Interim Framework Small Business Lighting 2021 Evaluation Report

Submitted to IESO

in partnership with NMR Group

Date: 08.23.2022

Principal authors:

Resource Innovations – Henri van Rensburg, Ron Shaw, Bashar Alhayek

NMR Group – Joanne O'Donnell, Christine Smaglia, Julian Ricardo

Resource Innovations
TD Canada Trust Tower
161 Bay Street, 27th Floor
M5J 2S1 Toronto, Canada
416.572.2433
resource-innovations.com

Contents

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 managing 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 the IESO program staff, program delivery vendors, and contractors that the evaluation team interviewed or 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 telephone surveys, and site visits. Their cooperation with the evaluation team's efforts has produced high quality data that will serve Ontario conservation efforts for years to come.

Acronyms and Abbreviations

EM&V	Evaluation, measurement, and verification
EUL	Effective useful life
FR	Free-ridership
GW or GWh	Measurement of demand (GW) or energy (GWh) equivalent to 1,000,000,000 W or Wh
HVAC	Heating, ventilation, and air conditioning
HOU	Hours of use
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 Wh
LED	Light emitting diode
MW or MWh	Measurement of demand (MW) or energy (MWh) equivalent to 1,000,000 W or Wh
NTG	Net-to-gross
PY	Program year
SO	Spillover

1. Executive Summary

The Independent Electricity System Operator (IESO) retained Resource Innovations (formerly Nexant Inc.), and their sub-contractor NMR Group, Inc., to conduct an evaluation of the Small Business Lighting program (SBL) for the 2021 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 SBL Program during the January 1, 2021 through December 31, 2021 evaluation period.

1.1. Program Description

The SBL program provides owners and tenants of commercial, institutional, and agricultural facilities, as well as multi-family buildings, the opportunity to receive up to $2,000 in free lighting upgrades. Participants who wish to have qualified equipment installed above the $2,000 limit are eligible for additional incentives intended to expand the program's impact and reach. Eligible measures are defined by the program and include a wide variety of lighting fixtures and lamps.

1.2. Evaluation Goals and Objectives

The following are the goals and objectives of the PY2021 evaluation of the SBL Program:

- Conduct audits of completed projects to verify the installation of equipment and evaluate operating parameters through desk reviews and site visits.
- 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
- Conduct a job impact evaluation to quantify the jobs created by the SBL program in PY2021
- Provide recommendations on program improvements based on feedback obtained through the evaluations.

1.3. Summary of Results

1.3.1. Impact Evaluation

An impact evaluation was performed to analyze the impact of the program's improvements and quantify the savings generated as a result of implementing the SBL projects in Ontario during 2021. During the evaluation period, 971 projects were completed. The Eastern and Central regions (29% each) are the highest contributors to the program's first-year net verified energy savings, followed by

the Northern (21%) regions[1]. The PY2021 SBL program achieved energy and summer peak demand realization rates of 83.9% and 98.1%, respectively. These realization rates include interactive effects observed on HVAC equipment due to high efficiency lighting. The energy and summer peak demand net-to-gross ratios are 98.7% and 108.7%, respectively. 100% of the first-year net verified energy savings are projected to persist until the end of the framework accounting period (2022). The net verified impact results of the 2021 SBL program are presented in Table 1-1.

Table 1-1: 2021 SBL Impact Results

Savings	Reported Savings	Realization Rate	Gross Verified Savings	Gross Verified Precision at 90% Confidence	Net-to-Gross Ratio	Net Verified Savings	Net Verified Persisting Savings at 2022
Energy (MWh)	5,855.1	83.9%	4,914.2	9.5%	98.7%	4,851.8	4,851.8
Summer Peak Demand (kW)	883.7	98.1%	818.2	13.4%	108.7%	889.0	889.0

1.3.2. Process Evaluation

The evaluation team performed a process evaluation to better understand program design and delivery in 2021. 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 insights from the process evaluation are summarized below and are presented in detail in the Process Evaluation section.

Site visits. The majority of surveyed participants had no suggestions for improving the initial site assessment (75%), the installer visit(s) (77%), 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, installer visit(s), or the overall installation process, the most common were to reduce the time it takes to complete the visits, improve the assessor or installer's professionalism, provide more flexibility in scheduling the visits, and improve site cleanup.

Incentive impacts. Nearly one-sixth of participants (15%) stated they were offered additional lighting upgrades that exceeded the $2,000 incentive cap, and nearly one-half of those participants installed them. Most auditors and contractors (nine of fifteen respondents) noted that the incentive cap had reduced the scope of some of their customers' projects and one reported it had reduced the scope of all their customers' projects. The interviewed delivery vendor staff noted that program incentives have not risen in recent years to help offset the rising equipment, fuel, and installation costs associated with completing program projects.

[1] A list of postal code designation and exact project counts for each region are presented in Appendix E.

Program barriers. Customers' lack of awareness of the program and the perception of upgrades not being worth the trouble of participating were cited by auditors and contractors as barriers that prevented more customers from participating in the program (mentioned by five respondents each). The most common suggestion mentioned by auditors and contractors to address barriers to participation was to increase marketing of the program (mentioned by five respondents).

Auditor and contractor program satisfaction. On average, auditors and contractors were very satisfied with the program overall, assigning an overall program satisfaction rating of 4.1 on a scale from one (1) to five (5), where one meant "not satisfied at all satisfied" and five meant "extremely satisfied." When rating specific aspects of the program, respondents assigned the highest average satisfaction rating to the interactions that they had with the program delivery vendor (4.6) and the lowest satisfaction ratings to the number and types of equipment incentivized through the program (3.9) and program training and education (3.9).

Program improvement recommendations. Some program improvement recommendations mentioned by auditors and contractors included hiring quality assessors, reducing the reimbursement time for contractors, more in-person trainings, and making worksheets simpler (mentioned by one respondent each). Some program improvement recommendations mentioned by the interviewed IESO staff and delivery vendor staff included ensuring that Electrical Safety Authority (ESA) fees are identified and communicated about upfront, that the program consider ways in which smaller industrial customers could be served by this program or similar direct install programs, and that the program identify possible opportunities to collaborate with gas utilities in the future to make a wider variety of equipment available to customers while also helping to address customer interest in decarbonization.

1.4. Findings and Recommendations

Finding 1. Reported Peak Demand Savings – Coincidence Factors (CF). The SBL reported peak demand savings seem to be calculated based on a predetermined coincidence factor (CFs). This is an improvement from previous years where connected demand was reported instead of actual peak demand. However, the CFs used seem to be conservative.

- **Recommendation 1:** The PY2021 SBL is the last year for the program. For future iterations of this program (i.e. 2021-2024 CDM SBP), it is recommended to further review and update the CFs used to report the peak demand savings to better align with verified results. Another approach that would result in high accuracy of reported peak demand is using the facility's actual HOU collected using the assessment tool to determine project specific CF.

Finding 2. Improved baseline and retrofit photos. Photos of the pre-existing baseline and retrofitted fixtures and lamps submitted by the SBL assessors and installers are still taken from wide angles and from a few feet away, which do not provide useful information about the lamp wattage or lamp type.

- **Recommendation 2.** Given that this is the last year for the IF SBL program, it is recommended to consider this finding for the newly designed Small Business Program (SBP), and specify what information should be captured in the pre-retrofit and post-retrofit pictures that are taken by the SBP assessors/installers

Finding 3. Few participants who were recommended additional lighting upgrades beyond the project cost cap made those upgrades. Only one-sixth (15%) of participants reported that assessors or installers recommended additional lighting upgrades that exceeded the $2,000 incentive cap. Of those participants, about one-half (4 of 9 respondents) installed them. Most of those participants who installed additional lighting upgrades stated they did so because the incentive cap was not sufficient to complete the project.

- **Recommendation 3.** When applicable, continue to encourage assessors and installers to offer additional lighting upgrades to participants beyond those available through the program. Help interested participants identify ways to complete the work, either by installing the additional equipment at the time of participation or by providing them with a recommended equipment list to consider installing in the future.

Please note that a similar recommendation to Recommendation 3 was included in the PY2020 evaluation as well. In response to the recommendation in PY2020, the IESO indicated that they will continue to work with the program delivery vendors to ensure installations are completed effectively and with the right supply of eligible measures. Given that similar feedback was shared as part of the PY2021 evaluation, a similar recommendation has been provided again to ensure that it is carefully considered in future program years.

Introduction

The SBL program provides owners and tenants of commercial, institutional, and agricultural facilities, as well as multi-family buildings, with less than 50 employees, the opportunity for up to $2,000 in free lighting upgrades. Participants who wish to have qualified equipment installed above the $2,000 limit are eligible for additional incentives intended to expand the program's impact and reach. Eligible measures are defined by the program and include a wide variety of lighting fixtures and lamps.

1.5. Goals and objectives

The goals and objectives of the 2021 SBL program evaluation are as follows:

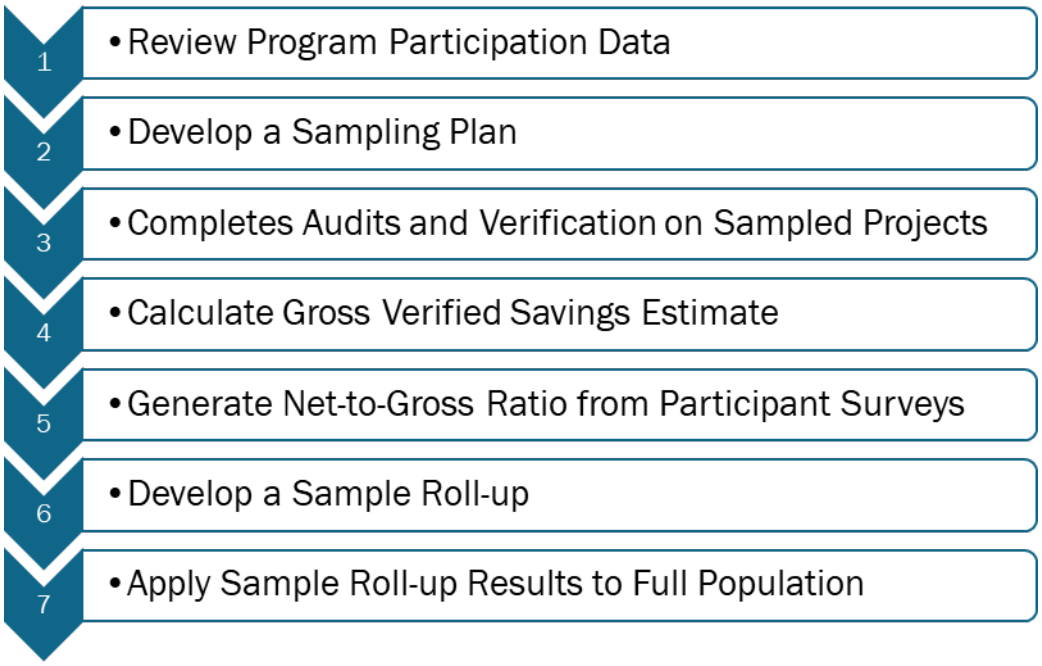
- Conduct audits of completed projects to verify the installation of equipment and evaluate operating parameters through desk reviews and site visits
- Verify energy and summer peak demand savings with a high degree of confidence and precision
- Assess free-ridership (FR) and participant spillover (SO) to determine an appropriate net-to-gross (NTG) ratio
- Conduct cost effectiveness and greenhouse gas quantification analyses using IESO's Cost Effectiveness tool
- Conduct a job impact evaluation to quantify the jobs created by the SBL program in PY2021
- Provide recommendations for program improvements based on feedback obtained from the evaluations

2. Evaluation Methodology

2.1. Impact Evaluation Methodology

The impact evaluation methodology is built upon a series of steps, as outlined in Figure 3-1. Additional details can be found in Appendix A and Appendix B.

Figure 3-1: Impact Evaluation Methodology



Due to a small 2021 population size and the limited budget the 2021 SBL sample consisted of 35 projects. The 2021 impact sample was combined with the sample from the 2020 SBL evaluation to increase the number of projects in the sample and provide better precision of the results.

2.2. Process Evaluation 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, program delivery vendor staff, assessors, installers, and participants. For each respondent type, a customized interview guide or survey instrument was developed to ensure responses produced comparable data and allowed for the inference of meaningful conclusions. Table 3-1 presents the survey methodology, the total population invited to participate in the surveys or interviews, the total number of completed surveys or interviews, and the sampling error at the 90% confidence level for each respondent type. Additional details regarding the process evaluation methodology can be found in Appendix C.

