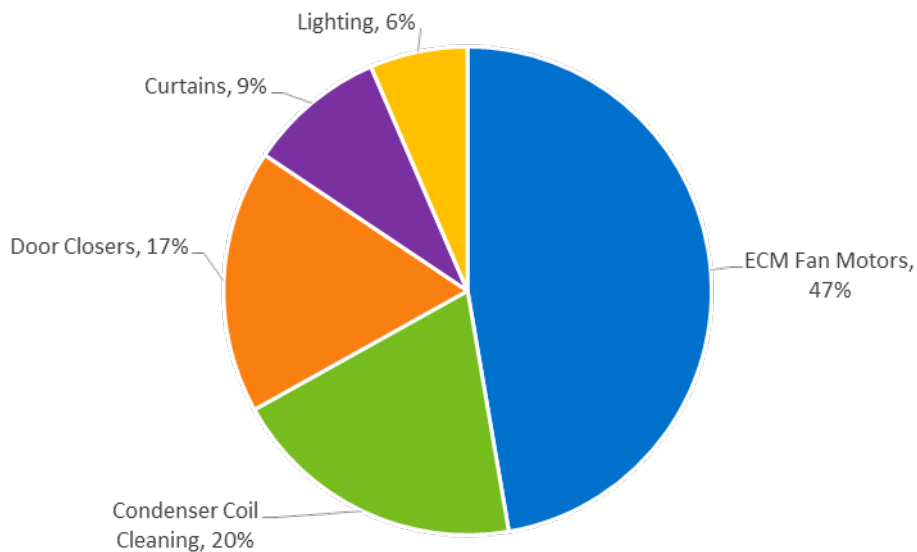
Figure 3-2 illustrates the expected net verified annual energy savings over a 20- year horizon, which is the length of the longest measure life (LED Case Lighting) in the program. Sixty-eight percent (68%) of the first-year (2020) savings are estimated to persist through year 15 (2034), mainly due to the strong influence of the ECM fan motor measure on the program's overall savings.

Figure 3-2: Net Verified Energy Savings by Year

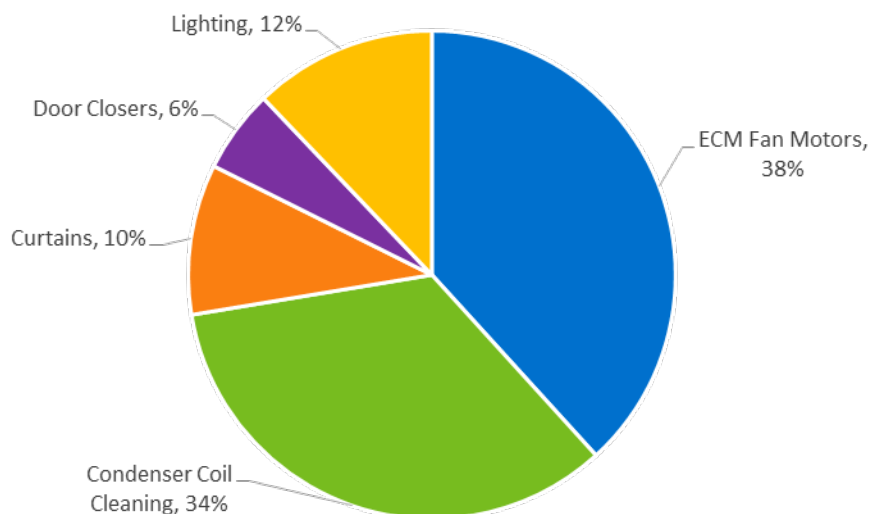
3.3 Impact Evaluation Findings

3.3.1 REP Measures

Figure 3-3 and Figure 3-4 represent the first-year net verified energy and summer peak demand savings contribution for each measure in the 2020 REP. ECM fan motors produced the majority of the net verified energy savings (66%) and net verified summer peak demand savings (47%). The door closer measure accounted for merely 5% of the net verified energy savings yet contributed 17% to the net verified summer peak demand savings.

Figure 3-3: First-Year Net Verified Energy Savings by Measure Type**Figure 3-4: First-Year Net Verified Summer Peak Demand Savings by Measure Type**

ECM fan motors and condenser coil cleaning measures accounted for the majority (72%) of the program's implemented measure quantity, which is consistent with their contribution to the program's energy and summer peak demand savings. Figure 3-5 presents the overall composition of the 2020 REP implemented measures.

Figure 3-5: Program Installed Measure Quantity

Ninety-two percent (92%) of the 2020 REP participants implemented the condenser coil cleaning and ECM fan motor measures. The high adoption rate is due to the measures' compatibility among all refrigeration system types (i.e., walk-in and reach-in, freezers or coolers). In contrast, curtain and door closer measures' installations are limited to walk-in freezers or coolers.

The condenser coil cleaning measure is highly adopted within the 2020 REP due to its ease of implementation and simple requirements. Table 3-4 below presents the adoption rate of each measure within the 2020 REP.

Table 3-4: REP Measure Adoption Rates

Measure	Adoption Rate
Condenser Coil Cleaning	92%
ECM Fan Motors	92%
Curtains	64%
Lighting	50%
Door Closer	41%

3.3.2 Realization Rates

Table 3-5 and Table 3-6 present the average reported and gross verified first-year energy and summer peak demand savings per measure type. While the program-level energy realization rate is 87%, the measure-level realization rates ranged from 43% for condenser coil cleaning to 303% for door closers. Similarly, the measure-level summer peak demand realization rates deviated from the program level realization rate (103%) and ranged from 42% for condenser coil cleaning to 340% for curtains.

Table 3-5: Reported and Verified Gross Energy Savings Measure

Measures	Reported Energy Saving (kWh/unit)	Verified Energy Savings (kWh/unit)	Energy Realization Rate
ECM Fan Motors	942	591	63%
Condenser Coil Cleaning	339	145	43%
Door Closers	338	1,024	303%
Lighting	217	181	83%
Curtains	499	1,008	202%

Table 3-6: Reported and Verified Gross Peak Demand Savings Measure

Measures	Reported Demand Savings (kW/Measure)	Verified Demand Savings (kW/Measure)	Demand Realization Rate
ECM Fan Motors	0.077	0.075	97%
Condenser Coil Cleaning	0.057	0.024	42%
Door Closers	0.146	0.144	98%
Lighting	0.051	0.034	67%
Curtains	0.046	0.156	340%

The majority of the 2020 REP measures and their energy and summer peak demand savings were updated during the first half of the program year. Measure updates were implemented in two phases. Condenser coil cleaning and curtain measures were updated in February 2020, while other measures were updated after COVID-19-related program disruptions in June 2020.

Table 3-7 presents a comparison of the 2020 REP realization rates. The energy realization rate improved from 75% prior to the measures' update to 102% after the update. The measure-level update also positively impacted the demand realization rate, which decreased from 136% to 97%.

Table 3-7: 2020 REP Realization Rate Comparison

Realization Rate	REP 2020 Program Year	REP 2020 - Before Measure Update	REP 2020 - After Measure Update
Energy	87%	75%	102%
Demand	103%	136%	97%

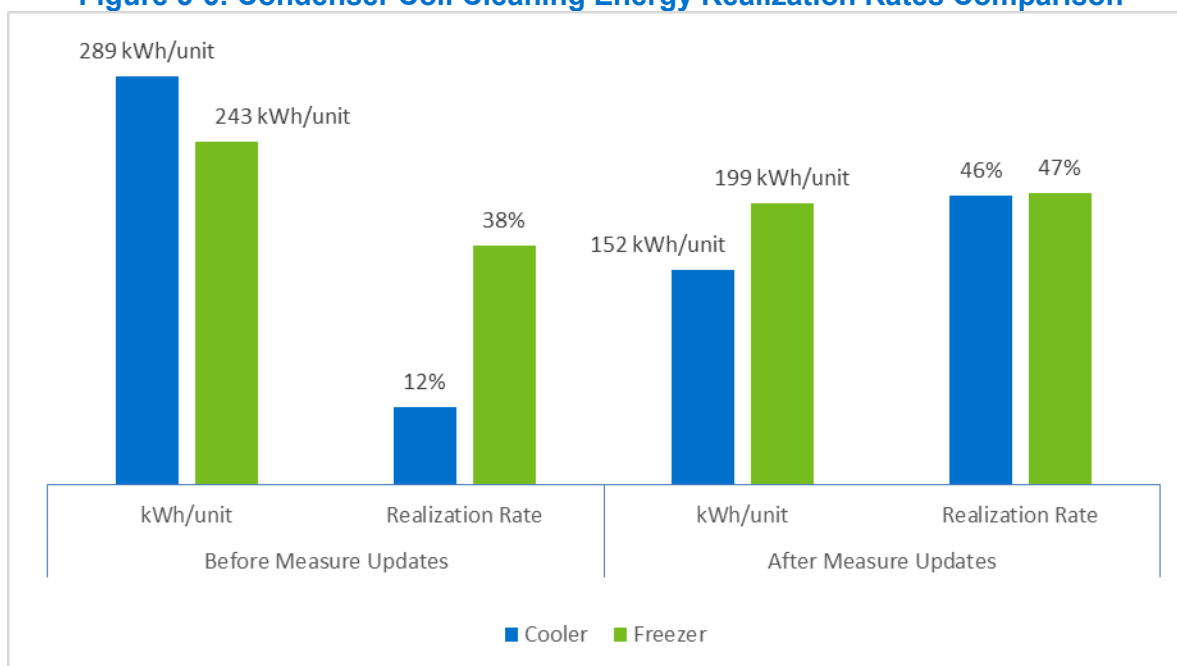
Similar to the program-level realization rates, the measure-level realization rates improved after the measure updates. The sections below discuss each measure's gross energy and summer peak demand savings and the factors contributing to their realization rates.

Condenser coil cleaning: This measure and its associated energy and summer peak demand savings were updated in February 2020 based on refrigeration case types (i.e., cooler or freezer). Figure 3-6 compares the reported energy savings and energy realization rates before and after the measure's update. The reported energy savings for coolers and freezers

decreased, which resulted in improved energy realization rates. Given the measure update was completed early in the year (February 2020), the overall realization rate of the condenser coil cleaning (43%) is more aligned with the updated measure's realization rates.

While this update positively impacted the overall program realization rates, the reported energy and summer peak demand savings need to be modified with more accurate estimates to approach a 100% realization rate. Measure-specific savings details were unavailable to the evaluator to assist in understanding the derivation of the reported savings estimates. Therefore, it is difficult to comment on the approach that is needed to be taken to correct the reported savings.

Figure 3-6: Condenser Coil Cleaning Energy Realization Rates Comparison



Additionally, the verified quantity of installed measures is lower than the reported quantity. In many instances, during the phone interviews with participants, the evaluator verified fewer condensers at the site than the reported quantity. The REP implementer, confirmed they provided the number of cleaning products as the reported quantity instead of the number of condensers that are actually cleaned.

ECM Fan Motors: Prior to the measure updates in June 2020, the ECM fan motor measure was merely sub-categorized based on motor horsepower. The measure's update expanded the motor's specification, based on requirements to calculate energy and summer peak demand savings. The updated specifications include:

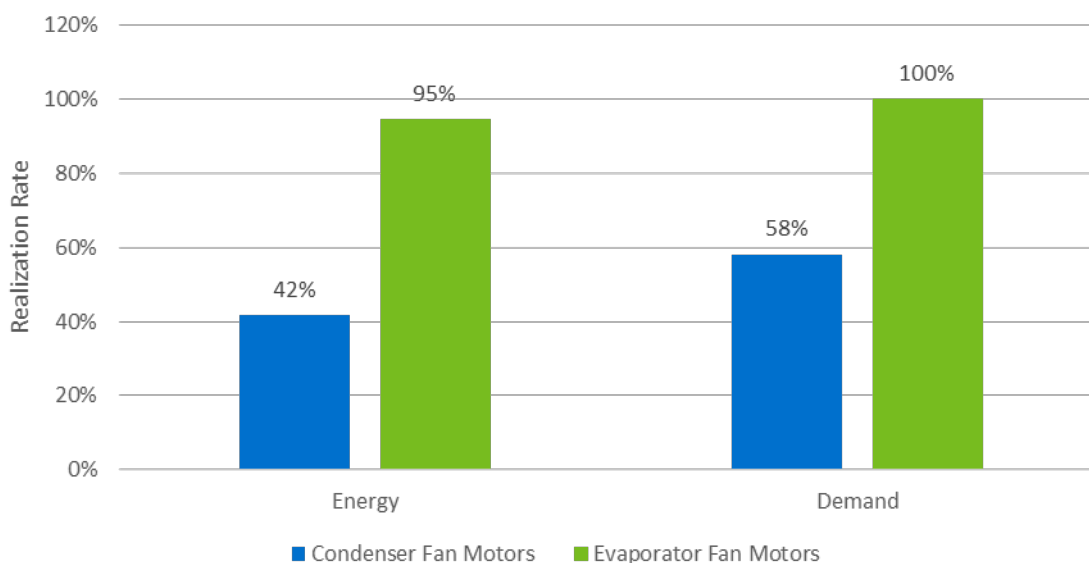
- Base case motor type (i.e., Shaded Pole (SP) or Permanent Split Capacitor (PSC))
- Condenser or evaporator end-use
- Cooler or Freezer
- Walk-in or reach-in

The new sub-categories contributed to reporting more accurate energy and summer peak demand savings, which led to improved realization rates. The energy realization rate improved from 45% prior to measure update to 75% after the measure update. Similarly, measure updates improved the overall ECM fan motor summer peak demand realization rate from 152% to 84%.

Figure 3-7 illustrates the updated ECM motor measures, where evaporator fans had higher energy realization rates (95%) compared to condenser fan motors (42%). Similarly, the reported summer peak demand for evaporator fans is verified to be accurate (100% realization rate), while the condenser fans had a lower realization rate at 58%.

Upon reviewing the measure-specific savings details, it was identified that both the evaporator and condenser fans have the same reported energy and summer peak demand savings. This is not an accurate assumption as condenser fans' operating hours depend on the compressor operation and outdoor temperature. Therefore, the equivalent full load hours (EFLH) should be considered in the calculations. Therefore, the reported savings should be adjusted depending on the end use (condenser or evaporator).