Table 3-1: Process Evaluation Primary Data Sources

Respondent Type	Methodology	Population	Completes – Web	Completes – Phone	Completes – Total	Response Rate	90% CI Error Margin
IESO Program Staff	Phone In-depth Interview (IDI)	1	-	1	1	100%	0%
Program Delivery Vendor Staff	Phone IDI	1	-	1	1	100%	0%
SBL Assessors and Installers	Web Survey	46	17	-	17	37%	N/A*
SBL Participants	Web and Phone Survey	360	46	14	60[2]	16.7%	9.8%

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

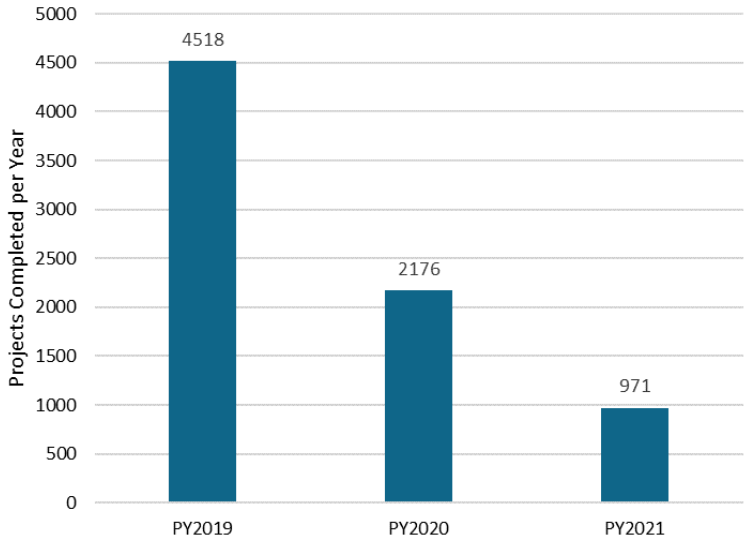
[2] Please note that the count of process survey responses (n=60) is less than the count of NTG responses (n=63) because some respondents did not complete the process section of the survey.

3. Impact Evaluation Results

3.1. Participation

There were 971 projects completed under the SBL program in 2021. This indicates a 55% drop in participation from 2020, and a 79% drop from 2019 participation levels. The low participation level in 2021 is owed to the fact that the SBL program concluded on December 31st, 2020. PY2021 SBL projects are those which were started in 2020 and were allowed to be completed in 2021. Thus, the PY2021 was the last year of the IF SBL program, and the program was being delivered concurrently with the new 2021-2024 CDM framework Small Business Program (SBP). The SBP offers small business owners the opportunity to implement the same SBL measures in addition to non-lighting measures. Additionally, It is noted that the COVID-19 pandemic persisted through PY2021, where government-mandated restrictions and lockdowns adversely influenced the delivery of the SBL program. Figure 4-1 presents the projects completed between 2019 and 2021.

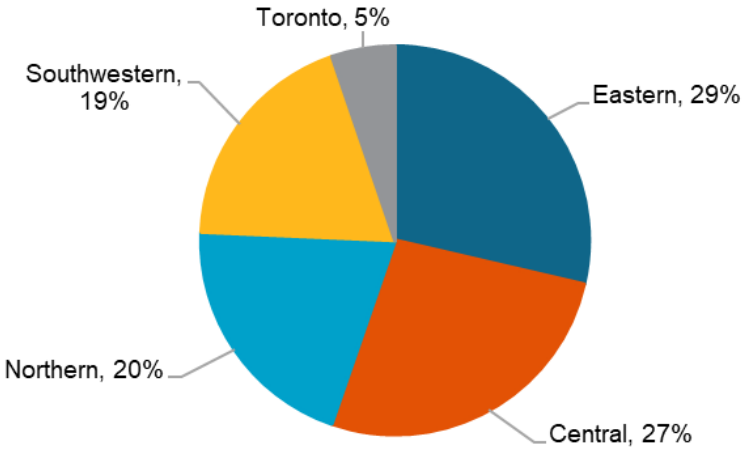
Figure 4-1: SBL Completed Projects per Year*



*PY2019 and PY2020 project counts include true-up project

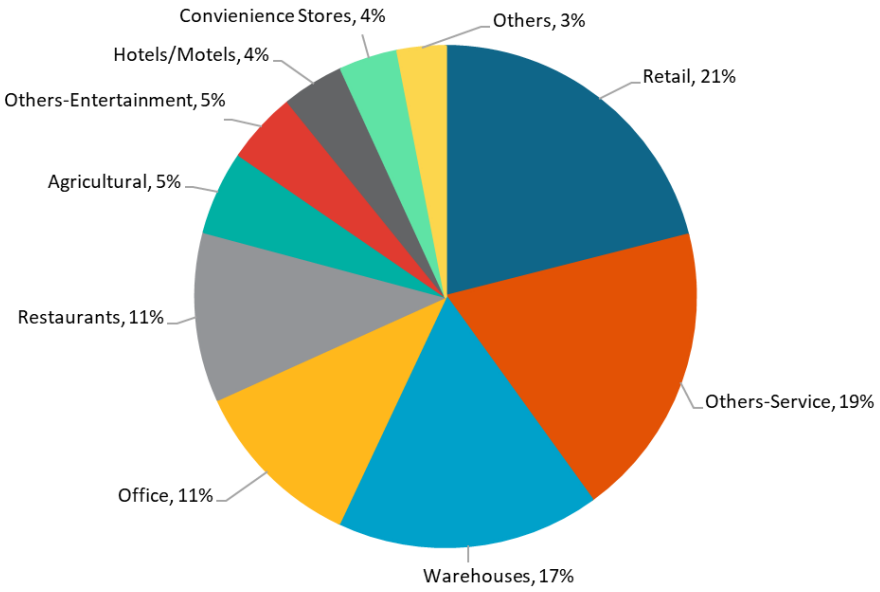
The SBL program database contains postal code information for each completed project, whereby each project was assigned to one of five geographical delivery regions. The Eastern region is the primary contributor to the SBL projects, accounting for 29% of all completed projects, followed by the Central and Northern regions (27% and 20% respectively) and the South-West region (19%). A list of postal code designation and exact project counts for each region are presented in Appendix G. The full breakout of projects completed in each geographical region is presented in Figure 4-2.

Figure 4-2: 2021 SBL Program Projects in Each Geographical Region



The SBL Assessment Tool allows the SBL program assessors to track and document each assessed site's facility type. The SBL database contained information regarding each completed project's facility type, with a total of 33 unique facility types reported. Each unique entry was re-categorized into one of 10 possible facility types. In PY2021 SBL database, 556 projects did not have a reported facility type and were categorized as "unidentified." A full list of the facility types reported in the PY2021 SBL program database and their respective re-categorized designation is provided in Appendix G. The retail sector, followed by warehouses and offices, contributed the most to the 2021 SBL program accounting for 58% of completed projects with identified the facility type. The full project count distribution by identified facility type for the 2021 SBL program is presented in Figure 4-3.

Figure 4-3: 2021 SBL Program Project Count by Facility Type



3.2. Energy and Demand Savings Results

The net verified impact results of the 2021 SBL program are presented in Table 4-1. All savings discussed in the remainder of this report refer to first-year net verified savings unless otherwise specified. PY2019 through PY2021 results including true up projects are also provided in Table 4-2, for comparison.

Table 4-1: 2021 SBL Impact Results

Savings	Reported Savings	Realization Rate	Gross Verified Savings	Net-to-Gross Ratio	Net Verified Savings	Lifetime Net Verified Energy Savings (MWh)	Net Verified Persisting Savings at 2022 (MWh)
Energy (MWh)	5,855.1	83.9%	4,914.2	98.73%	4,851.8	60,746.9	4,851.8
Summer Peak Demand (kW)	883.7	98.1%	818.2	108.7%	889.0	NA	889.0

Table 4-2: 2019-2021 SBL Net Results Comparison

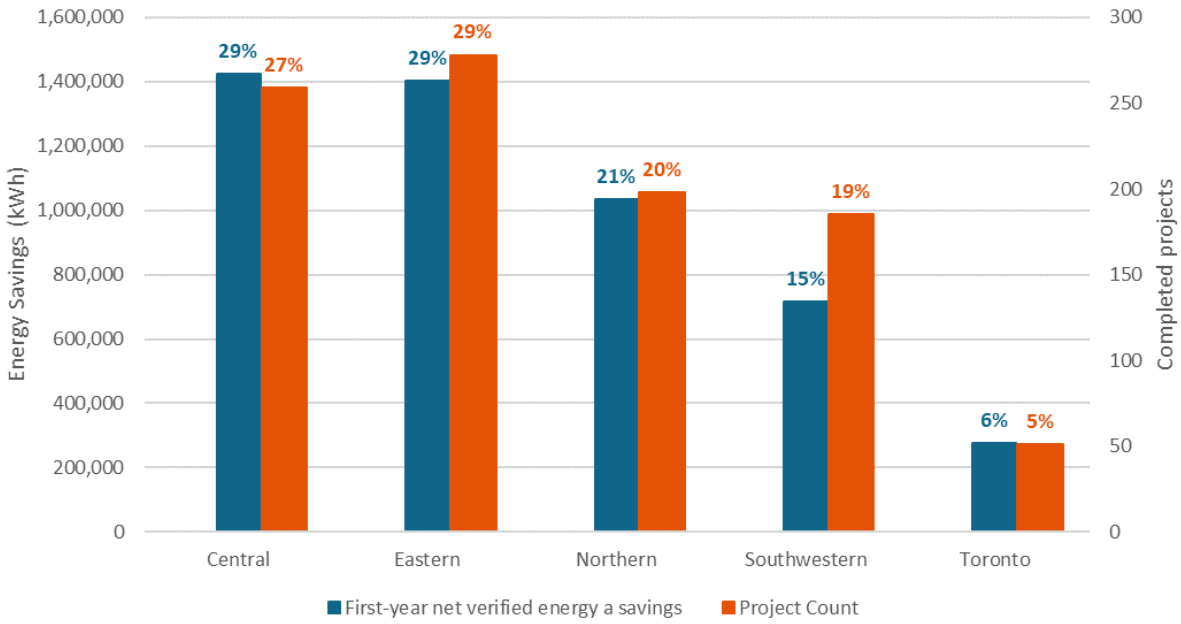
Measurement	2019	2020	2021	2019-2021
Projects	4,518	2,176	971	7,665
1st Year Savings				
Net Energy (MWh)	28,297.0	12,005.9	4,851.8	45,154.7
Net Summer Peak Demand (MW)	6.9	3.3	0.89	11.1
Average Energy Savings per project	6.26	5.52	5.00	5.89
Persisting Savings at 2022				
Net Energy (MWh)	28,276.9	12,005.9	4,851.8	45,134.6
Net Summer Peak Demand (MW)	6.9	3.3	0.89	11.1

The program realization rates presented in Table 4-1 include the interactive effects that occurred on the HVAC operation, as a result of the lighting retrofits. The methodology for calculating the interactive effects is described in Appendix A.4, and the NTG ratio calculation is described in Appendix B.

Between 2020 and 2021, there was a 60% decrease in the first-year net verified energy savings and a 52% decrease in the first-year net verified summer peak demand savings. As discussed earlier, the decrease can be mainly attributed to PY2021 being the last year of the IF SBL program and the introduction of the newly designed SBP.

Figure 4-4 presents the 2021 SBL first year net verified energy savings contribution and completed project count by region[3]. The Central and Eastern regions accounted for 58% of the program's net verified energy savings.

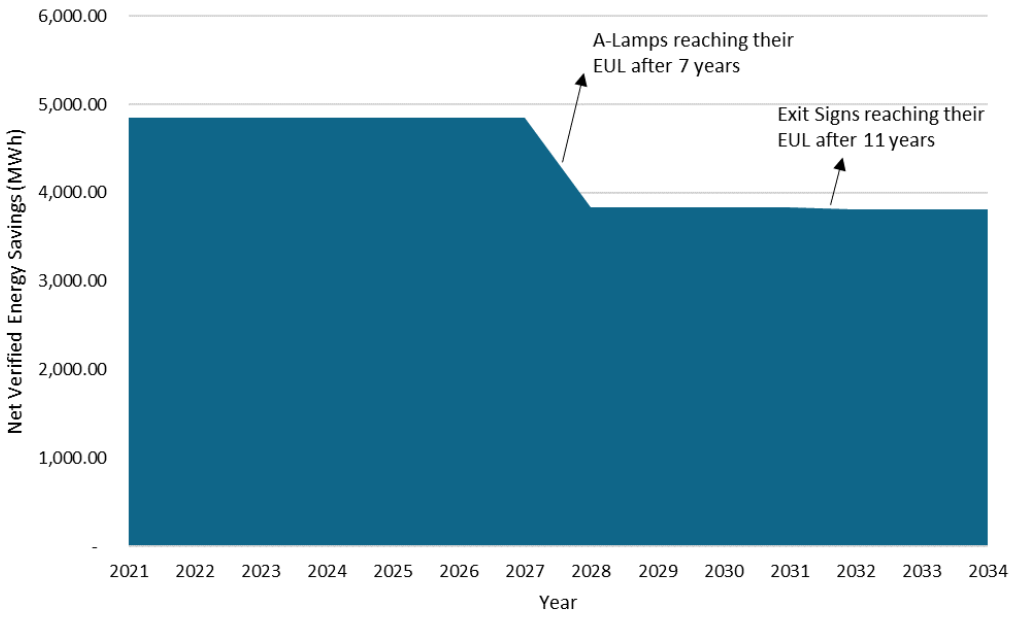
Figure 4-4: 2021 SBL First-Year Net Verified Energy saving and completed projects by regions



The 2021 SBL program is expected to achieve 60,747 MWh of lifetime net verified energy savings based on the installed measures and their respective effective useful lives (EULs). The lifetime savings of the SBL program depend mainly on the effective useful lives (EULs) of the SBL measures, which describe how long the savings associated with the measure will persist. The IESO's list of eligible SBL measures provides an estimated rated lifespan in hours for each measure. The rated life and assumed hours of use (HOU) are used to calculate each measure's EUL. For example, the average rated life of a Linear LED Tube is 50,000 hours, and its assumed average HOU is 3,700 hours annually, leading to a calculated EUL of 13.5 years (50,000 hours /3,700 hours). Figure 4-5 illustrates the annual net verified energy savings of the 2021 SBL program over time. The shortest EUL for the 2021 SBL measures is seven years, and over 56% of the first-year net verified savings have a EUL of 14 years and will persist until 2034.