Figure 3-7: ECM Fan Motor Realization Rate Comparison



Strip Curtains: The strip curtains measure update did not improve the realization rates significantly, as this measure is highly dependent on the facility type. For instance, supermarkets and restaurants have relatively higher savings per curtain compared to convenience stores.

Currently reported energy and summer peak demand savings are only influenced by the type of the walk-in system (i.e., cooler or freezer) and do not consider the facility type. Measure-specific deemed savings calculations need to consider the facility type to either subcategorize the measure based on the facility type or improve the single deemed savings value, to be a true representation of the savings based on all facility types.

Door Closers: The door closer measure had a high energy realization rate due to the low reported savings values. An error was identified in the deemed energy savings calculation. An incorrect Cooling Degree Day (CDD) for the Waterloo region was selected for extrapolating a deemed savings from another climate zone. By correcting this error, the reported savings appear to be very close to the verified values.

Lighting: The verified hours of operation for lighting measures are lower than the deemed hours of operation. Reported energy savings for lighting measures assume 8,760 annual run hours for LED tubes installed in display cases, whereas verified hours depend on each store's hours which are usually less than 8760 hours per year. The average verified hours for the verified installed LED case lighting measure is 4680 hours.

Reported energy savings assume 4,380 annual run hours for LED A-19 lamps installed inside walk-in coolers and freezers. This impacts the verified energy savings for LED A-19 lamps as they are often installed inside walk-in coolers and freezers, and their verified hours are limited to a few hours per day.

The reported demand savings for lighting measures reflect the change in the connected load and do not coincide with the IESO's summer peak demand definition (understood to be 1:00 PM through 7:00 PM on non-holiday weekdays in June through August).

3.3.2.1 Energy

Below is a summary of the findings that contribute to the energy savings realization rates.

- The verified quantity of the installed condenser coil cleaning measure is lower than the reported quantity. During phone interviews with participants, the evaluator verified fewer condensers at the site than the reported quantity. The implementer confirmed they provided the number of cleaning products as the reported quantity instead of the number of condensers actually cleaned. Additional cleaning products are used, depending on the dirtiness of the coils.
- The same reported energy savings for evaporator fan motors were used for condenser motors. Since condenser fans' operating hours are lower than evaporator fans' hours, verified energy savings for the ECM condenser fan motors are considerably lower than the reported savings.
- The deemed savings for strip curtains did not consider the facility type and used a single deemed value. Nexant has verified the facility type and calculated the savings accordingly. This resulted in higher savings for completed projects in restaurants and supermarkets, as they have higher refrigeration cooling loads.
- The incorrect input (inaccurate CDD) was identified for the calculation of the door closer deemed energy savings, which led to underestimating the reported energy savings for this measure significantly.
- The verified hours of operation for lighting measures are lower than the deemed hours of operation. The reported energy savings for lighting measures in the 2020 REP assume 8,760 annual run hours for LED tubes installed in display cases and 4,380 annual run hours for LED A-19 lamps installed inside walk-in coolers and freezers. The verified

hours were confirmed to be similar to the store hours for LED tubes and a few hours for LED-A19 lamps.

3.3.2.2 Summer Peak Demand

The findings discussed above in Section 3.3.2.1 are also applicable for the summer peak demand savings realization rates except for the door closer measure, as the incorrect input only applied to calculations of the deemed energy savings. Additionally, the summer peak demand savings reported for the 2020 REP savings reflect a change in the connected load that is not adjusted for peak coincidence. The IESO requires reporting net verified savings based on the summer peak demand definition.

3.3.3 Net Verified Savings

To calculate the net verified savings, the portion of gross verified savings attributable to the program was calculated. The net verified savings were determined by multiplying the gross verified savings by the net-to-gross (NTG) ratio, as shown in Equation 3-1.

Equation 3-1: Net Verified Savings

$$Savings_{net} = Savings_{verified} \times NTG$$

Where:

$Savings_{net}$ = Net verified savings impact (kW or kWh)

$Savings_{verified}$ = Verified savings (kW or kWh)

NTG = Net-to-gross

To estimate the direct influence of the program in generating net verified energy savings, attribution surveys were implemented to calculate free-ridership (FR) and spillover (SO) rates. Both FR and SO are represented as percentages of the program's total reported savings and estimated for each survey respondent. The results are then aggregated to develop total FR and SO estimates and are weighted by the percent of savings associated with each respondent's completed energy-efficiency project. Therefore, respondents with comparatively larger projects influence the total estimates more so than smaller projects, allowing for results that are reflective of the responding participants and their associated impact on the program.

FR refers to the program savings attributable to free riders, which are program participants who would have implemented a program measure or practice in the program's absence. SO refers to additional reductions in energy consumption and demand due to program influences beyond those directly associated with program participation. SO represents installations of energy-efficient equipment influenced by the participant's experience with the program and completed without receiving any program incentives or other financial support.

The NTG ratio is defined by Equation 3-2, where FR is the participant free-ridership percentage, and SO is the participant spillover percentage.

Equation 3-2: Net-to-gross Ratio

$$NTG = 100\% - FR + SO$$

FR and SO were calculated for a single incented project for each sampled participant, and these results were combined to develop overall FR, SO, and NTG values. Additional detail regarding the NTG evaluation methodology can be found in Appendix B.

3.3.4 REP Cost Effectiveness and Avoided Greenhouse Gas Emissions

A cost-effectiveness (CE) analysis for the IF 2020 REP was conducted using the IESO's CE Tool V7.1. Cost-effectiveness results are presented in Table 3-8. The REP passed the Total Resource Cost (TRC) test but not the Program Administrator Cost (PAC) test.

The PY2020 CE is improved compared to 2019, as 2019 was the first year in the IF with relatively higher costs to start up the program. Another contributor to the low cost to benefit ratios is that some REP measures have low EULs. For instance, the condenser coil cleaning measure reaches the end of its expected life after one year and stops accruing savings attributable to the REP.

Table 3-8: IF REP Program Cost Effectiveness Results

Cost Effectiveness Test	Value		
	2020	2019	2019 - 2020
Total Resource Cost (TRC)			
TRC Costs (\$)	\$1,066,741	\$452,118	\$1,518,859
TRC Benefits (\$)	\$1,123,249	\$298,192	\$1,421,441
TRC Net Benefits (\$)	\$56,508	(\$153,926)	(\$97,418)
TRC Net Benefit (Ratio)	1.05	0.66	0.94
Program Administrator Cost (PAC)			
PAC Costs (\$)	\$1,116,398	\$459,381	\$1,575,779
PAC Benefits (\$)	\$976,738	\$259,298	\$1,236,036
PAC Net Benefits (\$)	(\$139,659)	(\$200,083)	(\$339,743)
PAC Net Benefit (Ratio)	0.87	0.66	0.78
Levelized Unit Energy Cost (LUEC)			
\$/kWh	\$0.06	\$0.09	\$0.07
\$/kW	\$451.22	\$508.69	\$466.59

Avoided greenhouse gas (GHG) emissions attributable to the program are provided in Table 3-9.

Table 3-9: Avoided Greenhouse Gas Emissions

Program Year	First Year GHG Avoided (Tonnes CO ₂ equivalent)			Lifetime GHG Avoided (Tonnes CO ₂ equivalent)		
	Electric	Gas*	Total	Electric	Gas*	Total
2019**	56.3	-	56.3	1000.6	-	1000.6
2020	244.5	-	244.5	3970.3	-	3970.3
2019 - 2020	300.8	-	300.8	4970.9	-	4970.9

*Interactive Effects Gas Penalty

** Includes PY2019 True ups

3.4 Net-to-Gross Evaluation

The NTG evaluation results are presented in the following subsections, and Appendix C presents additional details.

Table 3-10 presents the results of the PY2020 REP NTG evaluation. The evaluation team targeted and achieved 90% confidence and 10% precision levels when calculating the NTG for this program. The following subsections summarize the completed analyses for the interpretation of these values.

Table 3-10: Net-to-gross Results

Unique Participants	NTG Responses	Savings Weighted Free-ridership	Spillover, energy	Spillover, summer peak demand	Net-to-Gross, energy	Net-to-gross, summer peak demand	Energy Precision
647	75	14.6%	8.2%	17.6%	93.6%	103.0%	7.9%

*Note: FR: Free-ridership, SO: Spillover; NTG: Net-to-gross.

3.4.1 Key Findings

Key findings from the NTG analysis include the following:

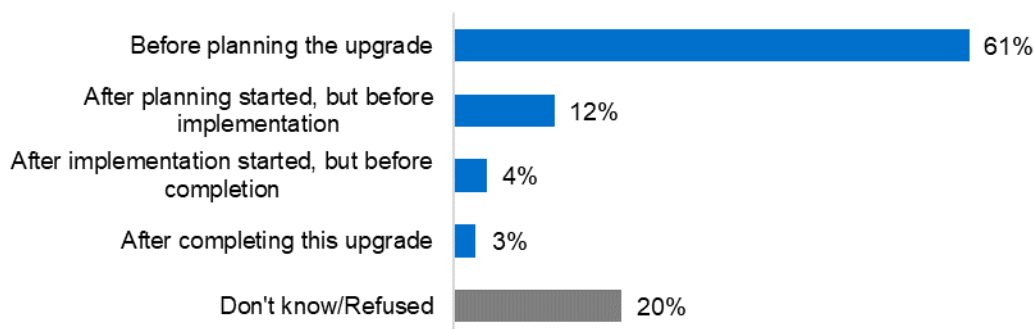
- Participant feedback indicates moderately low levels of FR at 14.6%.
 - The program assisted more than three-fifths (64%) of participants with upgrades they otherwise would not have been able to implement (37%) or would have had to postpone (27%).
 - Close to two-fifths (36%) would have either done the “exact same installation” anyway (8%), would have done the installation but scaled it back (7%), or were unsure of what they would have done (21%). This suggests that there is room for FR improvements in future program years.
 - The availability of program upgrades at no cost had the greatest influence on the respondents’ decision to participate in the program (84%).
- Participation in the program resulted in a relatively high SO at 8.2%, which helped offset the FR. Close to one-tenth (8%) of respondents installed equipment with attributable SO savings.

3.4.2 Free-ridership

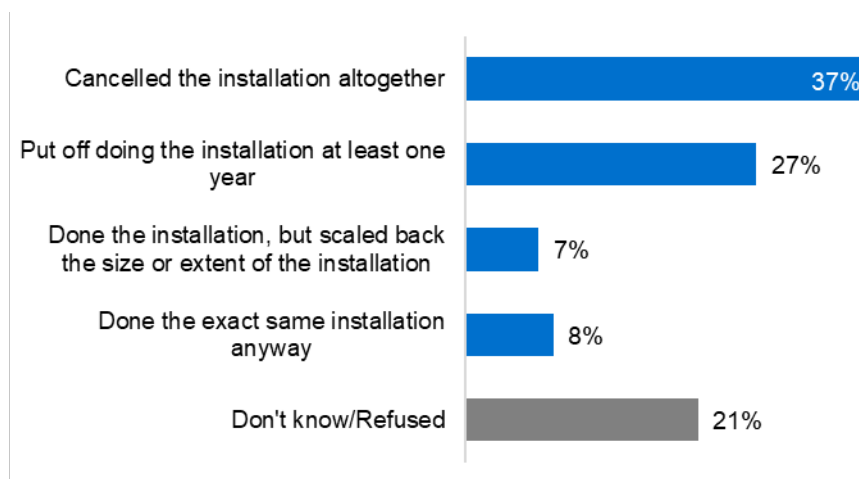
The extent of FR within the program was assessed by surveying REP participants to understand their experiences and plans before learning about the program, what they would have done in the program's absence, and how influential the program was on their decision to implement the energy-efficient upgrades.

Over three-fifths (61%) of respondents indicated they first learned they could get no-cost energy-efficiency upgrades through the program before planning the equipment upgrade. Fewer respondents (16%) indicated learning about it after either the planning or implementation had started but before completion (Figure 3-8). Only 3% of respondents reported learning about the program's offerings after completing the related upgrade. This suggests the program was influential in many of these respondents' decisions to begin the project. While responses to this question do not directly impact the FR score, they provide additional context for understanding the participants' decision-making processes.

Figure 3-8: When Participant First Learned About the Program (n=75)



Participants were then asked what they would have done in the program's absence (Figure 3-9). Overall, participant responses suggest moderate FR. Over three-fifths (64%) would have either delayed the upgrade by at least one year or cancelled the equipment upgrade altogether. However, close to two-fifths (36%) would have either done the "exact same installation" anyway (8%), would have done the installation but scaled it back (7%), or were unsure of what they would have done (21%), which is indicative of partial or full FR for these respondents. Responses from this participant intent question were factored into the FR analysis.

Figure 3-9: Actions in Absence of Program (n=75)

The five respondents who stated they would have installed less energy-efficient or less expensive equipment reported they would have reduced the project's size, scope, or efficiency by a small amount. These results indicate the program allowed these participants to increase the size and/or extent of their projects beyond what they would have been able to achieve independently. This question was not used to calculate the FR score, though it provided additional context around participant intentions.

The six respondents who stated they would have done the "exact same upgrade" in the program's absence were asked to confirm they would have had the funds to cover the project's entire cost without the program funding. Three stated they definitely would have had the funds to cover it independently, one stated they might have had the funds, and two stated they definitely would not have had the funds. This feedback indicates some degree of FR and suggests the program may have assisted a portion of these participants in completing projects they might not have been able to otherwise. This participant intent question was factored into the FR analysis.