[3] A list of postal code designation and exact project counts for each region are presented in Appendix G.

Figure 4-5: Net Verified Energy Savings over Time



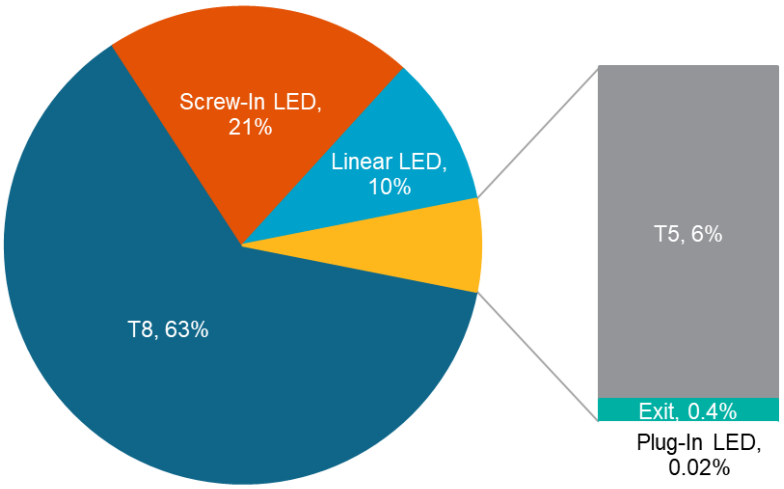
3.3. Impact Evaluation Findings

The following sections provide details on the impact findings of the installed measures, the first-year net savings, and contribution by measure, types of upgraded facilities, incentives, and program realization rates.

3.3.1. SBL Measure Types

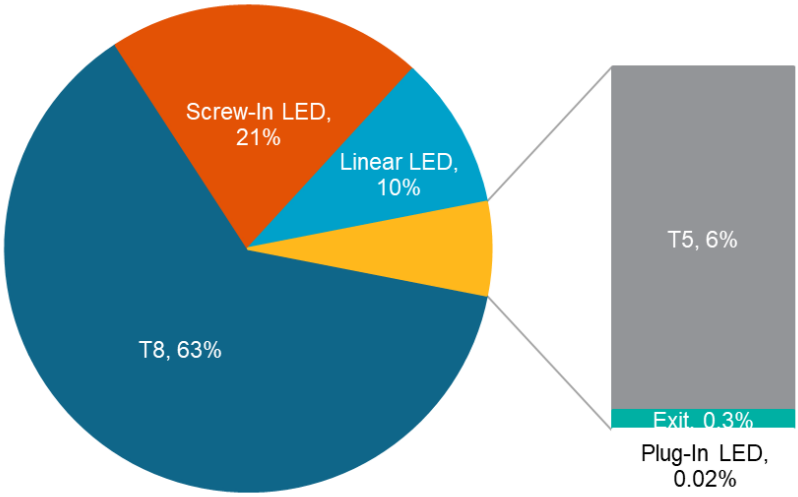
The SBL program's first-year net verified savings in 2021 were produced primarily by T8 Linear LEDs and Screw-in LEDs (specifically LED A-Lamps). These two measures made up 63% and 21% of the total first-year net verified energy savings in 2021, respectively. This trend is consistent with PY2020 and PY2019, where T8 linear LEDs (55% in 2020 and 53% in 2019) and screw-in LED lamps (30% in 2020 and 31% in 2019) contributed the most to the PY2020 net verified energy savings. The measure types adopted during the IF SBL (i.e. PY2019-PY2021) have remained generally consistent, where majority of the savings were derived from T8 retrofits, Screw-in A-shape lamps, and T5 retrofits. The full distribution of energy savings by measure type in the 2021 SBL program is shown in Figure 4-6. Similarly, T8 Linear LEDs and Screw-in LEDs are the two main contributors to the 2021 SBL summer peak demand savings, where they made up 63% and 21% of the total program net verified summer peak demand savings, respectively (Figure 4-7).

Figure 4-6: 2021 SBL Net Energy Savings Contributions by Measure Type*



*Does not sum to 100% due to rounding.

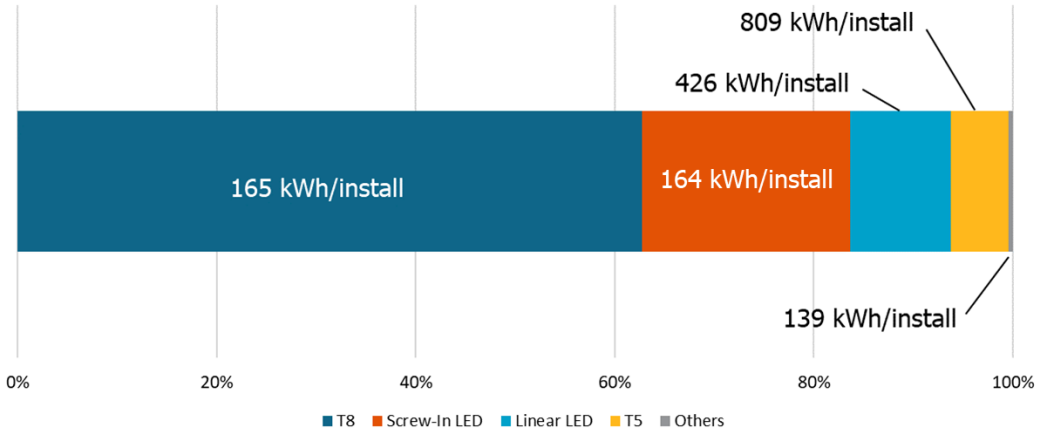
Figure 4-7: 2021 SBL Net Summer Peak Demand Savings by Measure Type*



*Does not sum to 100% due to rounding.

A breakdown of the produced savings per measure/unit installed for the 2021 SBL program is provided in Figure 4-8. T8 installations accounted for 63% of the program's net verified energy savings, with an average savings of 165 kWh per measure. Contrarily, T5 installations accounted for merely 6% of the total program net verified energy savings, though they had the highest energy savings of 809 kWh per measure installed. The "Others" category in Figure 4-8 refers to the mix of the remaining measures that contributed to the SBL program and accounted for less than 1% of the total program energy savings, with an average of 139 kWh per measure. These measures mainly consisted of outdoor lights and exit signs.

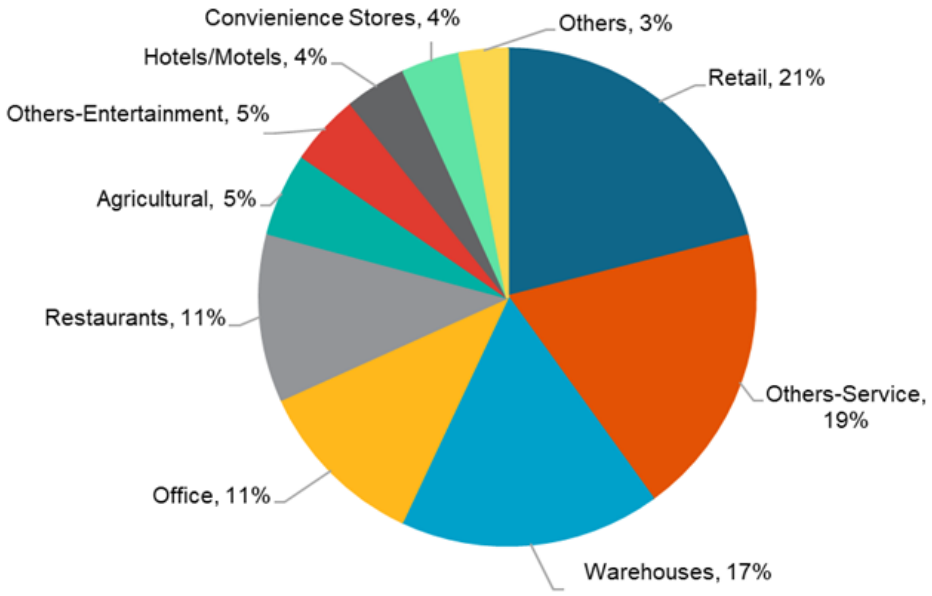
Figure 4-8: 2021 SBL per Measure Energy Savings Contribution



3.3.2. SBL Facility Types

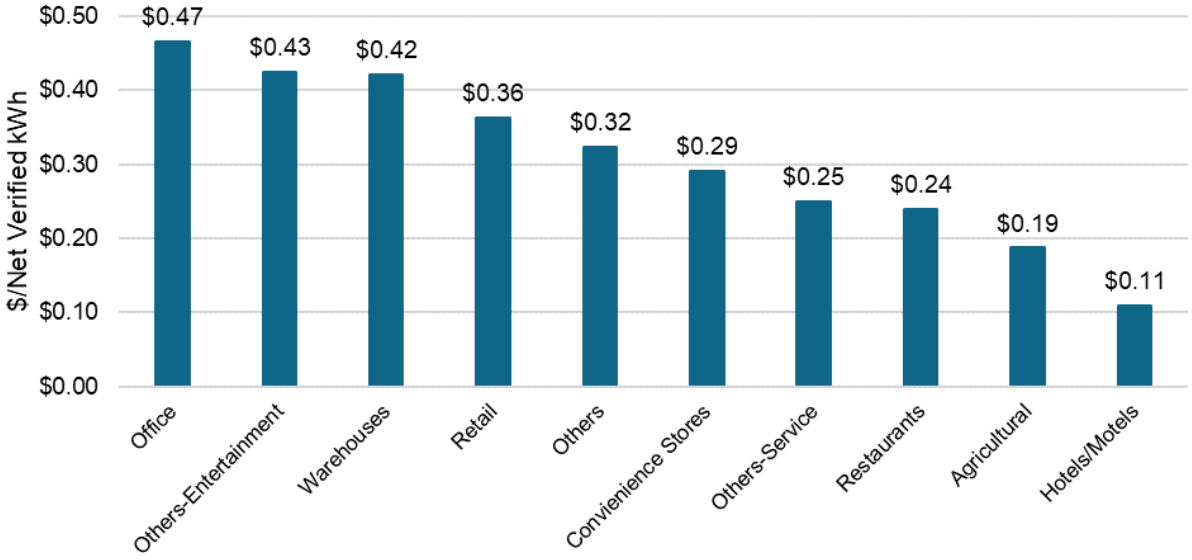
The PY2021 SBL database did not contain the facility type for the majority (57%) of reported projects (556 of 971 projects). Therefore, the following analysis is based on the 415 projects with available facility data. The retail sector accounted for 25% of identified projects in 2021, followed by warehouse (18%) and offices (15%). Consistent with project count contribution, the top contributors to the 2021 SBL program's net verified energy savings were retail facilities (21%), warehouses (17%), and offices (11%) (Figure 4-9). Others-service category shown in the figure below refers to a mix of facility types such as religious buildings, municipal buildings, police, and fire stations. While the SBL program serves a wide range of facility types within the small business sector, the top facility types contributing to the IF SBL in PY2019-PY2021 has remained fairly consistent, where retail, warehouse, and office facilities made up majority of the program's savings.

Figure 4-9: 2021 SBL Program Net Energy Savings by Facility Type Composition



The implementation cost per kWh of net verified energy savings for the program ranged from $0.11 to $0.47, depending on the facility type, with an average of $0.31 (Figure 4-10). This cost accounts for the total project cost charged by the delivery agent, including the IESO paid incentive and customer contribution (if any).

Figure 4-10: 2021 SBL Facilities Implementation Cost per kWh



This wide variation in cost is mainly attributed to the different measure types implemented at each facility. The high cost resulted from installing more Linear LED Tubes, while the lower cost was

attributed to installing a higher quantity of Screw-in fixtures. For instance, offices, which had an average cost of $0.47/kWh, had 66% of its energy savings produced by Linear T8 LED Tubes. In contrast, hotel/motel, which had an average cost of $0.11/kWh, had 47% of its energy savings achieved from A-lamps replacements. These trends are consistent with PY2020 and PY2019, where retail facilities and warehouses, having the highest average cost had majority of their savings produced by Linear T8 LED Tubes. While agricultural and hotel/motel facilities, which had the lowest average cost in PY2020 and PY2019 had majority of their savings achieved from A-lamps replacements.

3.3.3. Incentive Cap

The current design of the SBL program provides participants with the opportunity to receive up to $2,000 in free lighting upgrades. Participants who wish to install additional qualified equipment above the $2,000 limit are eligible for additional incentives intended to expand the program's impact and reach. The evaluation analysis determines that 81% of the 2021 SBL participants did not exceed the maximum incentive, nor did they implement any measures beyond the cap. The average project incentive was $1,538. Only 19% of the participants exceeded the $2,000 limit and paid out-of-pocket to install additional measures, with an average participant out-of-pocket payment of $917/project. These observations are consistent with the PY2020 and PY2019, where the average project incentive was $1,552 and $1,401, respectively. During PY2019 and PY2020, 28% and 18% of the participants exceeded the $2,000 limit with an out-of-pocket of $675 and $688, respectively.