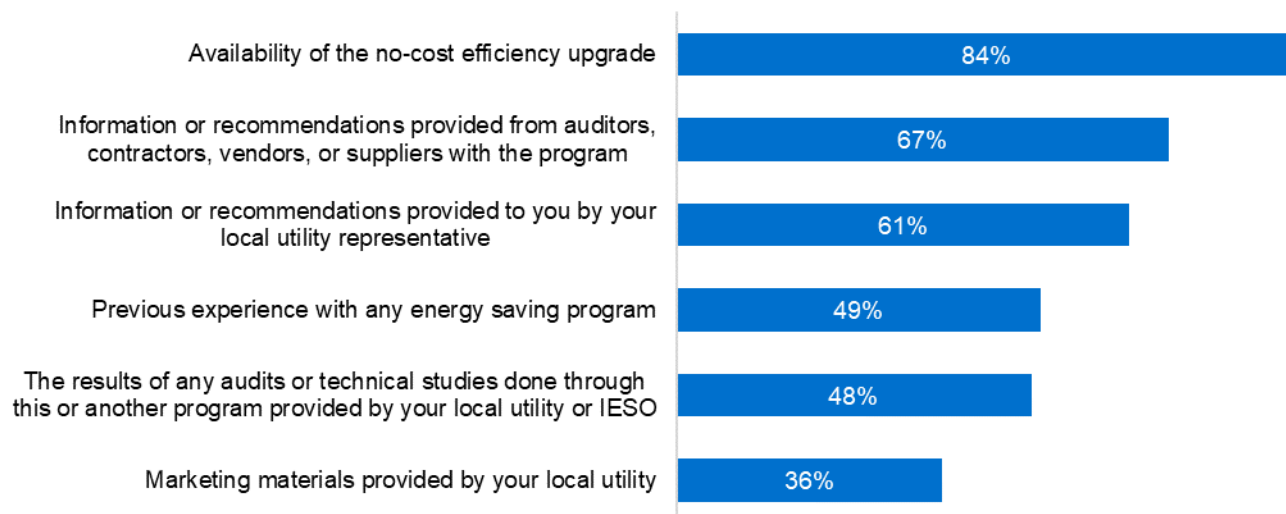
The six respondents who stated they would have done the "exact same upgrade" in the program's absence were asked if they would have had a specific installation contractor in mind to hire to complete the installation. One stated they would have had a specific contractor in mind, four stated they did not have a contractor in mind, and the remaining respondent did not know.

Respondents were then asked how influential various program features were on their decision to install the energy-efficient equipment (Figure 3-10). They rated each feature's influence on a scale from one (1) to five (5), where one indicates it had "no influence at all" and five indicates it was "extremely influential." The highest-rated responses were the upgrades' availability at no cost (84% with a rating of 4 or 5) and the recommendations from auditors, contractors, vendors, or suppliers (67% with a rating of 4 or 5).

Respondents stated the least influential program features were the marketing materials provided by their local utility and the results of the audits/ technical studies completed through the REP or other programs (36% and 48% with a rating of 4 or 5, respectively). This suggests a

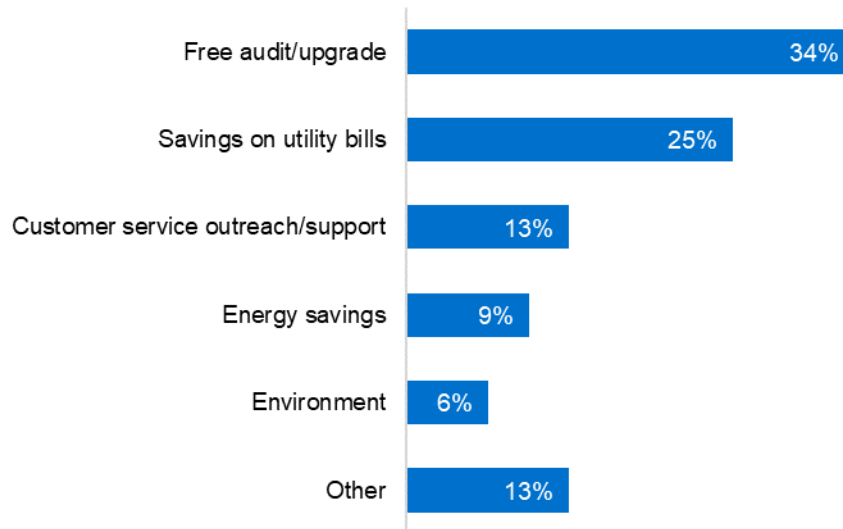
need to assess the program's effectiveness in reaching customers with marketing materials and how expert recommendations and technical information are provided. This question, which focuses on the program's influence and the prior questions about customer intentions, was used to estimate the FR score.

Figure 3-10: Influence of Program Features on Participation (n=75)
(Rating of 4 or 5 on a scale from 1 to 5)



When respondents were asked whether any other factors played “a great role” in influencing their organization to install the energy-efficient equipment, the respondents’ answers varied widely (Figure 3-11). Of the more than two-fifths (43%) of those who responded, the most common responses were related to the free audit or upgrade being influential (34%), followed by the possibility of achieving savings on utility bills (25%).

Figure 3-11: Other Influential Factors on Upgrade Decision*
(Open-ended and multiple responses allowed; n=35)

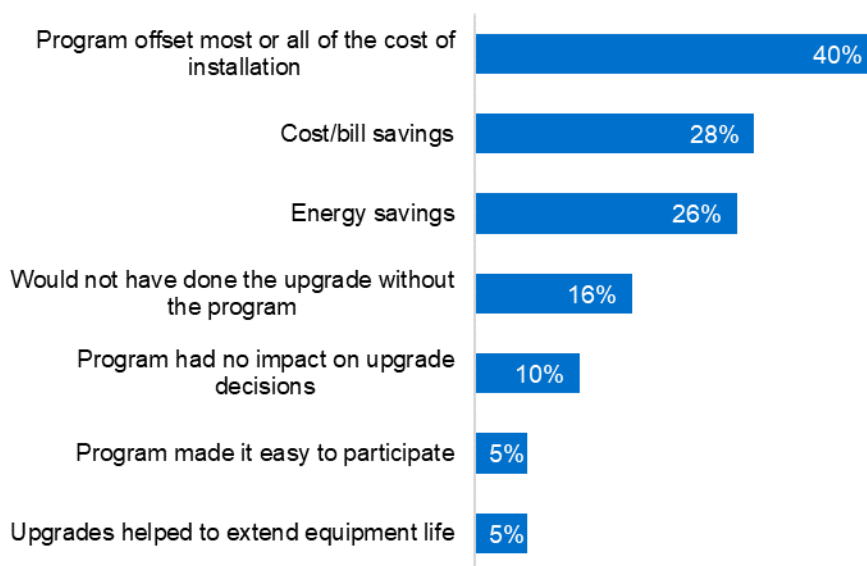


*Does not sum to 100% due to multiple response.

Participants were then asked to explain in their own words what impact, if any, the financial support or technical assistance they received from the program had on their decision to install the program incentivized equipment at the time that they did (Figure 3-12). Of the more than three-fourths (77%) of those who responded, the most common responses were related to the financial incentive offsetting most or all of the installation cost (40%) and wanting to save on cost/bills (28%) and energy (26%). Close to one-fifth (16%) stated they would have been unlikely to implement the upgrade without the program.

Figure 3-12: Program Impact on Decision to Install Equipment*

(Open-ended and multiple responses allowed; n=58)



*Does not sum to 100% due to multiple responses.

In summary, FR results among REP participants indicate moderately low levels of FR (14.6% FR score). The program assisted over three-fifths (64%) of participants with upgrades they otherwise would not have been able to implement or would have had to postpone. However, close to two-fifths (36%) would have done the “exact same project” in the program’s absence (8%), would have done the installation but scaled it back (7%), or were unsure of what they would have done (21%), suggesting that there is room for FR improvements in future program years.

3.4.3 Spillover

To estimate SO, participants were asked if they installed any energy-efficient equipment for which they did not receive an incentive following their participation in REP. Nearly one-fifth (16%, or 12 respondents) reported installing new equipment.

Table 3-11 displays the types of non-incentivized equipment installed by companies after their REP project was completed. Some survey respondents installed multiple equipment types. A total of 20 equipment installations occurred across the different equipment types.

Respondents were then asked what level of influence their participation in REP had on their decision to install this additional energy-efficient equipment. Participants rated the program’s influence on a scale from one (1) to five (5), where one indicates the program had “no influence at all” and five indicates the program was “extremely influential.” As indicated in Table 3-11, the average influence score for most equipment types was below a 3-rating, which suggests the program was not influential on most respondent’s additional equipment installations. However, six respondents indicated the program had some influence (a rating of 3 or higher) on their

decisions to install ENERGY STAR appliances, fans, lighting, lighting controls, and motor/pump upgrades.

Table 3-11: Program Influence on Efficient Equipment Installed Outside the Program
(Multiple responses allowed; n=12)

Type of Equipment Installed	Count of Respondents	Average Influence Score
ENERGY STAR Appliance	1	5
Fan	4	2.3
Lighting	4	3
Lighting - Controls	2	2.5
Motor/Pump Upgrade	4	2.3
Motor/Pump Drive Improvement (VSD and Sync Belt)	1	1
Other	4	1

The six participants who indicated they installed the program-influenced non-incentivized equipment were then asked a series of follow-up questions (for example, capacity, efficiency, annual hours of operation). These details are displayed in Appendix C and are used within the NTG algorithm to attribute SO savings to each equipment installation. SO savings were driven mainly by:

- the installation of four new fan upgrades completed by two respondents,
- 66 new LED screw base upgrades completed by two respondents,
- 13 new LED exterior upgrades completed by one respondent, and
- 24 new LED linear fixture upgrades completed by two respondents.

In summary, SO results among REP participants indicate a relatively high SO (8.2% Energy SO and 17.6% Summer Peak Demand SO), which helped offset the FR. Close to one-tenth (8%, or six respondents) installed equipment with attributable SO savings.

4 Process Evaluation

A process evaluation was performed to better understand the program design and delivery of the REP. The IESO program staff and delivery vendor interviews as well as assessor, installer, and participant surveys were utilized to gather primary data to support this evaluation. In the sections below, if the number of respondents to a question is under 20, counts are shown rather than percentages. The results should be considered as directional given the small number of respondents.

4.1 Process Methodology

The process evaluation focused on program design and delivery. Program processes were assessed through interviews and surveys with relevant program actors, including the IESO program staff, LDC program staff, program delivery vendor staff, auditors, contractors, and participants. For each respondent type, a customized interview guide or survey instrument was developed to ensure responses produced comparable data and allow for meaningful conclusions to be drawn.

Table 4-1 presents the survey methodology, the total population invited to participate in the surveys or interviews, the total number of completed surveys, and the sampling error at the 90% confidence level for each respondent type. The following subsections provide context about each surveyed group.

Additional detail regarding the process evaluation methodology can be found in Appendix D.

Table 4-1: Process Evaluation Primary Data Sources

Respondent Type	Methodology	Completed	Population	90% CI Error Margin
IESO Program Staff	Phone In-depth Interview (IDI)	1	1	0%
LDC Program Staff	Phone IDI	1	1	0%
Program Delivery Vendor Staff	Phone IDI	1	1	0%
Auditors and Contractors	Web Survey	5	8	N/A*
Participants	Web Survey	75	647	9.0%

*Error margin not displayed if the respondent count is below 30 unless census is achieved.

4.1.1 IESO Program Staff, LDC Program Staff, and Program Delivery Vendor Staff Interviews

In-depth interviews (IDIs) were completed with one IESO program staff member and one LDC staff member. Additionally, two interviews were completed with staff members from the program delivery vendor. The appropriate staff to interview were identified in consultation with the IESO EM&V staff. Interview topics included:

- program roles and responsibilities
- design and delivery

- marketing and outreach
- market actor engagement
- program strengths and weaknesses
- suggestions for improvement

4.1.2 Auditor and Contractor Survey

A total of eight unique companies were emailed to request their participation in a web survey. A total of five auditors and contractors completed the survey. The sample was developed from the records provided by the program delivery vendor staff. Interview topics included:

- firmographics
- program roles and responsibilities
- audits and/or projects completed
- training and education
- perceptions of customer awareness and decision-making
- barriers to participation
- satisfaction
- program improvement suggestions

4.1.3 Participant Survey

A total of 647 unique companies were emailed to request their participation in a web survey. A total of 75 participants completed the survey. The sample was developed from the program records provided by the IESO EM&V staff. Survey topics included:

- firmographics
- improvement suggestions about the initial site assessment, the follow-up visit, and the installation process overall
- business decision-making processes
- FR and SO
- participation in other programs
- impacts of the COVID-19 crisis

4.2 IESO, LDC & Program Delivery Vendor Staff Perspectives

The following subsections highlight the feedback received from the IESO, LDC, and the program delivery vendor staff.

4.2.1 Key Findings

Key findings from the IESO, LDC, and program delivery vendor staff IDIs include the following:

- All interviewees indicated the pandemic presented the greatest challenge to the program in 2020. The IESO staff and LDC staff stated they thought the program delivery vendor and the program's partners effectively delivered the program under challenging circumstances.
- The pandemic halted the program's delivery for over three months. However, once the program was re-introduced to the market, the LDC staff reported that delivery went relatively smoothly.
- The program delivery vendor staff utilized their call center to reschedule customer site visits. They managed a record of prospective customers for all the participating LDCs to ensure they could be contacted once the program's operations resumed.
- Both the delivery vendor and the LDC staff indicated that the biweekly calls hosted by delivery vendor were a valuable way to stay connected and address issues.
- The LDC staff stated the pandemic, the delayed start to the program, and the inflexible program end date all impacted their project volumes and ability to meet the program targets.
- According to the program delivery vendor staff, time was a limited resource given the pause in delivery in 2020 for the pandemic, the constraints of transitioning to the Interim Framework in 2019, and an inflexible program end date in December of 2020.

4.2.2 Design and Delivery

The REP followed a similar turnkey, direct install program design and delivery approach as the program had under prior frameworks. The program was delivered for all participating LDCs with the support of a program delivery vendor. One LDC, Peterborough Utilities, served as the lead LDC, coordinating with the IESO, delivery vendor, other participating LDCs, and other market actors as needed. The program began delivery under the IF in August of 2019 for some LDCs, with others joining over time.

The program delivery vendor facilitated biweekly calls with the LDCs to discuss program delivery topics, including marketing and outreach and lessons learned. Both the delivery vendor staff and LDC staff indicated these meetings were valuable to stay connected and address any issues as they arose.

In 2020, COVID-19-related restrictions halted the program's delivery for over three months. However, once the program was re-introduced to the market, the LDC staff reported that delivery went relatively smoothly. The program delivery vendor quickly developed new health and safety protocols in line with provincial guidelines to be followed by auditors and contractors once the restrictions were lifted.

The program delivery vendor staff utilized their call center to reschedule customer site visits. They managed a record of prospective customers for all the participating LDCs to ensure they could be contacted once the program's operations resumed. The LDC staff indicated this process worked very well.

4.2.3 Auditor and Contractor Engagement

As in 2019, the program delivery vendor was responsible for training and supporting the program's auditors and contractors. The program delivery vendor trained auditors and contractors on all relevant program protocols, including proper assessment procedures, the program's system, and data and image capture procedures. The training was completed both online through PowerPoints and webinars as well as onsite with new staff shadowing the experienced staff's onsite visits.

The technical assessments were performed by both the internal delivery vendor and external refrigeration technician resources. The installations were performed by the internal delivery vendor staff who were refrigeration contractors as well as external electrical contractors (for the motor measures and, in some instances, for other program-qualifying measures).

The program transitioned from a two-step to a three-step site visit process. The first visit consisted of a technical assessment (referred to as an equipment "health check"), during which relevant measures were identified, and the work order was signed. Depending on the measures to be installed, one to two installation visits would be performed by either an electrician or refrigeration contractor, or both.

The LDC staff indicated they also collaborated with auditors and contractors, answering questions and providing them with customer information as needed, as well as establishing connections in general. The LDCs also provided auditors with letters of endorsement that indicated the program's legitimacy, which were brought on-site to help address any customer concerns.

4.2.4 Customer Engagement

The program delivery vendor staff primarily generated customer leads through their internal call center. The LDC staff also reported that participating LDCs utilized various marketing and outreach techniques to compliment the program delivery vendor's activities. For example, they coordinated with local business chambers, sent out e-blasts to customers, conducted online campaigns, hosted printed advertisements, and updated marketing materials such as sell sheets from prior iterations of the program.

When feasible, the LDC staff indicated that they adopt a hands-on, interactive approach, such as interacting with customers directly to help build their confidence in the program, especially if they have concerns or are uncertain about participating. Additionally, the program delivery staff indicated they had made progress with the corporate customers, including several recent installs with a franchise.

4.2.5 Barriers and Opportunities

All interviewees indicated the pandemic presented the greatest challenge to the program in 2020. The IESO staff and LDC staff stated the program delivery vendor and the program's partners effectively delivered the program under challenging circumstances. Given the pandemic's strain on small businesses, the LDC staff stated that it was important to them to resume the program's delivery as soon as possible to provide the opportunity to their customers.

Both the program delivery vendor staff and LDC staff stated that administrative costs increased due to the need to staying prepared and equipped to deliver the program once restrictions were lifted. Program delivery vendor staff highlighted other challenges, including:

- the constraints of transitioning to the Interim Framework in 2019 (such as delays related to the award of the contract and the resulting short ramp-up period that followed in 2019, and long contracting processes for some LDCs),
- the limited time to deliver the program given the COVID-19-related delivery interruption in 2020 and the pause in delivery in 2020 for the pandemic, and
- an inflexible program end date in December of 2020.

Another participation barrier was that some customers did not have the appropriate decision-maker communicating with the program about their company's preferences from the onset. If this occurs, it may have led to multiple site visits to ensure all relevant measures were installed. LDC staff suggested that offering webinars where customers could interact and share their perspectives on how the program worked for them could be an approach to address this challenge.

Given some early program learnings, the IESO staff indicated that the initial site visit, during which the assessors catalogue eligible upgrade opportunities, is a critical step. Ensuring a thorough assessment is performed by knowledgeable assessors can reduce the number of site visits required and improve the customer experience. They indicated that the delivery vendor staff has already taken steps to address this by providing additional training and support for the assessors. The delivery vendor staff noted that instituting a standardized checklist for installers may be another useful program improvement moving forward.

According to the program delivery vendor, program predictions for eligible customers with refrigeration needs may not have been accurate, particularly in locations where customer interest was low or the measures were inappropriate for specific business types. They suggested that as the program evolves, these estimates would be worth revisiting to ensure that associated participation objectives are feasible.

4.3 Auditor and Contractor Perspectives

The following subsections highlight the feedback received from the surveys with the auditors and contractors.

4.3.1 Key Findings

Five surveys were completed with auditors and contractors. The key findings from these surveys include the following:

- Three of the survey respondents reported working as a contractor, and two reported working as both an auditor and contractor for the program.
- All five responding auditors and contractors reported either receiving one-on-one training from the program delivery vendor (4 respondents) or clarifications to inquiries about the program rules, application process, and other aspects of the program (2 respondents).

- Interactions with the LDC, the number and types of equipment offered, the value provided by the equipment, and interactions with the program representative from the IESO all received satisfaction ratings of 4 or higher on a scale from one (1) to five (5), where one indicates “not at all satisfied” and five indicates “completely satisfied.” However, on average, respondents rated their overall experience with the program as a 3.4.
- When asked what, if any, barriers prevented more customers from participating in the program in 2020, respondents reported a lack of awareness (2 respondents), customers thinking the upgrades were not worth the trouble of participating (1 respondent), language barriers (1 respondent), and not believing the program was free (2 respondents).
- To reach customers whose primary language is not English, one respondent suggested developing information sheets in several languages and working with trusted community representatives to share information about the program.
- Three respondents suggested increasing the program’s marketing to ensure customers are aware of the program even before they are contacted through the program.
- Other program improvement suggestions included improve the transparency between the program delivery vendor and the contractors (1 respondent), improve the organization from the program delivery vendor (1 respondent), a faster turnaround in paying invoices (1 respondent), improvements to the training provided (such as manufacturer product training) (1 respondent), and raising the incentive cap to ensure larger business types are able to complete more work (1 respondent).

4.3.2 Firmographics

Three of the survey respondents reported working as a contractor, and two reported working as both an auditor and contractor for the program. Four of the respondents became involved with the program after being contacted by the program delivery vendor. One respondent was referred by a friend at the program delivery vendor.

One respondent reported having 45 full-time employees, with seven involved with REP in the past year. The other four respondents reported having one or two staff members that were involved with the program in PY2020. Two of the firms had been in business for over 40 years, one had been in business for 16 years, and two had been in business for three years or less.

Responding auditors completed an average of 150 audits through the program in 2020 (2 respondents), and responding contractors completed an average of 63 installation projects through the program in 2020 (4 respondents). Audits and/or projects completed through the program represented 4% of respondents’ total sales in 2020 (2 respondents).

4.3.3 Program Experience

Two respondents reported working with the Business Refrigeration Incentive (BRI) program under the Conservation First Framework (CFF).

Four respondents recalled receiving one-on-one in-person training from the program delivery vendor, and two recalled receiving direct responses to their questions. Of the four that received one-on-one training, all recalled receiving training on topics including program offerings,

program rules, the application process, installation procedures and practices, and marketing and outreach techniques to better promote the program to customers. One contractor reported that “Training could be improved with manufacturer product training, so techs have a better understanding of [their] product when upgrading.”

4.3.4 Outreach and Marketing

Four respondents indicated that customers primarily learned about the program through leads generated by the program delivery vendor.

Three of the respondents rated their advice and recommendations on the installed equipment as a five (5) on a scale from one (1) to five (5), where one indicates “no influence at all” and five indicates “extremely influential.” One of these respondents stated, “Some customers wanted to install more than the program provided.”

The other two respondents provided lower ratings of a 2 (1 respondent) or a 1 (1 respondent) as they indicated that some customers were unconvinced about the program’s validity despite their advice and recommendations. Overall, respondents provided an average influence rating of 3.6.

4.3.5 Barriers and Improvement Suggestions

When asked why some customers might not have installed some or all the recommended upgrades or technologies, responses included:

- concerns about warranties (1 respondent),
- concerns about the program’s validity (2 respondents), and
- some of the units being incompatible or inaccessible (1 respondent).

Of the five respondents, two reported that it was rare for a customer not to agree to install some or all of the recommended upgrades. One respondent speculated that a refusal might occur if their equipment was purchased recently or if the customer felt that the deal was “too good to be true.”

When asked what, if any, barriers prevented more customers from participating in the program in 2020, respondents reported a lack of awareness (2 respondents), customers thinking the upgrades were not worth the trouble of participating (1 respondent), language barriers (1 respondent), not believing the program was free (2 respondents).

When asked how these customer participation barriers could be addressed, three respondents suggested the program needed to increase marketing, with one respondent noting that marketing will help “to ensure every business is aware of the program before they are contacted by the provider.” Another respondent suggested developing information sheets in several languages to bring onsite during assessments and work with trusted community representatives to share information about the program.

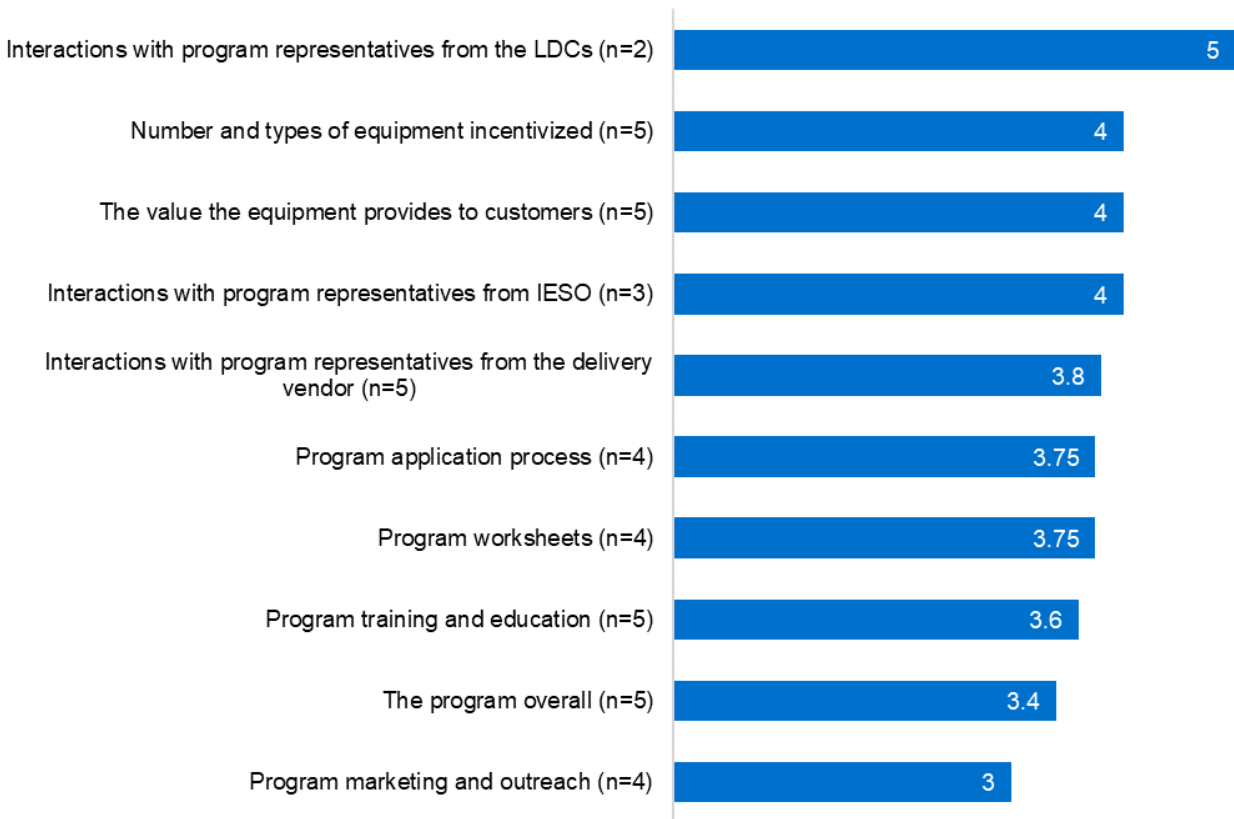
Finally, respondents were asked if there were any other areas of program improvement that they would suggest. Respondents mentioned improving the transparency between the program delivery vendor and the contractors (1 respondent), improving the organization from the program delivery vendor (1 respondent), a faster turnaround in paying invoices (1 respondent), improvements to the training provided (such as manufacturer product training) (1 respondent), and raising the incentive cap to ensure larger business types are able to complete more work (1 respondent).

4.3.6 Satisfaction

All respondents were asked to rate how satisfied they were with various aspects of the REP on a scale from one (1) to five (5), where one indicates “not at all satisfied” and five indicates “completely satisfied” (Figure 4-1). The two respondents who indicated they had interacted with REP representatives from the LDCs stated they were completely satisfied with the interactions they had (rating of 5). On average, respondents rated their satisfaction as a 4 with the number and types of equipment incentivized through the program, the equipment’s value to the customers, and interactions they had with any REP representatives from the IESO.

On average, respondents rated their overall experience with the program as a 3.4. Two respondents expressed a need for better communication and transparency between the program delivery vendor and the auditors and contractors.

Figure 4-1: Satisfaction with REP
(Average rating on a scale from 1 to 5)



4.4 Participants Perspectives

The following subsections highlight the feedback received from the participant survey.

4.4.1 Key Findings

Key findings from participants' responses include the following:

- A majority of survey respondents had no suggestions for improving the initial site assessment (81%), the contractor visit(s) (73%), or the overall installation process (85%). This suggests a high level of satisfaction with the program.
- Of those with suggestions for improving the site assessment (19%), contractor visit(s) (27%), or the overall installation process (7%), the most common suggestions were to:
 - Provide more flexibility in scheduling
 - Improve the professionalism of the assessor or contractor during the visits
 - Recommend appropriate or higher quality equipment
 - Shorten the length of the contractor's visit
 - Higher more competent/knowledgeable contractors

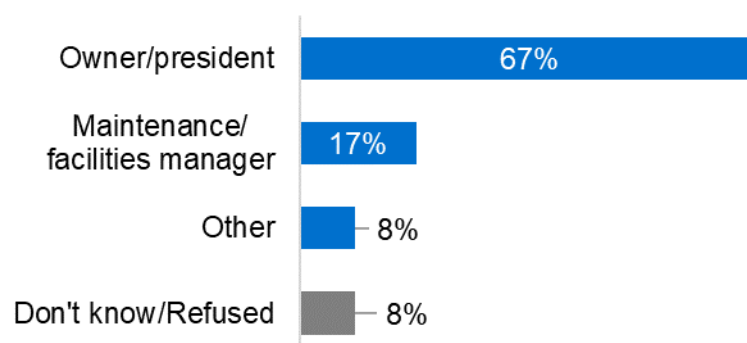
- Nearly all respondents (89%) reported that program activity, including the site assessment and installation, did not cause any disruption to their business.
- Three-fifths (60%) of respondents did not apply to any other programs besides the REP. Of the 14 respondents who had applied to other programs, the Save on Energy Retrofit Program (10%) was most commonly mentioned.
- Over two-thirds of respondents (69%) are interested in receiving additional assistance to help identify alternate energy-efficiency opportunities.
- Only about one-fourth of respondents (27%) had service maintenance contracts with third-party contractors. Only 10% of these respondents stated their service maintenance contractors discussed energy-efficiency opportunities with them very often.
- Just over one-half of respondents (52%) stated they would consider investing in upgrades with a determined payback period.
- COVID-19 had a significant impact on most respondents. The primary challenges reported were a loss of sales/customers (32%) and having to close or cancel events or their business as a whole for a period of time (18%).