3.3.4. Realization Rates

The standard equations for calculating energy and peak demand savings produced by lighting upgrades depend on three main inputs: hours of use (HOU), fixture wattages, and fixture counts. A difference between the verified and reported values across these three main inputs will lead to an adjustment in savings through the realization rate.

3.3.4.1. Energy

The energy realization rate for the PY2021 SBL program is 83.9%, an increase of 6.2% compared to the PY2020 (77.7% energy realization rate). The PY2021 SBL energy realization rate has remained closely consistent with PY2019 energy realization rate (83.6% energy realization rate). The main contributor to the energy realization rate is the deviation between the verified hours of use from the reported hours of use for the sampled projects.

Hours of Use

The SBL assessment tool only accepts one schedule for the entire facility. Six (6) instances were found in the PY2021 sample (n=35), where lighting equipment was installed in multiple spaces with varying schedules. With only one input schedule, assessors tend to input the schedule corresponding to the greatest number of hours a light would operate if varying schedules were observed.

The 2021 SBL program evaluation did not rely on a deemed HOU assumption. However, for reference, the average reported and verified HOU associated with the 35 sampled sites is 3,295 and 3,370 hours/year, respectively. The verified HOU for PY2021 closely matches the 3,288 hours/year verified during the PY2020 evaluation.

Interactive Effects

The reported savings achieved through the SBL program did not include interactive effects observed on the operation of HVAC equipment through the installation of more efficient lighting fixtures. The verified savings were calculated both with and without these interactive effects. The results of the different calculation methodologies are detailed in Table 4-3. The verified energy savings presented elsewhere in this report include interactive effects.

Table 4-3: Significance of Interactive Effects on 2021 SBL Energy Savings

Interactive Effects	Reported Energy Savings (MWh)	Energy Realization Rate	Gross Verified Energy Savings (MWh)	Additional Interactive Savings (MWh)	Gas Heating Penalty (MMBtu)
Not Included	5,855.1	80.6%	4,716.6	-	-
Included	5,855.1	83.9%	4,914.2	197.6	-9,933.4

3.3.4.2. Summer Peak Demand

The summer peak demand realization rate for the PY2021 SBL program is 98.1%. The PY2021 summer peak demand realization rate varies drastically throughout the IF, where the SBL program achieved a realization rate of 85.9% and 78.7% during the PY2019 and PY2020, respectively. The reported demand savings do not include interactive effects, while the verified summer peak demand savings accounted for these effects. Table 4-4 shows the verified summer peak demand savings both with and without these interactive effects.

Table 4-4: Significance of Interactive Effects on 2021 SBL Summer Peak Demand Savings

Interactive Effects	Reported Demand Savings (kW)	Summer Peak Demand Realization Rate	Gross Verified Summer Peak Demand Savings (kW)	Additional Interactive Savings (kW)
Not Included	883.7	86.0%	759.0	-
Included	883.7	98.1%	866.9	107.9

3.4. Net-to-Gross

Table 4-5 presents the results of the PY2021 SBL program NTG evaluation. The evaluation targeted and achieved 90% confidence and 10% precision levels when calculating NTG for this program.

Participant feedback indicates low levels of FR at 8.8%, which indicates the program is generally reaching the participants who would not have implemented lighting upgrades without the program. These PY2021 results show similar trends with previous evaluation years, where in PY2019 and in PY2021, FR was 4% and 5.6%, respectively, and the Weighted Energy NTG was 98.3% and 99.1%, respectively.

Table 4-5: SBL Program Net-to-Gross Results

Unique Participants	NTG Responses	Savings Weighted Free-ridership	Spillover – Energy	Spillover – Summer Demand	Weighted Net-to-Gross – Energy	Weighted Net-to-Gross – Summer Demand	Energy NTG Precision at 85% Confidence
360	63	8.8%	7.5%	17.4%	98.7%	108.7%	±4.7%

Almost one-half (48%) of the PY2021 participants were not planning on upgrading their lighting before learning about the program. Of the one-seventh (9 respondents) of participants who said they were already planning on upgrading their lighting, most (8 respondents) said they would have put off (2 respondents) or cancelled the upgrades (1 respondent) or installed less expensive or less efficient lighting (5 respondents) without the program's support. This suggests relatively low FR for these respondents. One respondent would have installed the same lighting equipment and paid the full cost themselves, which is indicative of FR for this respondent. Participation in the program resulted in a moderately high SO at 7.5%, with around one-fifth (19%) installing equipment with attributable SO savings. Additional analyses performed to assist in the interpretation of these values can be found in Appendix D.2.

3.5. SBL Cost Effectiveness

A cost-effectiveness (CE) analysis for the SBL was conducted using IESO's CE Tool V7.1. The cost-effectiveness results are presented in Table 4-6. The SBL program passed the Total Resource Cost (TRC) test and the Program Administrator Cost (PAC) test, with both benefits exceeding their respective costs. The PY2021 CE is lower compared to 2019 and 2020 but the overall 2019-2021 test results all pass with values greater than 1.0.

Table 4-6: IF SBL Program Cost Effectiveness Results

Cost Effectiveness Test	Program Year			
Total Resource Cost (TRC)	**2019**	**2020**	**2021**	**2019-2021**
TRC Costs ($)	$9,419,933	$4,581,606	$2,090,199	**$16,091,738**
TRC Benefits ($)	$12,577,671	$6,703,372	$2,298,223	**$21,579,266**
TRC Net Benefits ($)	$3,157,738	$2,121,766	$208,024	**$5,487,528**
TRC Net Benefit (Ratio)	1.34	1.46	1.10	**1.34**
Program Administrator Cost (PAC)	**2019**	**2020**	**2021**	**2019-2021**
PAC Costs ($)	$8,684,454	$4,347,936	$1,944,308	**$14,976,698**
PAC Benefits ($)	$14,435,595	$7,437,788	$2,735,685	**$24,609,068**

PAC Net Benefits ($)	$5,751,141	$3,089,852	$791,377	**$9,632,370**
PAC Net Benefit (Ratio)	1.66	1.71	1.41	**1.64**
Levelized Unit Energy Cost (LUEC)	**2019**	**2020**	**2021**	**2019-2021**
$/kWh	$0.04	$0.04	$0.05	**$0.04**
$/kW	$143.50	$150.33	$250.58	**$154.07**

4. Process Evaluation

A process evaluation was performed to better understand the design and delivery of the SBL program. 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. IESO Program Staff and Delivery Vendor Perspectives

4.1.1. Key Findings

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

- IESO staff indicated that the program's delivery went well in 2021 despite the challenges associated with COVID-19. They noted that the delivery vendor effectively engaged eligible customers, providing consistent and reliable customer support. These findings are similar to PY2020, where IESO staff also indicated the delivery vendor was able to pivot their delivery approach quickly given COVID-19 challenges.
- IESO staff noted that rising equipment costs and a changing mix of measures eligible for the program have had an influence on the cost-effectiveness of the program. Considering the addition of a customer co-pay option was recommended as a potential way to open the program up to additional measure offerings.
- Delivery vendor staff noted that program incentives have not risen in recent years to help offset the rising equipment, fuel, and installation costs associated with completing program projects. As in PY2020, the delivery vendor staff stated that it may be beneficial to review incentives in future iterations of the program.
- As in 2019 and 2020, most customer outreach and lead generation was performed by the delivery vendor's in-house call center.
- Electrical Safety Authority (ESA) fees were identified by both IESO staff and delivery vendor staff as a challenge in 2021. Ensuring that these fees are identified by the assessors and communicated upfront before work orders are signed was recommended by both IESO staff and delivery vendor staff.
- Identifying ways in which smaller industrial customers may be better served by this program or similar direct install programs was also recommended for further consideration by IESO staff.

4.1.2. Design and Delivery

IESO staff reported that the program met their expectations in 2021 despite the ongoing pandemic and despite the program not meeting its savings targets for the year. They indicated that the program

continued to attract interest from the market and that the delivery vendor responded well despite ongoing COVID-related issues. IESO and the delivery vendor had routine touchpoints to receive updates and feedback on any pain points. IESO staff indicated that they worked collaboratively with the vendor to address any opportunities or challenges as they arose.

The primary goal of program, as reported by IESO staff, was to make the program available to small businesses and to achieve deep savings for those businesses. Additionally, ensuring that the program is as easy to participate in as possible for the customers is another important program goal.

As in prior year's, the program's assessors were employed directly by the delivery vendor and the program's installers were typically local, independent firms contracted by the delivery vendor to complete the lighting installations. The delivery vendor was responsible for all onboarding, assessor and installer training, and ongoing communications with assessors and installers regarding program updates. Delivery vendor staff reported that most of the assessors and installers had participated in the program in prior years, and that the process of delivering the program with them went smoothly overall.

4.1.3. Customer Engagement

While the marketing of the program was primarily done by the program vendor, the IESO also promoted the program through the Save on Energy website which received updates to its small business page in 2021. Additionally, the IESO performed limited social media outreach in 2021, which led to increased customer inquiries in the program according to the delivery vendor. IESO staff indicated that customer satisfaction with the program was very high in 2021 as measured by the IESO's customer satisfaction surveys. IESO staff also indicated that in the event that customers were not satisfied with the work completed through the program, a communication channel was in place that allowed customers to contact the vendor or installer to find replacement products, or to determine if their products could be repaired or replaced under warranty. IESO staff also indicted that they worked closely with the delivery vendor to encourage contractors to confirm that the installations meet customer needs before leaving customer sites.

4.1.4. Barriers and Opportunities

Both the IESO staff and delivery vendor staff indicated that the main barriers for the program in 2021 were COVID-19 and the related lockdowns and provincial health and safety requirements associated with it. To help address these barriers, and given that the program's design involves direct installations at customer sites, they worked closely with the delivery vendor to make sure safety was the top priority. During lockdowns, the delivery vendor also established a waitlist of customers, with the vendor noting that the lockdowns were often the busiest period of inbound customer inquiries. Once restrictions were lifted, the delivery vendor reached back to those on the waitlist; while many customers were still engaged with the program, others were no longer interested or were not able to participate given shifting priorities. Despite these challenges, IESO program staff stated that the delivery vendor effectively communicated with and set expectations with customers to ensure that as many customers as possible were retained as program participants.

Both IESO staff and delivery vendor staff stated that program is limited in terms of the measures it can make available to customers as the program also needs to adhere to cost-effectiveness targets and energy-savings priorities. IESO staff noted that rising equipment costs and a changing mix of measures eligible for the program have had an influence on the program's cost-effectiveness. One IESO staff member said that if a customer co-pay were to be considered, it may open the program up to additional measure offerings. IESO staff noted that while there may be some measures the program cannot offer, it does offer a wide array of equipment that customers have reported satisfaction with. Delivery vendor staff reiterated that it can be challenging to meet customer needs, especially if the funding available is not sufficient to complete the project the customer has in mind. Additionally, delivery vendor staff noted that program incentives have not risen in recent years to help offset the rising equipment, fuel, and installation costs associated with completing program projects.

IESO staff also identified unexpected fees, specifically those from the Electrical Safety Authority (ESA), as a challenge in 2021. ESA fees, which are associated with installing certain types of eligible measures, sometimes arose after the work orders were signed. While ESA fees were often covered by the program, they were not always, and in some instances, the customer was not made aware of the fees until the installation occurred. IESO staff indicated that it can be challenging to identify these fees up front, but that there is an opportunity to both ensure the assessors have the knowledge to identify them before work orders are signed and to ensure they are communicating about them with contractors and customers.

IESO staff recommended considering ways in which smaller industrial customers may be better served by this program or similar direct install programs. For example, they noted that certain equipment types, such as air compressors, do not qualify for the program but could potentially work well as part of a direct-install program model.

4.2. Assessor and Installer Perspectives

The following subsections highlight the feedback received from the assessor and installer survey.

4.2.1. Key Findings

Key findings from the assessors' and installers' responses include the following:

- Many respondents received program training via webinars or online instruction (seven out of fifteen), through responses to questions (five out of fifteen), or through one-on-one instruction from the vendor (five out of fifteen). Program training via webinars or online instruction was also the most common method for receiving training in PY2019 (twelve out of twenty-four) and PY2020 (eight out of seventeen).
- Most respondents (ten out of fifteen) indicated that customers participated in the program after being informed by the program delivery vendor. This finding is consistent with previous years, as most respondents from PY2019 (fifteen out of twenty-four) and PY2020 (ten out of seventeen) indicated the same.

- Customers' lack of awareness of the program and the perception of upgrades not being worth the trouble of participating were cited as reasons that prevented more customers from participating in the program (mentioned by five respondents each). This finding was consistent with previous years, as most respondents from PY2019 (sixteen out of twenty-four) and PY2020 (twelve out of seventeen) indicated the same.
- The most common suggestion to address barriers to participation was to increase marketing of the program (mentioned by five respondents). This finding was consistent with previous years, as most respondents in PY2019 (six out of twenty-four) and PY2020 (ten out of fifteen) indicated the same.
- Most respondents (nine of fifteen) noted that the incentive cap had reduced the scope of some of their customers' projects and one reported it had reduced the scope of all their customers' projects.
- On average, respondents assigned an overall program satisfaction rating of 4.1 on a scale from one (1) to five (5), where one meant "not satisfied at all" and five meant "extremely satisfied." This overall program rating is less than those of previous years, 4.2 in PY 2019 and 4.5 in PY2020.
- Some program improvement recommendations included hiring quality assessors, reducing the reimbursement time for contractors, more in-person trainings, and making worksheets simpler (mentioned by one respondent each). Respondents in PY2021 similarly provided recommendations also provided in PY2019 and PY2020, such as reducing the reimbursement time for contractors and providing different lighting offerings.

4.2.2. Training and Education

Respondents were asked what types of training or education they had received related to the program in 2021. Most respondents (seven out of fifteen) received training and education via a webinar or other online instruction. Others received training through responses to inquiries from the program delivery vendor or the IESO (five respondents) and one-on-one in-person instruction from the program delivery vendor (five respondents). A full list of these training and education types can be found in Table D-4 in Appendix D.1.

The twelve respondents who indicated that they had received training for the program were asked what topics had been covered in the trainings. Nearly all respondents (eleven out of twelve) had received information on the program rules, and many others received information on program offerings (nine respondents). A full list of these training and education topics covered can be found in Table D-5 in Appendix D.1.

Recommended Training Content	
Marketing and outreach techniques	✓
The offerings associated with the program	✓
The program rules	✓
Installation procedures and practices	✓
Application process training or support	✓

All respondents were asked what additional training or education topics would be helpful to support their work in the future. The most common topic suggestion from respondents was marketing and

outreach techniques to better promote the program to customers (six respondents). A full list of these recommended training and education topics can be found in Table D-6 in Appendix D.1.

4.2.3. Customer Participation

Most respondents indicated that customers most commonly participated in the program after being informed by the program delivery vendor (ten out of fifteen respondents). A full list of the ways customers commonly came to participate can be found in Table D-7 in Appendix D.1.

Respondents were asked about what barriers prevented customers from participating in the program. The most common barriers, reported by five respondents each, were customers being unaware of the program and customers deeming the upgrades not worth the trouble of participating. A full list of barriers to participation can be found in Table D-8 in Appendix D.1.

The nine respondents who had identified barriers to participation were asked how the program could address them. The most common suggestion was to increase program marketing (mentioned by five respondents). Specific marketing suggestions included: providing information sheets to distribute to businesses, social media outreach, bill inserts, and more advertising by mail or radio. Other suggestions, mentioned by one respondent each, included: more customer education, sharing long term savings data and testimonials from previous participants, direct promotion from IESO, providing more options for lighting products, providing eligible contractor lists for customers to reference, and hiring more program assessors. A full list of suggestions to overcome barriers to participation can be found in Table D-9 in Appendix D.1.

Suggestions to Address Participation Barriers	
Increase marketing	✓
Improve customer education	✓
Share customer testimonials	✓
Direct promotion from IESO	✓
Provide more options for lighting products	✓
Provide eligible contractor lists	✓
Hire more assessors	✓

All respondents were asked if participants were typically able to install all the lighting types of interest to them through the program. Ten respondents reported that participants had been able to install the lighting products of interest to them, while three reported that participants had not been able to install all lighting products of interest to them through the program, and two did not recall. As a follow up, respondents were asked what types of lighting equipment or models participants had been interested in but had not been able to install through the program. The three respondents to this question stated that some participants had been interested in exterior lighting but had not been able to install it since it is ineligible through the program.

4.2.4. Project Incentive Cap Impacts

Respondents were asked how the project incentive cap of $2,000 impacted the way their customers were able to participate in the program, if at all. Most respondents (nine of fifteen) noted that the incentive cap had reduced the scope of *some* of their customers' projects and one reported it had

reduced the scope of *all* their customers' projects. Two respondents noted that the incentive cap increased the scope of *some* of their customers' projects and two felt it had had no impact at all on customer participation. A full list of ways that the incentive cap impacted customer projects can be found in Table D-10 in Appendix D.1. Respondents who had reported that the incentive cap reduced the scope of either some or all of their customers' projects were asked by what percentage the scope had been reduced. Of these ten respondents, one-half (5 respondents) reported a scope reduction of 26% or more. A full list of the feedback provided regarding the reduction in project scope can be found in Table D-11 in Appendix D.1.

Respondents were also asked if any participants had installed additional energy-efficient equipment upgrades that exceeded the project incentive cap. The majority (eleven out of fifteen) indicated that participants had installed additional energy-efficient equipment upgrades. These eleven respondents were asked to describe the upgrades, with more lighting fixtures mentioned most frequently (seven respondents). A full list of these additional upgrades can be found in Table D-13 in Appendix D.1. These same 11 respondents were also asked why they thought some participants had decided to install the additional upgrades that exceeded the project incentive cap, with most citing (six out of eleven) that the incentive cap had not been sufficient to complete the project and four citing that participants felt the energy or monetary savings justified the additional cost. A full list of these additional upgrades can be found in Table D-14 in Appendix D.1.

All respondents were asked if any participants had completed projects that did not reach the project incentive cap. Most (ten out of fifteen) indicated that participants completed projects that had not reached the incentive cap and three respondents indicated participants had not. The ten respondents who indicated that some participants had completed projects that did not reach the incentive cap were asked why they thought these projects had not done so. Reasons varied, with the most common being that the customer did not need to install additional energy-efficient equipment (three respondents). A full list of these reasons can be found in Table D-16 in Appendix D.1.

4.2.5. Program Satisfaction

Respondents provided feedback on their level of satisfaction with various program aspects. They rated each aspect on a scale from one (1) to five (5), where one meant "not satisfied at all satisfied" and five meant "extremely satisfied" (Table 5-1). Overall, respondents were very satisfied with the program, giving it an average satisfaction rating of 4.1. When rating specific aspects of the program, respondents assigned the highest average satisfaction rating to the interactions that they had with program representatives from either the delivery vendor (4.6) or the IESO (4.5), and to the program website (4.3). On average, respondents assigned the lowest satisfaction ratings to the number and types of equipment incentivized through the program (3.9) and program training and education (3.9).

Table 5-1: Satisfaction with Aspects of the Program (n=15)

Program Aspects	Average Satisfaction Rating
The program overall	4.1
The interactions you had with any program representatives from the delivery vendor	4.6
The interactions you had with any program representatives from the IESO	4.5
The program website	4.3
Program worksheets and materials	4.1
The value that the equipment covered by the program provides to customers	4.1
Program marketing and outreach	4.1
Program application process and forms	4.0
Number and types of equipment incentivized through the program	3.9
Program training and education received	3.9

4.2.6. Program Improvement Recommendations

Respondents were asked to recommend areas of improvement for the program. The six respondents who provided recommendations offered a variety of responses, with each suggestion mentioned once each. Some suggestions included hiring quality assessors (reported by contractors), paying installers more, and reducing the reimbursement time for installers. A full list of these recommendations can be found in Table D-17 in Appendix D.1. Respondents were also asked to recommend additional lighting equipment or models for inclusion in the program in future years. Of the 10 respondents who provided a response, most cited exterior lighting (seven respondents). A full list of these recommendations can be found in Table D-18 in Appendix D.1.

Program Improvement Recommendations	
Hire quality assessors	✓
Pay installers more	✓
Reduce the reimbursement time	✓
Ensure projects meet ESA requirements	✓
Provide different lighting offerings	✓
Add more in-person training	✓
Provide customers with more information	✓
Make worksheets simpler	✓
Reduce amount of product offerings	✓
Reduce amount of paperwork	✓

4.3. Participant Perspectives

4.3.1. Key Findings

Key findings from participants' responses include the following:

- The majority of survey respondents had no suggestions for improving the initial site assessment (75%), the installer visit(s) (77%), or the overall installation process (85%). This suggests a high level of satisfaction with the program. The percent of respondents who did not have suggestions for improving the initial site assessment (75%) declined from 78% in

PY2019 and 82% in PY2020. Findings have been consistent for installer visit and the overall installation process since PY2019.

- Of those with suggestions for improving the site assessment, installer visit(s), or the overall installation process, the most common were to reduce the time it takes to complete the visits, improve the assessor or installer's professionalism, provide more flexibility in scheduling the visits, and improve site cleanup. Reducing the time it takes to complete the visits, improving the assessor or installer's professionalism, and providing more flexibility in scheduling the visits have been consistent suggestions since PY2019.
- Nearly one-sixth of respondents (15%) stated they were offered additional lighting upgrades that exceeded the $2,000 incentive cap, and nearly one-half (4 of 9) of those respondents installed them. The percent of respondents who were recommended additional upgrades and installed them decreased from to 74% in PY2020 to 44% in PY2021, though this may be due to a larger proportion of PY2021 participants refusing the additional upgrades that were recommended to them.
- Over four-fifths (83%) of respondents had not applied to other energy-efficiency programs in 2021 besides the SBL program. Nearly one-tenth (7%) had applied to the Retrofit program. The share of respondents who had not applied to the other energy-efficiency programs have steadily increased from 73% in PY2019 and 81% in PY2020 to 83% in PY2021. Fewer respondents have applied to the Retrofit program as well.

4.3.2. Site Visit Improvement Suggestions

Initial Site Assessment Visit

Three-fourths (75%) of respondents had no suggestions for improving the initial site assessment visit, indicating that the majority were satisfied with the work done by the Save On Energy representative who performed the initial site assessment visit. Of the one-fourth (25%) of respondents who had a suggestion, the most common response was to reduce the time it takes to complete the assessment (6 respondents). The participants who provided other suggestions for improving the initial site assessment visit suggested improving the professionalism of the Save On Energy representative (1 respondent), improving the accuracy of the data collection by the Save On Energy representative (1 respondent), and improving Save On Energy representative response time (1 respondent). The respondent who suggested improving the professionalism of the Save On Energy representative suggested improving the assessors' politeness and business etiquette. A list of these improvement suggestions can be found in Figure D-10 in Appendix D.3.

Installation Visits

Over three-fourths (77%) of respondents did not have suggestions for improving installation visits, indicating that a large majority were satisfied with the work performed by the Save On Energy representative who performed the installation visit. Of the one-fifth (23%) of respondents who had a suggestion, the most common responses were to reduce the time it takes to complete the visit(s) (4 respondents), provide greater flexibility when scheduling the installer visit(s) (3 respondents), improve the Save On Energy representative's professionalism (2 respondents). Participants who

provided other feedback for improving the Save On Energy representative's visit(s) mentioned improving site clean-up (1 respondent) and ensuring that contractors return to complete the job (1 respondent). A list of these improvement suggestions can be found in Figure D-11 in Appendix D.3.

Participants who suggested improvements to the professionalism of the installer mentioned politeness/business etiquette (2 respondents) and respect for their company's business practices during the visit (1 respondent).

Overall Installation Process

Over four-fifths (85%) of respondents did not have suggestions for improving the overall installation process, indicating a high level of satisfaction with the program. Various responses were provided by the one-tenth (12%) of respondents who had a suggestion, with the most commonly mentioned being to improve the site cleanup (3 respondents) and to improve scheduling and communication (3 respondents). A list of these improvement suggestions can be found in Table D-27 in Appendix D.3.

Improvement Suggestions	
Improve site clean up	✓
Improve scheduling and communication	✓
Installer to replace all lighting	✓
Installer to complete unfinished work	✓
Ensure the installer does not damage property	✓
Encourage installer to be more cautious with installation	✓

Disruptions to Business

Almost nine in ten respondents (87%) mentioned there were no disruptions to their business as a result of the project installation. A small number of respondents reported the following disruptions to their business:

- minimal disruptions (2 respondents)
- needing to schedule their business' regular activities around the assessment and installation visits (1 respondent)
- needing multiple visits to complete the installation (1 respondent)
- having installation visits scheduled by the Save on Energy representative on short notice (1 respondent)

4.3.3. Additional Lighting Upgrades

Nearly one-sixth of respondents (15%) stated they were offered additional lighting upgrades that exceeded the $2,000 incentive cap. Of the nine respondents who were offered additional lighting upgrades, four respondents agreed to install them. The most common reason was the incentive cap was not sufficient to complete the project (4 respondents). One respondent stated their additional upgrades did not qualify under

Reasons for Installing Additional Lighting	
Insufficent incentive cap	✓
Additional upgrades did not qualify for the program	✓
The energy or monetary savings justified the additional cost	✓

the program. Another respondent stated the energy or monetary savings justified the additional cost. A list of these reasons can be found in Figure D-12 in Appendix D.3.

The five respondents who did not decide to install the additional lighting upgrades mentioned that it was cost-prohibitive (4 respondents), that they did not need to install additional lighting upgrades (1 respondents) or that they felt they were being recommended additional lighting upgrades that they were not interested in (1 respondent). A list of these reasons can be found in Figure D-13 in Appendix D.3.

Reasons for Not Installing Additional Lighting	
Cost prohibitive	✓
Did not want to install additional lighting upgrades	✓
Did not trust the offering	✓

5. Other Energy-Efficiency Benefits

5.1. Avoided Greenhouse Gas Emissions

The evaluation team used the IESO CE Tool V7.1 to calculate the avoided GHG emissions. Avoided GHG emissions were calculated for the first years of PY 2019, 2020 and 2021 and for the lifetime of the measures. Table 6-1 below represents the results of the avoided GHG emissions calculations. All GHG emissions below are in Tonnes of CO_2 equivalent, unless otherwise mentioned.