4.4.2 Firmographics

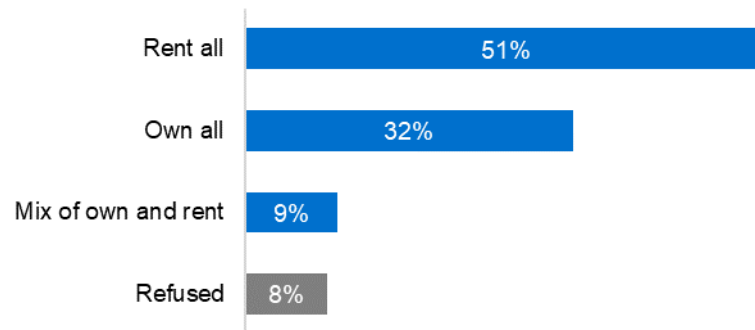
Participants were asked various questions to collect information on their job title, ownership status, and their responsibilities in relation to the program. Details on participants' companies (for example, primary activities, chain or franchise status, facility floor space, and whether the facility participated in other business programs) were also gathered during the survey.

As presented in Figure 4-2, over five-eighths (67%) of respondents indicated they were the owner or president of their company, with 17% indicating they were the maintenance or facilities manager, and 16% held an alternate title or preferred not to answer. Respondents with other titles included "chair" and "human resources."

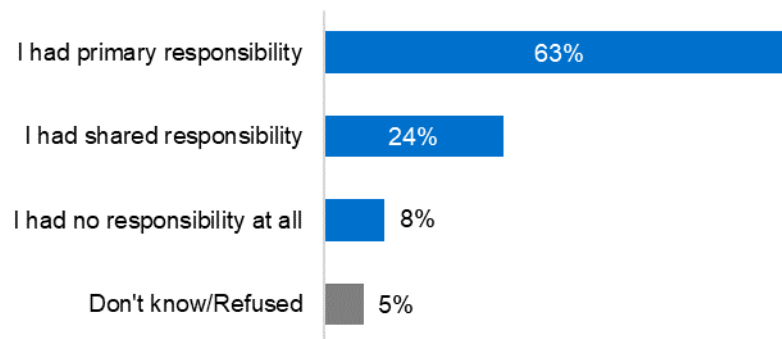
Figure 4-2: Title of Respondent
(Multiple responses allowed; n=75)



Over one-half (51%) of respondents reported renting the facility(ies) that received the energy-efficient upgrades through the program, while close to one-third (32%) owned the facility(ies) (Figure 4-3).

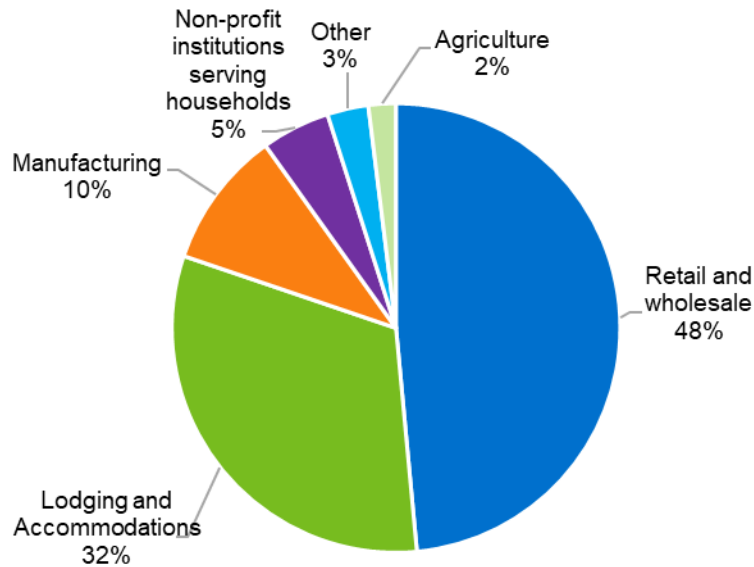
Figure 4-3: Ownership Status (n=75)

As presented in Figure 4-4, nearly two-thirds (63%) of respondents reported they had primary responsibility for budget or expenditure decisions regarding the energy-efficient upgrades or retrofits completed through the program.

Figure 4-4: Responsibility for Budget and Expenditures (n=75)

One-fourth of respondents (25%) indicated the facility(ies) that received the energy-efficient upgrades was (were) a chain or franchise. Close to one-half (48%) of the respondents indicated the primary business activity at the facility(ies) was (were) retail and wholesale (for example, food and beverage stores, general merchandise stores), followed by lodging and accommodations (32%). Other business activities included manufacturing (10%), non-profit institutions (5%), agriculture (2%), and other services (3%) (Figure 4-5).

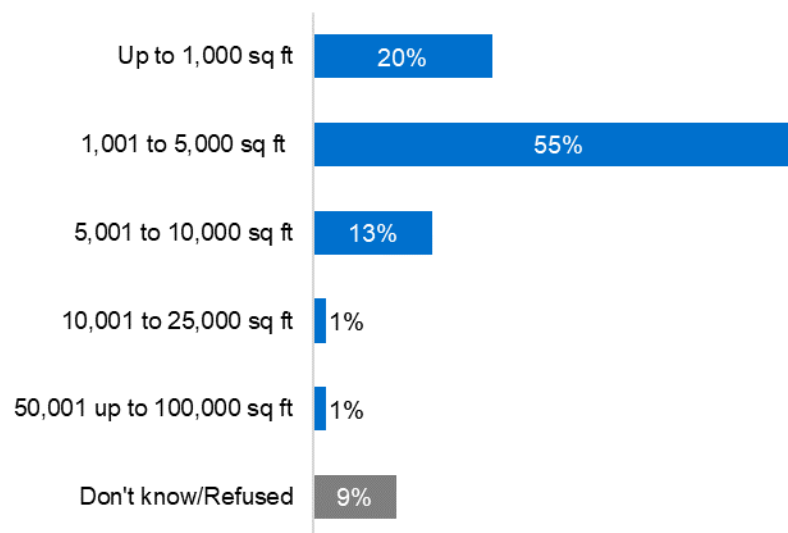
Figure 4-5: Primary Activity at Facility(ies)*
(Multiple responses allowed; n=63)



*12 respondents are excluded from this figure due to not providing a response to the question.

Most respondents reported having a facility size between 1,001 and 5,000 square feet (55%), while 20% of respondents reported a facility size of 1,000 square feet or less (Figure 4-6). Retail and wholesale businesses were reported to be 10,000 square feet or less.

Figure 4-6: Square Footage (n=75)*

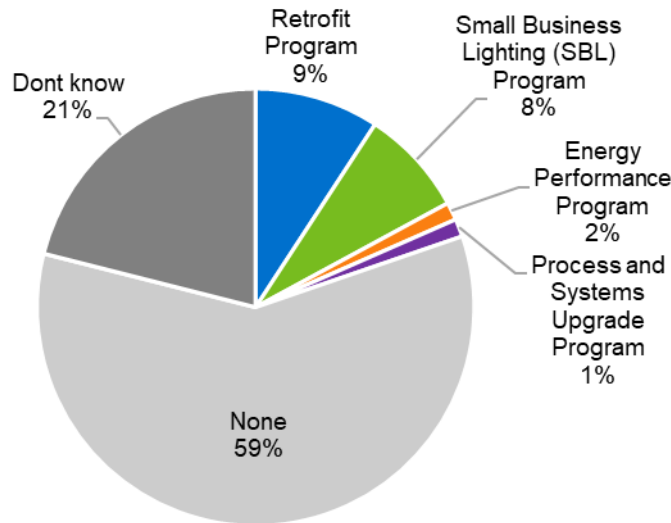


*Does not sum to 100% due to rounding.

Three-fifths of respondents (60%) did not apply to any other programs besides REP (Figure 4-7). Of the 14 respondents who applied to other programs, the Save on Energy Retrofit Program (10%) was most commonly reported.

Figure 4-7: Additional Energy-Efficiency Programs Applications

(Multiple response allowed; n=75)



4.4.3 Improvement Suggestions

Over three-fourths of respondents (81%) had no suggestions for improving the initial site assessment visit, indicating that a large majority were satisfied with the work performed by their auditor. As presented in Table 4-2, of those that suggested improvements, the most common suggestions were more flexibility in scheduling the assessment (4 respondents) and recommending the appropriate or higher quality equipment (4 respondents).

Table 4-2: Suggestions for Improving the Initial Site Assessment Visit

(Multiple responses allowed; n=14)*

Suggestions	Respondents
More flexibility in scheduling the assessment	4
Recommend appropriate or higher quality equipment	4
Shorten the time it takes to complete the assessment	3
Improve professionalism of the assessor	1
Provide more clarity on work to be performed	1
Perform the assessment for all customers	1

*Counts displayed rather than percentage due to small n.

The respondent who suggested improving the professionalism of the assessor stated the assessor could be more transparent about the work performed.

Almost three-fourths of respondents (73%) had no suggestions for improving contractor visits, indicating that the majority were satisfied with the work completed by their contractor. As presented in Table 4-3, of the 27% of respondents who provided suggestions, the most common responses were flexibility in scheduling (8 respondents), improving the professionalism of the contractor (4 respondents), and offering clear explanations about the work as well as providing contact information for follow up questions (2 respondents).

Table 4-3: Suggestions for Improving Program Contractor Visits
(Multiple responses allowed; n=20)*

Suggestions	Respondents
More flexibility in scheduling the installation	8
Improve the professionalism of the contractor	4
Offer clear explanations and provide contact information for follow-up	2
Other	2
Don't know/Refused	6

*Counts displayed rather than percentage due to small n.

Table 4-4 presents the feedback from four respondents who suggested improvements to address the contractor's professionalism. The most common suggestion was transparency from the contractor about the work being performed (3 respondents).

Table 4-4: Suggestions for Improving Contractor Professionalism
(Open-ended and multiple responses allowed; n=4)*

Suggestions	Respondents
Transparency about work performed	3
Responsiveness to questions or concerns	2
Politeness/business etiquette	1
Respect for our company's time during the visit	1

*Counts displayed rather than percentage due to small n.

Most respondents (85%) had no suggestions for improving the overall installation process, indicating a relatively high level of satisfaction with the program. As presented in Table 4-5, five respondents provided suggestions, with most relating to improving the interaction with or work performed by the contractors.

Table 4-5: Suggestions for Improving Overall Installation Process
(Open-ended and multiple responses allowed; n=5)*

Suggestions	Respondents
Hire more competent/knowledgeable contractors	2
Provide contact information to make following up easier if equipment fails	2
Perform higher quality installations and/or upgrades	1

Suggestions	Respondents
Provide paperwork to participant	1
Offer physical marketing materials	1

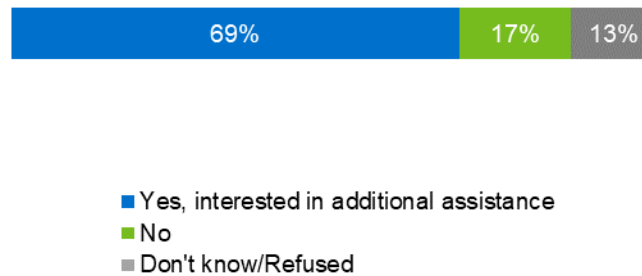
*Counts displayed rather than percentage due to small n.

Nearly all respondents (89%) reported that program activity, including the site assessment and installation, did not cause any disruptions to their business.

4.4.4 Decision-Making Processes

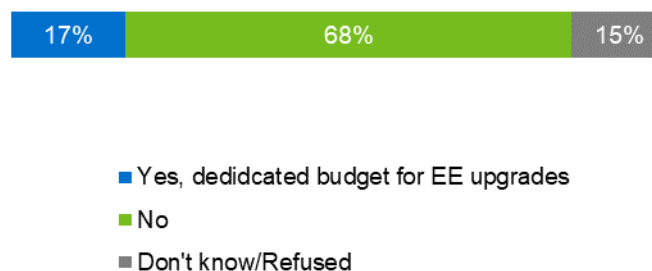
Over two-thirds of respondents (69%) were interested in receiving additional assistance to help identify alternate energy-efficiency opportunities.

Figure 4-8: Interest in Assistance to Identify Other Energy-Efficiency Opportunities (n=75)

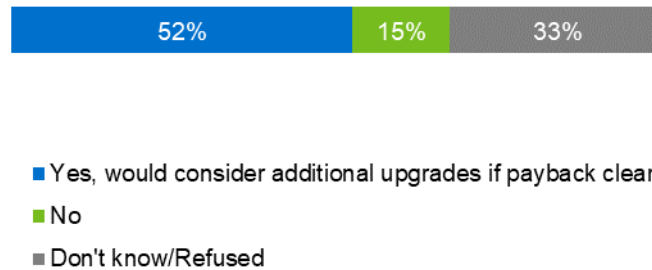


When asked whether their business had a dedicated budget to implement energy-efficiency upgrades at their facility(ies), less than one-fifth of respondents (17%) stated they did, compared to 68% that stated they did not and 15% that stated they did not know or refused to answer.

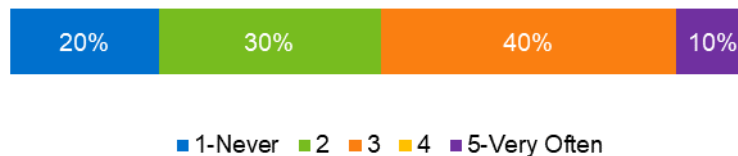
Figure 4-9: Availability of Dedicated Budget for Energy-Efficiency Upgrades (n=75)



Respondents were asked whether they would consider investing in energy-efficiency upgrades if a payback period could be determined. Just over one-half of respondents (52%) stated they would consider investing in upgrades with a determined payback period, 15% stated no, and 33% did not know or refused to answer.

Figure 4-10: Interest in Other Energy-Efficiency Upgrades if Payback Determined (n=75)

Only about one-fourth of respondents (27%) had service maintenance contracts with third-party contractors. The 20 respondents who stated having service maintenance contracts were asked to rate how often their business' third-party contractor(s) discussed energy-efficiency opportunities on a scale from one (1) to five (5), where one indicates "never" and five indicates "very often" (Figure 4-11). Only 10% of these respondents stated their service maintenance contractors discussed energy-efficiency opportunities with them very often.

Figure 4-11: Frequency that Service Contractors Discuss Efficiency Opportunities (n=20)

4.4.5 Business Response to the COVID-19 Crisis

Respondents were asked an open-ended question about how the COVID-19 pandemic had impacted their company and its operations. Of the 59 respondents who responded to this question, the greatest impact of COVID-19 was a loss of sales/customers (32%) and having to close or cancel events or their business as a whole for a period of time (18%).

Table 4-6 illustrates the effect of the pandemic on sales by primary business activity. Three respondents reported seeing an increase in business and a demand for their products. The other respondents either saw sales decline or had their business operations cease for a period of time. One respondent stated, "We had to close for the COVID crisis. We have been closed for a year and will stay closed until it is safe to return to rent the facility for parties, weddings and other functions."

Table 4-6: Impact to Sales of COVID-19
(Open-ended and multiple responses allowed; n=34)

Primary Business Activity	Respondents*		
	Sales Increased	Sales Decreased	Operations Ceased
Retail and Wholesale (n=14)	2	9	3
Lodging and Accommodation (n=13)	--	9	4
Manufacturing (n=4)	1	2	1
Non-profit (n=3)	--	1	2
Total	3	21	10

Six respondents indicated their company had to lay off staff members. One respondent indicated they laid off all staff besides family due to reduced hours, and the remaining staff are working overtime to stay in business. Respondents also mentioned experiencing disruptions to their supply chains, difficulty stocking certain items, and severe economic loss. One respondent described their experience by saying it was, “Devastat[ing], just when you get up of the mat you are knocked down. We are on strike three.”

Participants were asked to rate how closely the Save on Energy representatives (i.e., assessors, installers) adhered to the relevant health and safety standards associated with the COVID-19 pandemic. They rated the representative’s adherence on a scale from one (1) to five (5), where one indicates “did not adhere at all,” and five indicates “adhered completely.” More than three-fifths(64%) participants stated assessors and installers adhered to health and safety standards (Figure 4-12).

Figure 4-12: Adherence to Health and Safety Standards*
(Rating of 4 or 5 on a scale of 1 to 5; n=74)



*1 respondent is excluded from this figure due to not providing a response to the question.

Respondents who provided a rating of three or below did not have suggestions for improving the Save on Energy representative’s compliance with relevant health and safety standards associated with the COVID-19 pandemic.

4.5 Process Evaluation Findings and Recommendations

Finding 1. Program free-ridership was moderately low, relative to historical results, in PY2020 at 14.6%. The program’s NTG was high at 93.6%, and the FR score was moderately low at 14.6%. SO was relatively high at 8.2%, which helped offset the FR and led to a high NTG. The program assisted more than three-fifths (64%) of participants with upgrades they otherwise would not have been able to implement (37%) or would have had to postpone (27%). However, the remaining two-fifths (36%) would have either done the “exact same installation” anyway (8%), would have done the installation but scaled it back (7%), or were unsure of what

they would have done (21%), suggesting that there is room for FR improvements in future program years.

- **Recommendation 1a:**¹ *Maintain focus on minimizing FR. Key areas include:*
 - *identifying and targeting customer segments who would be unlikely to make upgrades without program support,*
 - *screening customers to ensure they have not already begun implementing measures, and*
 - *encouraging all participants to complete the evaluation surveys to ensure that the FR results are as representative of the true population of program participants as possible.*
- **Recommendation 1b.** *Encourage participants to install additional energy-efficient equipment or services beyond what is covered through the program if it is feasible for them to do so (for example, identify additional opportunities during initial assessment). Doing so may lead to increases in the program's spillover (SO), which may in turn help offset FR and lead to an improved net-to-gross (NTG) ratio.*

Please note that Recommendation 1a was included in the PY2019 evaluation as well. In response to the recommendation in PY2019, the LDC indicated that they would pursue ways to further reduce FR and noted that they had anticipated a lower FR due to refrigeration not being thought of as an energy efficiency opportunity as often as other measures, such as lighting. As indicated in the PY2020 recommendation, it will continue to be important to identify and target customer segments most in need of the program's support, to screen customers to ensure they have not begun implementing measures, and to encourage responses to the evaluation surveys. The program FR was moderately low in PY2020, but given the critical importance of minimizing FR, this recommendation is provided again to ensure that it continues to be carefully considered in future program years.

Finding 2: Satisfaction with the program and its elements were relatively moderate across the auditors and contractors, suggesting room for improvement. On average, auditors and contractors rated their overall experience with the program as a 3.4 on a scale from one (1) to five (5), where one indicates "not at all satisfied" and five indicates "completely satisfied." Auditors and contractors reported that a lack of awareness, customers deeming the upgrades not worth the trouble of participating, language barriers, and not believing that the program was free were the main barriers deterring additional customer participation. Common suggestions for improvement included developing information sheets in several languages and

¹ Based on the vendor's response in PY2019 to a similar recommendation, we understand that the vendor was planning to pursue ways to further reduce FR. Compared to PY2019, FR in PY2020 has been reduced, though there is still some room for improvement. As indicated in the PY2020 recommendation, to help continue to minimize FR further in future program years, it will continue to be important to identify customers most in need of the program's support, screening customers to ensure they have not already begun work prior to participation, and encouraging responses to the evaluation surveys.

working with community groups to share program information, increasing marketing efforts to improve awareness, and offering additional training opportunities to auditors and contractors.

- **Recommendation 2a:** Consider developing program information sheets in several languages and working with trusted community representatives to share information about the program.
- **Recommendation 2b:** Consider expanding the program's marketing to improve customer awareness and reduce skepticism about the program's legitimacy.
- **Recommendation 2c:** Offer additional training opportunities to auditors and contractors on topics that will equip them with the knowledge needed to effectively support the program (for example, manufacturer product training).

Please note that a recommendation similar to Recommendation 2a was included in the PY2019 evaluation as well. In response to the recommendation in PY2019, the LDC indicated that they were considering offering multi-lingual promotional materials and that they had worked with community groups, such as local business industry associations, chambers of congress, and hospitality groups. Given that these requests for multi-lingual information and working closely with community groups (including those that could help address language barriers) were still mentioned in PY2020, the recommendation has been provided again to ensure that it continues to be carefully considered in future program years.

Finding 3: Satisfaction with the program and its elements was high overall among participants, but there is room for improvement. Most participants had no suggestions for improving the initial site assessment (81%), the contractor visit(s) (73%), or the overall installation process (85%). This suggests a high level of satisfaction with the program. Of those participants with suggestions for improving the site assessment (19%), contractor visit(s) (27%), or the overall installation process (7%), the most common suggestions were to provide more flexibility in scheduling, improve the professionalism of the assessor or contractor during the visits, recommend appropriate or higher quality equipment, decrease the time of the contractor's visit, and higher more competent/knowledgeable contractors.

- **Recommendation 3a:** Provide more flexibility in scheduling the visits (for example, coordinate with participants to identify suitable times for the visit).
- **Recommendation 3b:** Offer additional training to auditors and contractors to ensure professionalism during assessments and contractor visits (for example, clearly explain work being performed, responsiveness to questions, politeness/business etiquette, respect for the company's time).
- **Recommendation 3c:** Ensure the products recommended through the program are appropriate for the specific business being served and are of high quality.
- **Recommendation 3d:** Reduce the time it takes to complete the contractor visits. Identify areas where additional program support or resources could assist the contractors in completing this task.

Please note that Recommendation 3a through 3b were included in the PY2019 evaluation as well. In response to the recommendation that was similar to 3a in PY2019, the LDC indicated that they had contacted customers to book appointments to allow flexibility in scheduling. In response to the recommendation that was similar to 3b in PY2019, the LDC indicated that they had worked to address some issues with professionalism of auditors and contractors from sub-contracted sources. Given that issues with flexibility of scheduling visits and professionalism of auditors and contractors was mentioned again in PY2020, these recommendations have been provided again to ensure that they continue to be carefully considered in future program years.

Finding 4: There is customer interest in receiving additional assistance to identify other energy-efficiency opportunities. Over two-thirds of participants (69%) were interested in receiving additional assistance to help identify alternate energy-efficiency opportunities. When asked whether their business had a dedicated budget to implement energy-efficiency upgrades in their facility(ies), less than one-fifth of participants (17%) stated they did.

- **Recommendation 4a:** *During the audit, if the program cannot cover additional upgrade opportunities, consider providing an itemized list of these additional upgrades to the customer for future consideration.*
- **Recommendation 4b:** *Assist customers who are interested in installing upgrades beyond those covered by the program by coordinating with participants and contractors regarding the possibility of having those upgrades performed concurrently with the program-qualified upgrades.*
- **Recommendation 4c:** *If the additional upgrades that customers are interested in cannot be installed at the time of the program contractor's visit, identify additional ways to support the customers (for example, identify other programs the customers may be eligible for, put customers in touch with trusted contractors, and help customers identify other possible financing opportunities).*

Finding 5: Service maintenance contractors do not typically recommend energy-efficiency improvements to customers. Only about one-fourth of participants (27%) had service maintenance contracts with third-party contractors. Only 10% of these participants stated their service maintenance contractors discussed energy-efficiency opportunities with them with some frequency.

- **Recommendation 5:** *Identify opportunities to engage service maintenance third-party contractors in discussions on the necessity of suggesting energy-efficiency upgrades to their customers.*

Finding 6. Additional cross-program promotion opportunities exist. Given that over one-half (55%) of participants had not applied to other energy-efficiency programs in 2020 besides the Retrofit program, opportunities exist to further promote other Save on Energy programs to REP customers.

- **Recommendation 6.** *Continue to identify cross-program promotion opportunities, which can be achieved through two means. Firstly, promoting other program opportunities to all participating REP customers at both the start and end of the participation process.*

Secondly, ensuring that participating REP customers are aware of other programs that target small businesses, including SBL.

Please note that a similar recommendation to Recommendation 6 was included in the PY2019 evaluation as well. In response to the recommendation in PY2019, the LDC indicated that they were planning to cross promote with the SBL program through a shared lead initiative with that program's vendor on a pilot basis. Given that participation in other programs was still very low as reported by the surveyed REP participants in PY2020, this recommendation has been provided again to ensure that it continues to be carefully considered in future program years.

Appendix A Impact Evaluation Methodology

A.1 Sample Plan

Independently verifying the energy and demand savings and attributing these savings first requires selecting sample projects that represent the program's population. The goal of a representative sample ensures results can be applied to the population's reported savings to verify gross and net impacts with minimal uncertainty. A random sampling of projects was completed by studying the population and developing a sampling plan based on the following factors:

- Participation levels provided in the program database extract
- Overall confidence/precision targets of 90/10 for the program assuming a coefficient of variation (C_v) of 0.5

A.2 Project Counts

Due to the similarity of measures installed through the REP the program applied a single sample based on completed projects

A.3 Project Audits

Subsequent to the sampling process, project audits representing the REP population were completed. Sampled projects received Level 1 audits, which consist of desk reviews of project documentation available from the program delivery vendor. These documents include project applications, equipment specification sheets, notes on equipment installed, invoices for equipment, and any other documentation submitted to the program. Evaluation of the REP often includes Level 2 audits with on-site visits and extensive metering to estimate equipment hours of use and operational load. However, the PY20 evaluation cycle was disrupted by the COVID-19 pandemic with corresponding facility closures and social distancing requirements, leading to the suspension of on-site visits.

To maximize participant responses, we expanded the types of outreach conducted for the impact evaluation. In addition to verification phone calls, the evaluation added an option to complete virtual site visits through a software solution.

Virtual site visits permitted the EM&V staff to view through the phone, tablet, or computer camera with the approval of the participant. The software acts like a virtual meeting that allows screen sharing and can be moved around a facility to verify equipment installation, quantities, and operating parameters. However, we faced difficulty as many participants were still working from home, which limits the opportunity to complete a virtual site visit, or were uncomfortable sharing access through their mobile equipment.

A.4 Reported Savings

Gross reported savings are the energy and summer peak demand savings derived from information submitted on participant applications. They reflect the equipment installed throughout the program. This information was provided to the evaluation team through the program participation data extract provided by the IESO.

A.5 Verified Savings

Energy and demand savings are verified for all sampled projects and rely on data collected and verified during the project audit. This information is evaluated utilizing analytical tools to determine the savings attributable to each project. For each project the verified savings are compared to the reported savings to define the program realization rate. This realization rate is then applied to all projects' gross reported savings in the population to estimate the verified savings. Equation A-1 shows the formula for calculating the program realization rate.

Equation A-1: Realization Rate

$$\text{Realization Rate} = \frac{\sum_i^n \text{Savings}_{\text{verified}}}{\sum_i^n \text{Savings}_{\text{reported}}}$$

Where:

$\text{Savings}_{\text{verified}}$ = Energy (kWh) or demand (kW) savings verified for each project in the sample

$\text{Savings}_{\text{reported}}$ = Energy (kWh) or demand (kW) savings reported by the program for each project in the sample

The total verified savings reflect the direct energy and demand impact of the program's operations. However, these savings do not account for customer or market behaviour impacts that may have been added to or subtracted from the program's direct results. These market effects are accounted for through the net impact analysis.