Table 6-1: IF SBL Avoided Greenhouse Gas Emissions

Program Year	Electric First Year GHG Avoided	Gas* First Year GHG Avoided	Total First Year GHG Avoided	Electric Lifetime GHG Avoided	Gas* Lifetime GHG Avoided	Total Lifetime GHG Avoided
2019**	2,271.75	-3,000.96	-729.21	47,557.56	-35,118.23	12,439.33
2020**	1,306.35	-1,305.36	0.99	21,439.92	-15,502.25	5,937.68
2021	563.76	-557.12	6.63	9375.42	-6975.44	2399.97
2019 - 2021	4,141.86	-4,863.44	-721.59	78,372.90	-57,595.91	20,776.98

*Interactive gas penalty
**Includes True ups

5.2. Job Impacts

5.2.1. Key Findings

Key findings from the PY2021 job impacts evaluation include the following:

- The analysis used an input-output model which estimated that SBL program will create 57 total jobs in Canada, of which 51 will be in Ontario.
- $1M of program investment resulted in the creation of 29.6 jobs, compared to 32.2 jobs in PY2020.
- 4 out of 57 (7%) of jobs impacts were realized in the first year – 3 of the 4 first year jobs impacts were due to first year savings.
- Throughout the IF (PY2019 – PY2021), the SBL program created a total of 431 jobs across Canada – 379 of which were created in Ontario.

5.2.2. Input Values

The job impacts model was used to estimate the impacts of three economic shocks:

- The demand shock, representing the demand for energy-efficient products and services from SBL

- The business reinvestment shock, representing the increased business reinvestment due to bill savings (and net of project funding)
- The household expenditure shock, representing decreases in household spending on goods and services due to increases in the residential portion of program funding.

Table 6-2 below displays the input values for the demand shock representing the products and services related to SBL. Each measure installed as part of the program was categorized according to the StatCan IO Supply and Use Product Classifications (SUPCs).

Table 6-2: Summary of Input Values for Demand Shock

Category Description	Non-Labour ($ Thousands)	Labour ($ Thousands)	Total Demand Shock ($ Thousands)
Lighting Fixtures	785	696	1,481
Electric Light Bulbs and Tubes	95	84	179
Subtotal	880	781	1,661
Office Administrative Services	-	-	451
Total			**2,112**

The second shock modelled by the IO Model was the business reinvestment shock. This shock represented the amount that businesses would reinvest and thus inject back into the economy. This amount was split over various industries in order to properly model the demand shock. The business reinvestment shock totaled $6.0 million over 27 different industries. More detail on the business reinvestment shock, along with the reinvestment values by industry, can be found in Appendix F.

The third model input is the household expenditure shock.[4] This shock represents the incremental increase in electricity bills to the residential sector from funding the program. The assumption is that the IESO programs are funded by all customers in proportion to the overall consumption of electricity. Thus, the residential funding portion was 35% of the $1.9M program budget or $0.68M.

5.2.3. Model Results

Impacts from the StatCan I-O model are generated separately for each shock and added together to calculate overall program job impacts. In the case of SBL, this means that three different sets of job impacts are combined into the overall jobs impacts. Table 6-3 shows the total estimated job impacts by type – combining the impacts from the demand, business reinvestment and household expenditure shocks. The majority (51 out of the 57 estimated total jobs) were in Ontario. Of the 30 direct jobs created across Canada, 29 were created in Ontario. A slightly smaller proportion of the indirect and induced jobs were in Ontario; 11 out of 14 jobs were estimated to be created within the

[4] The model is actually run with a normalized value of $1 million in extra household expenditures, and the job results can be scaled by the actual demand shock.

province for both categories. The FTE estimates were slightly lower overall than the total jobs, with a total of 42 FTEs (of all types) created in Ontario and 47 FTEs added nationwide. Almost all direct FTEs (25 of 26) were added in Ontario, with this number representing approximately 59% of the total FTEs added in Ontario and 53% of all FTEs created across Canada. In 2021, each $1M of program spend resulted in the creation of 29.6 total jobs compared to 32.2 jobs per $1M in 2020. As a result of SBL program activities during PYs 2019 through 2021, a total of 431 jobs were created across Canada, 379 of which are in Ontario.

Table 6-3: Total Job Impacts by Type

Job Impact Type	Ontario FTE *(In Person-Years)*	Total FTE *(In Person-Years)*	Ontario Total Jobs *(In Person-Years)*	Total Jobs *(In Person-Years)*	Total Jobs per $1M Investment *(In Person-Years)*
Direct	25	26	29	30	15.5
Indirect	9	11	11	14	7.0
Induced	8	11	11	14	7.1
Total[1]	**42**	**47**	**51**	**57**	**29.6**

[1] Columns may not add to totals due to rounding. Real values are rounded to the nearest whole number and the whole numbers do not sum exactly to the whole number total in every column.

A more detailed write up of the model impacts – including a breakout of impacts by industry, impacts due to first year savings and verbatims from program contractors – can be found in Appendix F.

6. Key Findings and Recommendations

Finding 1. Reported Peak Demand Savings – Coincidence Factors (CF). The SBL reported peak demand savings seem to be calculated based on a predetermined coincidence factor (CFs). This is an improvement from previous years where connected demand was reported instead of actual peak demand. However, the CFs used seem to be conservative.

- **Recommendation 1:** The PY2021 SBL is the last year for the program. For future iterations of this program (i.e. 2021-2024 CDM SBP), it is recommended to further review and update the CFs used to report the peak demand savings to better align with evaluation results. Another approach that would result in high accuracy of reported peak demand is using the facility's actual HOU collected using the assessment tool to determine project specific CF.

Finding 2. The SBL assessment tool only accepts one schedule for the entire facility. Six (6) instances were found in the PY2021 sample (n=35), where lighting equipment was installed in multiple spaces with varying schedules. With only one input schedule, assessors tend to input the schedule corresponding to the greatest number of hours a light would operate if varying schedules were observed.

- **Recommendation 2.** Allow for more than one lighting schedule to be entered on applications. This will allow for more accurate reported lighting savings values.

Finding 3. Improved baseline and retrofit photos. photos of the pre-existing baseline and retrofitted fixtures and lamps submitted by the SBL assessors and installers are still taken from wide angles and from a few feet away, which do not provide useful information about the lamp wattage or lamp type.

- **Recommendation 3.** Given that this is the last year for the IF SBL program, it is recommended to consider this finding for the newly designed Small Business Program (SBP), and specify what information should be captured in the pre-retrofit and post-retrofit pictures that are taken by the SBP assessors/installers

Finding 4. Few participants who were recommended additional lighting upgrades beyond the project cost cap made those upgrades. Only one-sixth (15%) of participants reported that assessors or installers recommended additional lighting upgrades that exceeded the $2,000 incentive cap. Of those participants, about one-half (4 of 9 respondents) installed them. Most of those participants who installed additional lighting upgrades stated they did so because the incentive cap was not sufficient to complete the project.

- **Recommendation 4.** When applicable, continue to encourage assessors and installers to offer additional lighting upgrades to participants beyond those available through the program. Help interested participants identify ways to complete the work, either by installing the additional equipment at the time of participation or by providing them with a recommended equipment list to consider installing in the future.

Please note that a similar recommendation to Recommendation 4 was included in the PY2020 evaluation as well. In response to the recommendation in PY2020, the IESO indicated that they will continue to work with the program delivery vendors to ensure installations are completed effectively and with the right supply of eligible measures. Given that similar feedback was shared as part of the PY2021 evaluation, a similar recommendation has been provided again to ensure that it is carefully considered in future program years.

Finding 5. Expanding the scope of lighting offerings was a common improvement suggestion. Assessors and installers were least satisfied with the number and types of equipment incentivized (rating of 3.9 on a scale of 1 to 5 where 5 meant “extremely satisfied”). Assessors, installers, and participants most often recommended including exterior lighting and signage offerings. Both IESO staff and delivery vendor staff noted that, while the program offers a wide variety of measures to customers, it must also adhere to cost-effectiveness targets and energy-saving priorities.

- **Recommendation 5a.** Explore the feasibility of including more lighting products that align with program goals and cost-effectiveness targets.
- **Recommendation 5b.** Explore the feasibility of offering a customer co-pay option to expand the scope of customer projects.

Please note that a similar recommendation to Recommendation 5a was included in the PY2020 evaluation as well. In response to the recommendation in PY2020, the IESO indicated that they would continue to evaluate and update the program offerings to include measures that deliver cost-effective savings and support the needs of small businesses. They also noted that eligible businesses would be encouraged to participate in other Save on Energy programs that offer additional measures and opportunities. Given that similar feedback was shared as part of the PY2021 evaluation, a similar recommendation has been provided again to ensure that it is carefully considered in future program years.

Finding 6. Opportunities exist to improve assessor and installer training and education. Most surveyed assessors and installers reported receiving training and education. Nearly all had received information on the program rules, and many others received information on program offerings. However, program training and education received the lowest satisfaction rating (a 3.9 on a scale of 1 to 5 where 5 meant "extremely satisfied") from assessors and installers. Providing marketing and outreach techniques to better promote the program to customers was the most common improvement recommendation, followed by more information on the program offerings and rules, and training on installation procedures and practices.

- **Recommendation 6a.** Revisit the assessor and installer training topics to ensure they cover areas that are most of interest to them (e.g., marketing and outreach techniques, more information on offerings and rules, and installation procedures and practices).
- **Recommendation 6b.** Offer training and education with regularity to ensure that assessors and installers to ensure new staff are well-informed about the program and to provide refreshers to others.

Finding 7. Participant perspectives on the program and its processes were positive overall, but there were some suggestions for program improvement provided. The majority of participants had no suggestions for improving the initial site assessment (75%), the installer visit(s) (77%), or the overall installation process (85%), which suggests a high level of satisfaction with the program. Of those with suggestions for improvements, the most common were to reduce the time it takes to complete the assessor and installation visits, improve the assessor or installer's professionalism (such as improving politeness and business etiquette and respecting the company's time), provide greater flexibility when scheduling the visits, and improve site cleanup.

- **Recommendation 7a:** Reduce the time it takes to complete the assessment and installation visits. Identify areas where additional program support or resources could allow the assessors/installers to complete this task more promptly.
- **Recommendation 7b:** Provide additional training to assessors and installers to ensure professionalism during assessments and installation visits.
- **Recommendation 7c:** Improve communication around scheduling the visits (for example, coordinating with participants to identify suitable times for the visit and sending reminder e-mails and/or text messages confirming appointments and providing accurate arrival windows).

- **Recommendation 7d:** Encourage assessors and installers to ensure all necessary clean up occurs prior to leaving a site.

Please note that similar recommendations to Recommendation 7a through 7c were included in the PY2020 evaluations as well. In response to the recommendation in PY2020, the IESO indicated that they would continue to identify methods to improve customer satisfaction, including increasing scheduling flexibility, professionalism, and addressing installation time issues in future versions of the program. They also noted that they would continue to administer customer satisfaction surveys to monitor the customer experience. Given that similar improvement suggestions were raised by participants as part of the PY2021 evaluation to those raised in PY2019 and PY2020 and given the critical importance of the customer experience overall, similar recommendations have been provided again to ensure that they continue to be carefully considered in future program years.

Finding 8. Additional cross-program promotion opportunities exist. Less than one in ten (7%) of SBL participants had also participated in the Retrofit program in 2021, and one in fifty (2%) participated in the Refrigeration Efficiency Program (REP).

- **Recommendation 8.** Continue to identify cross-program promotion opportunities, which can be achieved through two means. Firstly, promoting other program opportunities to all participating SBL customers at both the start and end of the participation process. Secondly, ensuring that participating SBL customers are aware of the other program opportunities designed with their business segment in mind.

Please note that a similar recommendation to Recommendation 8 was included in the PY2020 evaluation. In response to the recommendation in PY2020, the IESO indicated that cross-program opportunities would continue to be identified to support businesses. They also noted that a network had been established between the SBL and Retrofit program delivery vendors to share qualified leads for the respective programs. Given that participation in other programs was still very low as reported by the surveyed SBL participants in PY2021, this recommendation has been provided again to ensure that it continues to be carefully considered in future program years.

Finding 9. Opportunities exist to expand program marketing. Customers' lack of awareness of the program was cited by assessors and installers as one of the main reasons preventing more customers from participating in the program. The most common suggestion provided to address barriers to participation was to increase marketing of the program.

- **Recommendation 9** Increase marketing efforts across different platforms (e.g., social media, online, and through community groups such as small business associations and local community organizations).

Please note that a similar recommendation to Recommendation 9 was included in the PY2020 evaluation as well. In response to the recommendation in PY2020, the IESO indicated that they would continue to work with its program delivery vendors to increase program awareness by implementing online marketing initiatives and by reaching out to industry associations. Given that

similar feedback was shared as part of the PY2021 evaluation, a similar recommendation has been provided again to ensure that it is carefully considered in future program years.

Appendix A Impact Evaluation Methodology

This section describes in greater detail the specific tasks necessary and methodologies that will be used for the SBL program impact evaluation. The SBL program impact evaluation will include the following tasks:

- Program database assessment
- Population sampling
- Data collection and analysis
- Establish verified savings

A.1 Program Database Assessment

Analysis of the SBL program involved a simplified process of separating new projects from projects that were already evaluated in previous evaluations. Since the SBL database assigns a unique number to each project, these numbers and the project completion date were used to determine the new projects that need to be included in the 2021 PY evaluation.

A.2 Data Collection and Analysis

The Level 1 audit of the sampled SBL projects started with a review of the measure codes, quantities, and reported savings from the SBL database and all available project documentation including applications, invoices, work orders, site photos, etc. This information was used to develop Measurement and Verification (M&V) plans for projects that are selected for analysis. Level 2 audits included a virtual site reviews and verification of the installed equipment for a limited number of sampled projects. Development of M&V plans in advance of the on-site visits and desk reviews ensured time spent on site was focused on collecting and/or verifying the most important project specifications. Key parameters investigated on-site included baseline and retrofitted equipment information, operating hours, and lighting controls.

Discrepancies between reported fixture wattages and operating hours remain the main cause for energy realization rate deviation away from 100%. To verify the actual energy and demand savings, analysis staff recorded lamp wattages and ballast factors of retrofitted equipment. Normal, seasonal, and holiday operating hours were confirmed with the participant.

Following the completion of data collection and project analyses, a program level verified energy and demand savings was calculated by applying sample level adjustment factors (energy and demand realization rates, and net-to-gross ratios) to the overall program population.

A.3 Population Sampling

An important part of the evaluation planning process is the sample design for both the net-to-gross (NTG) and impact evaluation activities. Statistical sampling is the basis of the evaluation's ability to say something meaningful within a specified level of certainty and precision about a population of interest. Resource Innovations used statistical sampling of the program population to estimate impacts and collect data about customer perceptions, attitudes, and characteristics. Sampling considered pre-defined levels of confidence (90%) and precision (10%), population size, effect size and analysis methods.

The ideal magnitude of sample sizes varies as a function of:

- The Population of Interest: This could differ between impact and process evaluations. For example, the population of interest for impact evaluations of verified and net impacts is generally the savings and/or measures, whereas the population of interest for process evaluations tends to be the participant or trade ally. Therefore, samples are typically drawn to fulfill the greatest rigor requirement – generally impact evaluation.
- The Objective of Sampling: Sampling is designed to ensure the sample is representative of the population, but producing a sample that measures overall energy use with 90%/10% confidence/precision is very different than measuring a change in energy use with 90%/10% confidence/precision. Properly detecting changes in energy use often requires larger sample sizes, especially if the changes that need to be detected are relatively small. Our planned approach will meet or exceed the industry-accepted minimum level of 90% confidence level ± 10% precision (90% ± 10%).
- The Inherent Variability in the Data: The more volatile the load, the larger the sample size must be to meet precision requirements. The coefficient of variance (Cv) will be initially set at 0.5, unless there is a known reason that suggests otherwise (i.e., prior evaluation studies).

Resource Innovations collected 35 new SBL samples for the 2021 PY evaluation due to the small population and limited budget. The 68 sample projects from the 2020 PY evaluation were combined with the PY 2021 sample to increase the number of projects and improve the precision of the results.

A.4 Establish the Verified Savings

- The data collected as a result of Level 1 and Level 2 audit activities allowed energy and demand savings to be calculated for each sampled project—this is termed gross verified savings. The ratio of gross verified savings to the reported savings is the project realization rate and the summation of all project gross verified and reported savings provides the program level realization rate. Equation 1 shows the basic formula for calculating the realization rate.

Equation 1 Realization Rate

$$Program\ Realization\ Rate = \frac{\sum_1^n Gross\ Verified\ savings}{\sum_1^n Reported\ Savings}$$

Where:

n = Total number of projects evaluated

Gross Verified Savings = Sample savings (kWh or kW) verified through the evaluation

Reported Savings = Sample savings (kWh or kW) reported by the IESO

The methodology and peak definitions outlined in the EM&V Protocols were used to calculate verified demand savings (both winter and summer) by reviewing the average demand reduction across all peak hours.

The SBL Program incentivizes the implementation of equipment with efficiency levels that exceed local building and energy requirements. However, the energy consumption of equipment in an enclosed space cannot be viewed in isolation. Building systems interact with one another and a change in one system can affect the energy consumption of another. This interaction is important to consider when calculating the benefits provided by the SBL Program because it adopts a comprehensive view of grid level energy changes, rather than limiting the analysis to the energy change directly related to the modified equipment. The 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.5 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 2.

Equation 2: Lifetime Energy Savings

$$Lifetime\ Energy\ Savings = EUL \times Annual\ Energy\ Savings$$

Where:

EUL = Estimated useful life of the retrofitted equipment

A.6 Net Savings Methodology

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

Equation 3: 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, the evaluation team implemented attribution surveys to calculate free-ridership (FR) and spillover (SO) rates. Both FR and SO are represented as percentages of the total reported savings for the program. FR and SO are estimated for each survey respondent, and those results are then aggregated to develop total FR and SO estimates. Results are weighted by the percent of savings associated with each respondent's completed energy-efficiency project, meaning that 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 (program participants who would have implemented a program measure or practice in the absence of the program). SO refers to additional reductions in energy consumption and demand that are due to program influences beyond those directly associated with program participation. SO is representative of installations of energy-efficient equipment that were influenced by the participant's experience with the program and that were completed without receiving any program incentives or other financial support.

The *NTG* ratio is defined by Equation 4, where FR is the participant free-ridership percentage and SO is the participant spillover percentage.

Equation 4: Net-to-gross

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

The evaluation team calculated FR and SO for a single incented project for each sampled participant. The evaluation team then combined these results to develop overall FR, SO, and NTG values.

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 presented in Equation 5 is defined as follows:

Equation 5: Net-to-gross Ratio

$$\boldsymbol{NTG = 100\% - FR + SO}$$

Where FR is free-ridership and SO is spillover.

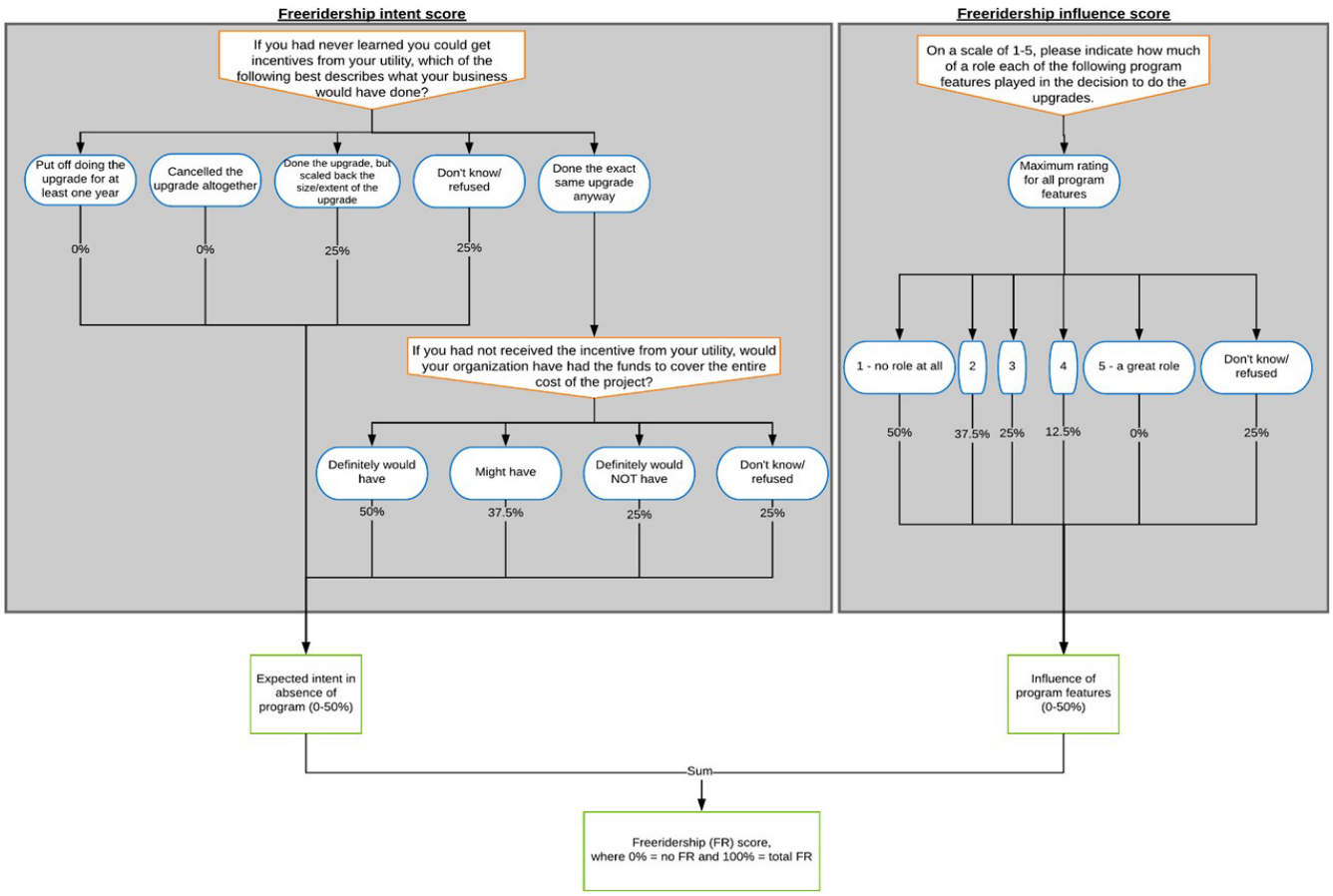
B.1 Free-ridership Methodology

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-1 illustrates the FR methodology.

Figure B-1: Free-ridership Methodology



Intention Component

The FR score's intention component asks participants how the evaluated project would have differed 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-1 indicates the possible intention scores a respondent could have received depending on their responses to these two questions.

Table B-1: 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)

If a respondent provides 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 stated 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 stated 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 receives a score of 50% (associated with high FR). If the respondent answered 2 (might have had the funds), they 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).

The bullet points below display the same FR intention scoring approach in list form. As mentioned above, for each respondent, the evaluation team calculated an intention score, 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%

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%
- The 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 their 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 indicates it played no role at all and five indicates it played a great role. The potential influence includes the following:

- Availability of the incentives or the no-cost upgrades
- The information or recommendations provided by the IESO staff (if applicable)
- The results of any audits or technical studies that were done (if applicable)
- The information or recommendations provided by contractors, vendors or suppliers associated with the program
- Marketing materials or information provided by the program

- Previous experience with any energy-saving program
- Others (identified by the respondent)

Table B-2 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. 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-2: 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 influencing 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 indicates 0% FR (i.e., the participant was not at all a free rider), a score of 100 indicates 100% FR (i.e., the participant was a complete free rider), and a score between 0 and 100 indicates the participant was a partial free rider.

B.2 Spillover Methodology

To assess 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 the upgrade, size, quantity, hours of operation

For each equipment type, 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 indicates it played no role at all and five indicates it played a great role. Suppose the influence score is between 3 and 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%

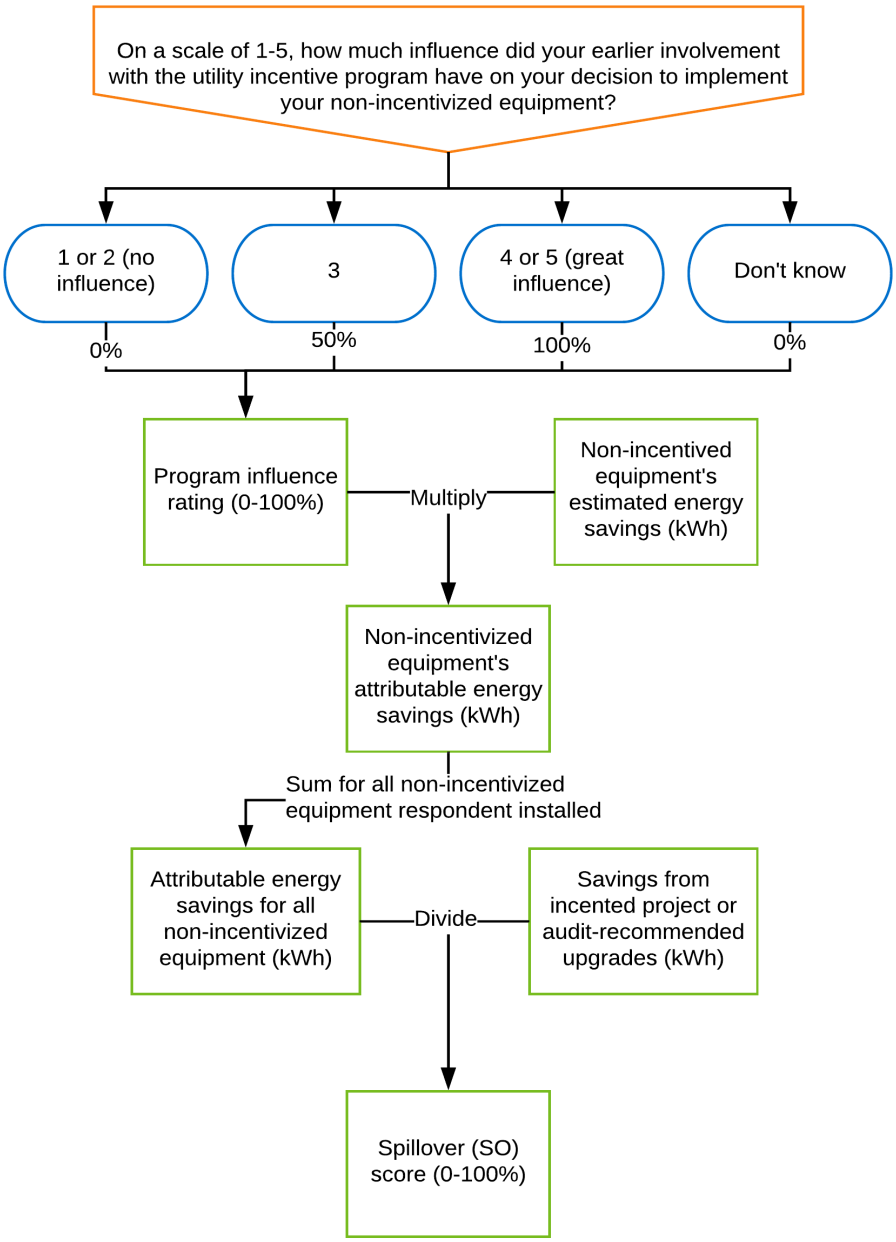
The following procedure was used to calculate an SO percentage for each respondent:

- 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-2 illustrates the SO methodology.