A.6 Interactive Effects for Lighting Equipment

The REP incentivizes the installation of lighting equipment that has higher efficiency levels compared to commonly installed lamps and fixtures. Ideally, this high-efficiency equipment should consume less energy. However, it is understood that the equipment's energy consumption in an enclosed space cannot be viewed in isolation. Building systems interact with one another, and a change in one system can affect a separate system's energy consumption. This interaction should be considered when calculating the benefits provided by the program. Examining cross-system interactions provides a comprehensive view of building-level energy changes, rather than limiting the analysis to solely the energy change that directly relates to the modified equipment. The IESO Evaluation Measurement and Verification (EM&V) Protocols state that interactive energy changes should be quantified and accounted for whenever possible. Based on this guidance, interactive effects were calculated for all energy-efficient lighting measures installed through the program to capture the changes in the operation of heating, ventilation and air-conditioning (HVAC) equipment due to lower heat loss from energy-efficient lighting equipment.

A.7 Lifetime Savings

When performing the impact evaluation, it is important to consider the total amount of savings over the lifetime of retrofitted equipment. This consideration is necessary given that energy savings, demand savings, avoided energy costs, and other benefits continue to accrue each year the equipment is in service. The method of calculating lifetime energy savings of a measure level is presented in Equation A-2.

Equation A-2: Lifetime Energy Savings

$$\text{Lifetime Energy Savings} = \text{EUL} \times \text{Annual Energy Savings}$$

Where:

EUL = Estimated useful life of the retrofitted equipment

Appendix B Detailed Net-to-Gross Methodology

This appendix provides detail on the sampling plans for collecting NTG data, the instruments used to assess FR and SO, the implementation of the data collection, and the analysis methods.

An effective questionnaire was developed to assess FR and SO. The approach has been used successfully in many previous evaluations. The NTG ratio is defined as follows (Equation B-3).

Equation B-3: Net-to-gross Ratio

$$NTG = 100\% - FR + SO$$

Where FR is free-ridership and SO is spillover.

B.1 Free-ridership Methodology

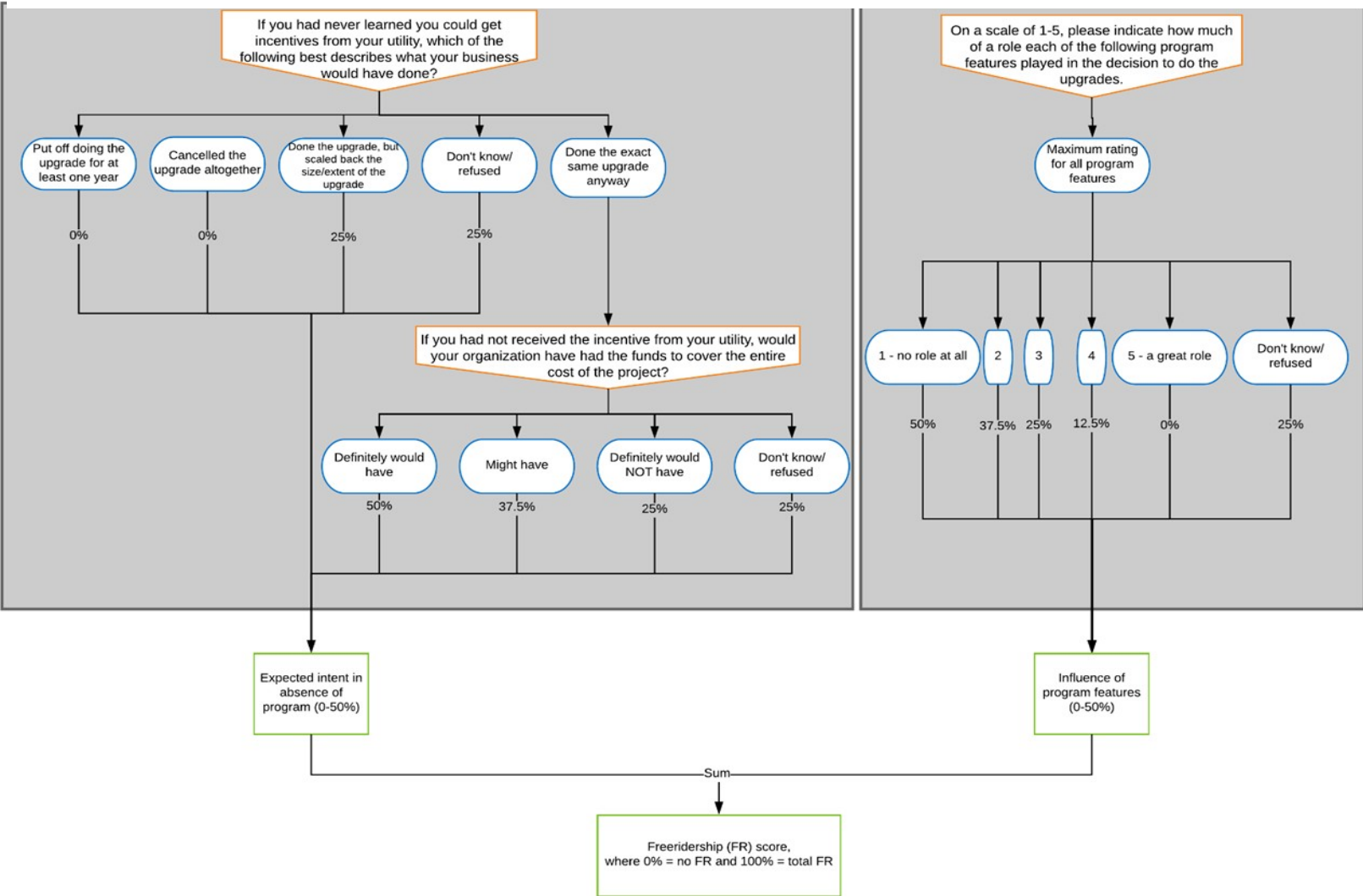
The survey addressed the attribution of savings for each sampled project or type of equipment through two main components:

- Intention of the expected behaviour in the program's absence
- Influence of various program features, such as the incentive, program marketing and outreach, and any technical assistance received

Each component produces scores ranging from 0 to 50. The two components are summed to produce a total FR score ranging from 0 (not a free rider) to 100 (complete free-rider). The total score is interpreted as a percentage (0% to 100%) to calculate the mean FR level for a given program.

Figure B-13 illustrates the FR methodology.

Figure B-13: Free-ridership Methodology



Intention Component

The FR score's intention component asks participants how the evaluated project would have been different in the program's absence. The two key questions that determine the intention score are as follows:

Question 1: If you had never learned you could get incentives/upgrades at no cost through the program, which of the following best describes what your business would have done? Your business would have...

1. Put off doing the upgrade for at least one year.
2. Cancelled the upgrade altogether.
3. Done the upgrade, but scaled back the size or extent of the upgrade.
4. Done the exact same upgrade anyway → Ask Question 2
98. Don't know
99. Refused

[ASK ONLY IF RESPONSE TO QUESTION 1=4: Done the exact same upgrade anyway] Question 2: If you had not received the incentive/upgrades at no cost from the program, would you say your organization definitely would have, might have, or definitely would not have had the funds to cover the entire cost of the project?

1. Definitely would have
2. Might have
3. Definitely would NOT have
98. Don't know
99. Refused

Table B-7 indicates the possible intention scores a respondent could have received depending on their responses to these two questions.

If a respondent provided an answer of 1 or 2 (would postpone or cancel the upgrade), the respondent would receive an FR intention score of 0% (on a scale from 0% to 50%, where 0% is associated with no FR and 50% is associated with high FR). If a respondent answered 3 (would have done the project, but scaled back the size or extent) or said they did not know or refused the question, the respondent would receive an FR intention score of 25% (associated with moderate FR). If the respondent answered 4 (would have done the exact same project anyway), they are asked the second question before an FR intention score can be assigned.

The second question asks the participants who had said they would have done the exact same project, regardless of whether their organization would have had the funds available to cover the entire project cost. If the respondent answered 1 (definitely would have had the funds), the respondent would receive a score of 50% (associated with high FR). If the respondent answered 2 (might have had the funds), they would receive a slightly lower FR score of 37.5%. If the respondent answered 3 (definitely would not have had the funds) or did not know or refused the question, the respondent would receive an FR intention score of 25% (associated with moderate FR).

Table B-7: Key to Free-ridership Intention Score

Question 1 Response	Question 2 Response	Intention Score (%)
1 or 2	Not asked	0 (no FR for intention score)
3, 98 (Don't Know), or 99 (Refused)	Not asked	25
4	3, 98 (Don't Know), or 99 (Refused)	25
4	2	37.5
4	1	50 (high FR for intention score)

The bullet points below display the same FR intention scoring approach in a list form. As mentioned above, for each respondent, an intention score was calculated, ranging from 0% to 50%, based on the respondent's report of how the project would have changed had there been no program:

- Project postponement or cancellation = 0%
- Reduction in size or scope or use of less energy efficient equipment = 25%
- Respondent does not know what they would have done in the absence of the program = 25%
- No change and respondent states firm would not have made funds available = 25%
- No change but respondent is not sure whether firm would have made funds available = 37.5%
- No change and respondent confirms firm would have made funds available = 50%

Influence Component

The influence component of the FR score asks each respondent to rate how much of a role various potential program-related influence factors had on their decision to do the upgrade(s) in question. Influence is reported using a scale from one (1) to five (5), where one means "it played no role at all" and five means "it played a great role." The potential influence includes the following:

- Availability of the incentives or the no-cost upgrades
- Information or recommendations provided to you by your local utility representative
- The results of any audits or technical studies done through this or another program provided by your local utility or the IESO
- Information or recommendations provided from auditors, contractors, vendors or suppliers associated with the program
- Marketing materials provided by your local utility about the program (email, direct mail, etc.)
- Previous experience with any energy saving program
- Others (identified by the respondent)

Table B-8 indicates the possible influence scores a respondent could receive depending on how they rated the influence factors above. For each respondent, the program influence is set equal to the maximum influence rating that a respondent reports across the various influence factors. For example, suppose the respondent provided a score of 5 (great role) to at least one of the influence factors. In that case, the program is considered to have had a great role in their decision to do the upgrade, and the influence component of FR is set to 0% (not a free rider).

Table B-8: Key to Free-ridership Influence Score

Maximum Influence Rating	Influence Score (%)
5 - program factor(s) highly influential	0
4	12.5
3	25
2	37.5
1 - program factor(s) not influential	50
98 – Don't know	25
99 - Refused	25

The bullet points below display the same FR Influence scoring approach in a list form. As mentioned above, for each project, a program influence score was calculated, also ranging from 0% to 50%, based on the highest influence rating given, among the potential influence factors:

- Maximum rating of 1 (no influence factor had a role in the decision to do the project) = 50%
- Maximum rating of 2 = 37.5%
- Maximum rating of 3 = 25%
- Maximum rating of 4 = 12.5%
- Maximum rating of 5 (at least one influence factor had a great role) = 0%
- Respondent does not know how much influence any factor had = 25%

The intention and program influence scores were summed for each project to generate an FR score ranging from 0 to 100. The scores are interpreted as % FR: a score of 0 means 0% FR (i.e., the participant was not at all a free rider), a score of 100 means 100% FR (the participant was a complete free rider), and a score between 0 and 100 means the participant was a partial free rider.

B.2 Spillover Methodology

To assess the SO, respondents were asked about installing energy-efficient equipment or services that were done without a program incentive following their participation in the program. The equipment-specific details assessed are as follows:

- ENERGY STAR Appliance: type and quantity
- Fan: type, size, quantity
- HVAC: air conditioner replacement, above code minimum: tonnage and quantity
- Lighting: type, quantity, wattage, hours of operation, location, and fixture length
- Lighting – controls: type of control, type and quantity of lights connected to control, hours of operation, and percentage of time the timer turns off lights
- Motor/Pump Upgrade: type, end use, horsepower, and efficiency quantity

- Motor/Pump Drive Improvement (VSD and Sync Belt): type, end use, horsepower, and quantity
- Others (identified by the respondent): description of upgrade, size, quantity, hours of operation

For each equipment type that the respondent reports installing without a program incentive, the survey instrument asks about the extent of influence that earlier involvement in the program had on the decision to carry out the upgrades. Influence is reported using a scale from one (1) to five (5), where one means “it played no role at all” and five means “it played a great role.” Suppose the influence score is between 3 to 5 for a particular equipment type. In that case, the survey instrument solicits details about the upgrades to estimate the quantity of energy savings that the upgrade produced.

For each upgrade, the program influence rating was converted to an influence score ranging from 0% to 100%, as follows:

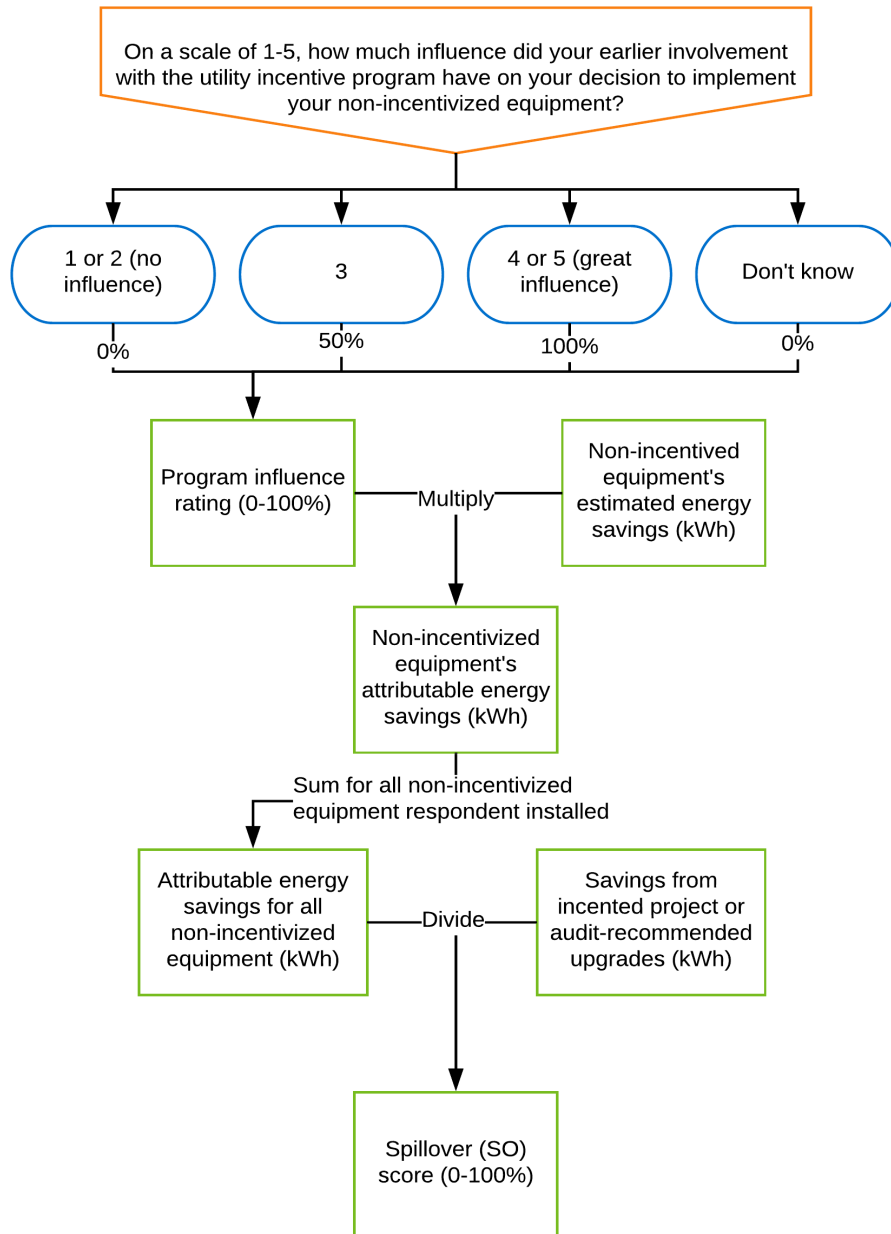
- Maximum rating of 1 or 2 (no influence) = 0%
- Maximum rating of 3 = 50%
- Maximum rating of 4 or 5 (great influence) = 100%
- Respondent does not know how much influence any factor had = 0%

The following procedure was used to calculate an SO percentage for each respondent:

- Multiplying the estimated energy savings for each upgrade by the influence percentage to calculate the upgrade’s program-attributable energy savings.
- Summing program-attributable energy savings from all identified upgrades for each respondent to calculate the respondent’s total SO savings.
- Dividing each respondent’s total SO savings by the savings from the incented project.

Figure B-14 illustrates the SO methodology,

Figure B-14: Spillover Methodology



B.3 Identification of Project or Upgrade for NTG Assessment

Participants were asked to consider all their completed projects in PY2020 through the particular program in question. This approach allowed for the respondent’s NTG value across all the projects they completed in PY2020 to be applied rather than just one.

B.4 Other Survey Questions

In addition to the questions addressing FR and SO, the survey included the following topics to provide additional context:

- Whether the respondent is the person primarily involved in decisions about upgrading equipment at their company. If the respondent is not the appropriate contact, they are asked by the interviewer to be transferred to or be provided contact information for the appropriate person in the case of a phone survey or to forward the survey weblink on to the appropriate contact if a web survey.
- Whether the respondent had primary or shared responsibility for the budget or expenditure decisions for the program-incentivized work completed at their company.
- The respondent's work title.
- When the respondent first learned about the program incentives, relative to the upgrade in question (before planning, after planning but before implementation, after implementation began but before project completion, or after project completion).
- When the respondent submitted their application to the program, and what their reasons were for submitting it after the work was started or completed, if applicable.
- How the respondent learned about the program.

The responses to these questions are not included in the algorithms for calculating FR or SO but provide additional context. The first question ensures that the appropriate person responded to the survey. The other questions provide feedback about responsibility for budget and expenditure decisions, the respondent's job title, application submission process details, and how and when program influence occurs.

B.5 Net-to-gross Survey Implementation

The survey was implemented over the web. It was assumed that all contacts who responded were the appropriate contacts to answer the questions. The introductory text in the survey asked the respondent to forward the survey weblink to the appropriate contact to fill it out if they were not the appropriate contact to do so.

Appendix C Additional Net-to-Gross Evaluation Results

This appendix provides additional results in support of the NTG evaluation.

Figure C-15: Influence of Program Features on Participation – Detailed Results (n=75)

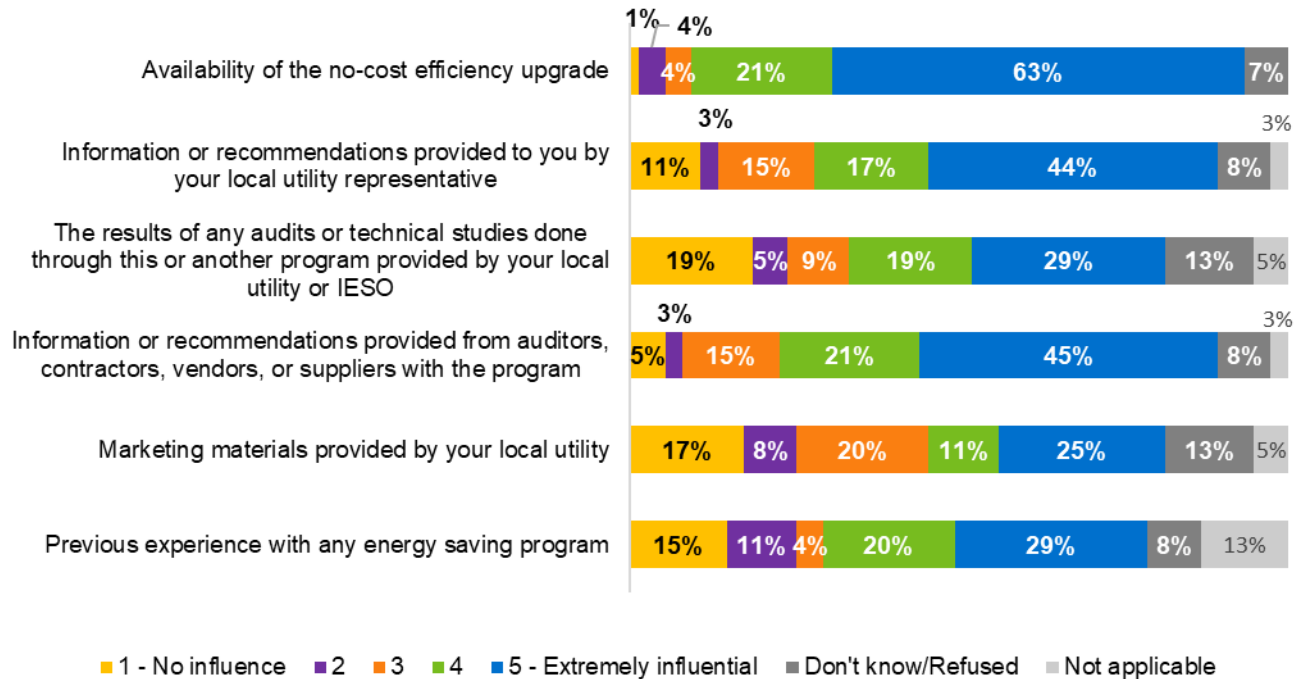


Table C-9: Detailed Spillover Results (n=6)

Type of Upgrade Installed	Size	Number Installed
Fan	<1 ft. in diameter	2
Fan	>8 ft. in diameter	2
ENERGY STAR Fridge	--	4
Lighting	LED Exterior	13
Lighting	LED Linear	24
Lighting	LED Screw Based	66
Lighting Control	Occupancy Sensor	1
Motor pump upgrade (on HVAC fan)	15.1-30.0 horsepower, premium efficiency	1
Motor pump upgrade (on HVAC fan)	1.1-5.0 horsepower, standard efficiency	1

Appendix D Detailed Process Evaluation Methodology

This appendix provides additional detail about the process evaluation methodology. A summary of the methodology was provided in Section 4.1. The process evaluation collected primary data from key program actors, including the IESO program staff, LDC program staff, program delivery vendor staff, auditors, contractors, and participants (Table D-10). Data were collected using different methods, depending on what was most suitable for a particular respondent group (for example, web surveys, telephone-based IDIs). This data, when collected and synthesized, provides a comprehensive understanding of the program.

All process evaluation data collection activities were carried out or managed by the evaluators. All survey instruments, interview guides, and sample files were developed by the evaluators for interviews and surveys. The survey instruments and interview guides were approved by the IESO EM&V staff, and the data used to develop the sample files was retained from program records supplied either by the IESO EM&V staff or the program delivery vendor.

Table D-10: Process Evaluation Primary Data Sources

Respondent Type	Methodology	Fielding Firm	Completed	Population	90% CI Error Margin
IESO Program Staff	Phone In-depth Interview (IDI)	NMR	1	1	0%
LDC Program Staff	Phone IDI	NMR	1	1	0%
Program Delivery Vendor Staff	Phone IDI	NMR	1	1	0%
Auditors and Contractors	Web Survey	NMR	5	8	N/A*
Participants	Web Survey	NMR	75	647	9.0%

*Error margin not displayed if the respondent count is below 30 unless census is achieved.

The following subsections provide additional details about the process evaluation methodology.

D.1 IESO, LDC, and Program Delivery Vendor Staff Interviews

In-depth interviews (IDIs) were completed with one IESO program staff member and one LDC staff member. Additionally, two interviews were completed with staff members from the program delivery vendor (Table D-11). The purpose of the interviews was to better understand the perspectives of the IESO program staff, LDC program staff, and program delivery vendor staff related to program design and delivery.

The interview topics covered included program roles and responsibilities, program design and delivery, marketing and outreach, market actor engagement, program strengths and weaknesses, and suggestions for improvement.

The appropriate staff to interview were identified in consultation with the IESO EM&V staff. The telephone IDI was conducted with the program delivery vendor staff using in-house staff (rather than through a survey lab). The interviews were completed between May 4 and May 14, 2021, and each interview took approximately 45 minutes to complete.

Table D-11: IESO, LDC, and Program Delivery Vendor Staff IDI Disposition

Disposition Report	IESO Program Staff	LDC Program Staff	Delivery Vendor Staff	Total
Completes	1	1	1	3
Emails bounced	0	0	0	0
Bad Contact Info (No Replacement Found)	0	0	0	0
Unsubscribed	0	0	0	0
Partial Complete	0	0	0	0
Screened Out	0	0	0	0
No Response	0	0	0	0
Total Invited to Participate	1	1	1	3

Table D-12 presents a comparison between the survey topics covered in the PY2019 and PY2020 participant surveys. The topics of Free-ridership, Spillover, Firmographics, and COVID-19 were similar across both surveys. Process-related topics saw the most difference across surveys, with more topics covered in PY2020 than in PY2019.

Table D-12: Participant Survey Topic Comparison Between PY2019 and PY2020

Survey Topics	PY2019	PY2020
Free-ridership	X	X
Spillover	X	X
Process: Suggestions about how to improve the initial site assessment visit	X	X
Process: What could be improved about the professionalism of the auditor who performed the initial site assessment visit	--	X
Process: Suggestions about how to improve the visits from the program contractor	X	X
Process: What could be improved about the professionalism of the contractor	--	X
Process: Suggestions about how to improve the installation process overall	X	X
Process: Whether any aspect of the program's site assessment or installation process created disruptions to business	X	X
Process: Whether business is interested in receiving additional assistance to help identify other energy-efficiency opportunities	--	X
Process: Whether business has a dedicated budget to make upgrades that may improve the energy efficiency of its facility(ies)	--	X
Process: Whether business would consider investing in upgrades that may improve the energy efficiency of its facility(ies) if a payback period could be determined	--	X
Process: Whether business has service maintenance contracts with third-party contractors	--	X
Process: How often the business' third-party contractor(s) discusses energy-efficiency opportunities with them	--	X
Process: Which additional energy efficiency programs business applied to	X	X
Firmographics	X	X
COVID-19	X	X

D.2 Auditor and Contractor Survey

A total of five auditors and contractors were surveyed from a sample of eight unique companies (Table D-13). The purpose of the survey was to better understand the auditor and contractors' perspectives related to program delivery.

The interview topics included firmographics, program roles and responsibilities, audits and/or projects completed, training and education, perceptions of customer awareness and decision-making, barriers to participation, satisfaction, and program improvement suggestions.

The sample was developed from program records provided by program delivery vendor staff. A census-based approach was employed to reach the largest number of respondents possible, given the small number of unique contacts.

The survey was delivered over the web by NMR staff using Qualtrics survey software. The survey implementation was conducted between March 30 and April 26 of 2021. The survey took an average of 15 minutes to complete after removing outliers.¹ Weekly email reminders were sent to non-responsive contacts through web survey fielding.

Table D-13: Auditor and Contractor Survey Disposition

Disposition Report	Count
Completes	5
Emails bounced	0
Bad Contact Info (No Replacement Found)	0
Unsubscribed	0
Partial Complete	0
Screened Out	0
No Response	3
Total Invited to Participate	8

D.3 Participant Survey

A total of 75 REP participants were surveyed from a sample of 647 unique companies (Table D-14). The purpose of the survey was to better understand participant perspectives related to program experience.

The survey topics included firmographics; improvement suggestions about the initial site assessment, the follow-up visit, and the installation process overall; business decision-making processes; FR; SO; participation in other programs; and the impacts of the COVID-19 crisis.

The sample was developed from program records provided by the IESO EM&V staff. A census-based approach was employed to reach the largest number of respondents possible, given the small number of unique contacts.

¹ Note that the survey was designed to allow the respondent to come back to it later to complete it if they preferred. The average survey time was calculated with this in mind and assumed that any survey that took 40 minutes or more to complete was likely completed by a respondent who took a break before completing the survey.

The survey was delivered over the web by NMR staff using Qualtrics survey software. The survey implementation was conducted between March 30 and April 20 of 2021. The survey took an average of 13 minutes to complete after removing outliers.² Weekly e-mail reminders were sent to non-responsive contacts through web survey fielding.

Table D-14: Participant Survey Disposition

Disposition Report	Count
Completes	75
Emails bounced	61
Bad Contact Info (No Replacement Found)	1
Unsubscribed	0
Partial Complete	8
Screened Out	12
No Response	490
Total Invited to Participate	647

² Note that the survey was designed to allow the respondent to come back to it later to complete it if they preferred. The average survey time was calculated with this in mind and assumed that any survey that took 40 minutes or more to complete was likely completed by a respondent who took a break before completing the survey.



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