Identification of Project or Upgrade for NTG Assessment

Figure B-2: Spillover Methodology



Participants were asked to consider all their completed projects in 2021 through the particular program in question. This approach allowed for the respondent's NTG value across all the projects they completed in 2021 to be applied rather than just one.

B.3 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. Suppose the respondent is not the appropriate contact. In that case, 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. In the case of a web survey, the weblink will be forwarded to the appropriate contact.
- 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 their reasons 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.4 Net-to-Gross Survey Implementation

The survey was implemented over the web and the phone. The survey lab was instructed to avoid collecting duplicate responses by no longer calling on respondents if they had responded to the web survey or deactivating the respondent's survey weblink if they had responded to the phone survey.

For each of the phone surveys, the survey lab called participants in a randomized order. After reaching the identified contact for a given participant, the interviewer explained the survey's purpose and identified the IESO as the sponsor. The interviewer asked if the contact was involved in decisions about upgrading equipment at that organization. If the contact was not involved in decisions about upgrading equipment, the interviewer asked to be transferred to or for the contact information of the appropriate decision-maker. The interviewer then attempted to reach the identified decision-maker to complete the survey.

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

Appendix C Detailed Process Evaluation Methodology

This appendix provides additional detail about the process evaluation methodology. A summary of the methodology was provided in Section 5.

C.1 Research Question Development

Table C-1 provides a list of the key research questions and the data sources used to investigate each. These research questions were developed at the beginning of the PY2020 evaluation period in January and February of 2021. They were written in consultation with the IESO program staff, the IESO EM&V staff, and after reviewing the timing of the related survey instruments to ensure respondent fatigue would be minimized. After the research questions were finalized, they were adapted for inclusion in the interview guides and survey instruments which were, in turn, reviewed and approved by the IESO EM&V and program staff (refer to Appendix C.2 for more information on the interview and survey methodology).

Table C-1: SBL Process Evaluation Research Objectives and Data Sources

Research Questions	Document and Program Records Review	IESO & Delivery Vendor Staff Interviews	Participant Surveys	Assessor and Installer Surveys
Is sufficient data being captured to effectively verify recommendations and savings?	✓	✓		
What are the goals and objectives of the program, and how well is the program doing in terms of meeting them?		✓		
What strategies implemented by the IESO were effective in terms of driving participation, increasing program awareness, and avoiding free-ridership?		✓	✓	✓
What were the experiences of participants, assessors, and installers in participating in the program?			✓	✓
What additional lighting equipment purchases occurred above the $2,000 program cap?			✓	✓
What are the programs strengths, barriers, and areas of improvement? How, if at all, could the professionalism of the assessors and installers be improved?		✓	✓	✓

Are provincial guidelines for health and safety followed the assessors and installers?			✓	✓
What program marketing and outreach occurs in support of other Save on Energy programs? What other programs have customers participated in?			✓	
What types of control equipment may have been installed at customer sites (e.g., smart thermostats, HVAC controls, lighting controls) and how are they used?			✓	
How many direct and indirect jobs are attributable to the SBL program from the investment and activities incurred by the IESO?		✓		
What NTG value is attributable to the SBL program?			✓	✓
Identification of any additional process-related research questions to pursue	✓	✓		

C.2 In-Depth Interview and Survey Methodology

This appendix provides additional detail about the process evaluation methodology. A summary of the methodology was provided in Section 5. The process evaluation collected primary data from key program actors, including the IESO program staff, program delivery vendor staff, assessors, installers, and participants (Table C-2). Data were collected using web surveys or telephone-based IDIs, depending on what was most suitable for a particular respondent group. 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 IESO EM&V staff approved the survey instruments and interview guides. 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 C-2: Process Evaluation Primary Data Sources

Respondent Type	Methodology	Population	Completes – Web	Completes – Phone	Completes – Total	Response Rate	90% CI Error Margin
IESO Program Staff	Phone In-depth Interview (IDI)	1	-	1	1	100%	0%
Program Delivery Vendor Staff	Phone IDI	1	-	1	1	100%	0%
SBL Assessors and Installers	Web Survey	46	15	-	15	33%	N/A*
SBL Participants	Web and Phone Survey	360	46	14	60[5]	16.7%	9.8%

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

IESO Program Staff and Program Delivery Vendor Staff Interviews

One in-depth interviews (IDI) was completed with two members of the IESO program staff and a second IDI was completed with one member of the program delivery vendor staff (Table C-3). The purpose of the interviews was to better understand the perspectives of the IESO program staff and program delivery vendor staff related to program design and delivery.

The interview topics addressed 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. Telephone IDIs were conducted with the IESO program staff and the program delivery vendor staff using in-house staff (rather than through a survey lab). The interviews were completed between May 5 and May 10 of 2022. Each interview took approximately one hour to complete.

[5] Please note that the count of process survey responses (n=60) is less than the count of NTG responses (n=63) because some respondents did not complete the process section of the survey.

Table C-3: IESO Program Staff and Program Delivery Vendor Staff IDI Disposition

Disposition Report	IESO Program Staff	Program Delivery Vendor Staff	Total
Completes	2	1	3
No Response	-	-	-
Unsubscribed	-	-	-
Partial Complete	-	-	-
Bad Contact Info (No Replacement Found)	-	-	-
Total Invited to Participate	2	1	3

SBL Assessor and Installer Survey

A total of 15 assessors and installers were surveyed from a sample of 48 unique companies (

Table C-4). The purpose of the survey was to better understand the SBL assessor and installer's perspectives related to program delivery.

The survey topics addressed firmographics, project background, training and education, customer participation, equipment feedback, impacts of the incentive cap, barriers to participation, equipment feedback, suggestions for improvement, satisfaction, job impacts, and impacts of the COVID-19 crisis.

The sample was developed from program records provided by the 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 the NMR staff using Qualtrics survey software. Survey implementation was conducted between March 23 and April 14 of 2022. The survey took an average of 15 minutes to complete after removing outliers.[6] Weekly email reminders were sent to non-responsive contacts throughout web survey fielding.

[6] Note that the survey was designed to allow the respondent to come back to it at a later time 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.

Table C-4: Assessor and Installer Survey Disposition

Disposition Report	Total
Completes	15
Emails bounced	1
Bad Contact Info (No Replacement Found)	1
Unsubscribed	-
Partial Complete	18
Screened Out	11
No Response	-
Total Invited to Participate	48

SBL Participant Survey

A total of 187 participants were surveyed from a sample of 1,048 unique contacts (Table C-5). The purpose of the survey was to better understand the SBL participant perspectives related to program experience.

The survey topics addressed firmographics; improvement suggestions about the initial site assessment, the follow-up visit, and the overall installation process; FR and SO, additional lighting upgrades, ESA fees, control equipment, participation in other programs, NEBs, job impacts, and the impacts of the COVID-19 crisis.

The sample was developed from program records provided by the IESO EM&V staff. Given the large number of program participants, a random subset of participants was selected for inclusion in the survey sample that did not overlap with the impact evaluation sampling.

The survey was delivered over the phone and the web in partnership with the Resource Innovations survey lab using Qualtrics survey software. Survey implementation was conducted between March 7 and March 30 of 2022. The survey took an average of 12 minutes to complete after removing outliers.[7] Weekly e-mail reminders were sent to non-responsive contacts throughout web survey fielding.

[7] Note that the survey was designed to allow the respondent to come back to it at a later time 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.

Table C-5: SBL Participant Survey Disposition

Disposition Report	Web	Phone	Total
Completes	46	14	60
Emails bounced	-	-	0
Bad Contact Info (No Replacement Found)	16	-	16
Unsubscribed	-	-	0
Partial Complete	-	9	9
Screened Out	-	1	1
Busy	-	35	35
Callback	-	57	57
Hard Refusal	-	36	36
No answer	-	77	77
No Eligible Respondent	-	8	8
Non-working #	-	7	7
Voicemail	-	93	93
Agreed to Complete Online	-	8	8
Wrong Number	-	7	7
Language Barriers	-	3	3
No Response	282	8	290
Total Invited to Participate	344	363	707

Appendix D Additional NTG and Process Results

This appendix provides additional results in support of the NTG and process evaluations.

D.1 Additional Assessor and Installer Process Results

This section provides additional detail regarding the process evaluation results collected as part of the SBL assessor and installer survey.

Firmographics and Program Experience

Responding assessors and installers were asked various questions to better understand their roles in SBP. Most of the respondents (fourteen out of fifteen) reported being hired by the program delivery vendor. One respondent indicated that the program had been recommended to them by another installer. All fifteen respondents were lighting installation contractors, but one was also an assessor.

Respondents were asked to report the sector and business category that best represented their company. Of the fourteen respondents who provided their sector, eight reported working for firms in the construction industry, while five reported working for firms in repair, maintenance, and operations (Table D-1).

Table D-1: Respondents' Business Category (n=14)

Sectors and Business Categories	Respondents
Construction	8
Non-Residential	4
Residential	1
Repair	3
Repair, maintenance, and operations	5
Other	1

Respondents were asked various questions about their business characteristics. Three respondents worked at companies that had been in business for ten years or less, and eight had been in business for twenty years or more. Ten respondents worked at companies with less than twenty full-time employees and seven had one to four part-time employees (Table D-2).

Table D-2: Business Characteristics (n=13)

# of Years in Business	Respondents
1 to 10	3
11 to 20	0
20+	8
Don't know/Refused	1
# of Full Time Employees	
1 to 10	6
11 to 20	4
21 - 30	1
Don't know/Refused	2
# of Part Time Employees	
1 to 4	7
Don't know/Refused	6

Respondents were asked to indicate whether they performed assessments and/or installations for the Save on Energy Small Business Lighting (SBL) Program under the Conservation First Framework, with six respondents reported having previously done so. In 2021, ten respondents reported completing less than 50 projects through the SBP and SBL programs, two completed 150 projects, one reported 400 projects, and one reported 800 projects. The one respondent that also served as an assessor reported completing 300 projects and estimated that 35% of their total sales was represented by the work that they performed under program in 2021 (Table D-3).

Table D-3: Program Experience (n=15)

Performed Assessments/Installations Under CFF	Respondents
Yes	6
No	3
Don't know/Refused	6
# of Projects Completed in 2021	
1 to 50	10
150	2
300	1
400	1
800	1

Training and Education

Table D-4 includes a list of types of training or education that responding assessors and installers had received related to the program in 2021. Section 5.2.2 includes more discussion around these improvement suggestions.

Table D-4: Type of Training and Education Received*
(Open end and multiple responses allowed; n=15)

Type of Training	Responses
Webinar or other online instruction	7
Responses to questions	5
One-on-one in-person instruction from Sonepar	5
One-on-one in-person instruction from IESO staff	1
No training	2
Don't know/Refused	1

*Does not sum to 15 due to multiple response.

Table D-5 includes a list of the topics covered in the trainings that responding assessors and installers had participated in. Section 5.2.2 includes more discussion around these training topics.

Table D-5: Topics Covered in Trainings*
(Open end and multiple responses allowed; n=12)

Training Content	Respondents
The program rules	11
The offerings associated with the program	9
Installation procedures and practices	7
Marketing and outreach techniques	5
Application process training or support	4

*Does not sum to 12 due to multiple response.

Table D-6 includes a list of additional training or education topics would be helpful to support the work responding assessors and installers work in the future. Section 5.2.2 includes more discussion around these training topics.

Table D-6: Recommended Training and Education Topics*
(Open end and multiple responses allowed; n=15)

Additional Training Content	Respondents
Marketing and outreach techniques	6
The offerings associated with the program	3
The program rules	3
Installation procedures and practices	3
Application process training or support	2
Don't know/Refused	5

*Does not sum to 15 due to multiple response.

Customer Participation

Table D-7 includes a list of the most common ways that customers came to participate in the program, as reported by the responding assessors and installers. Section 5.2.3 includes more discussion around these participation pathways.

Table D-7: Primary Way Customers Came to Participate*
(Open end and multiple response allowed; n=15)

Primary Ways	Respondents
Staff from delivery vendor generated leads and provided them to the assessor or installer	10
Assessor or installer described the program and qualifying equipment during client calls	2
Marketed the program during audits or other in-person customer contacts	1
Customers contacted you about installing equipment through the program	1
Don't know/Refused	1

Table D-8 includes a list of barriers preventing customers from participating in the program, as reported by the responding assessors and installers. Section 5.2.3 includes more discussion around these barriers to participation.

Table D-8: Barriers to Customer Participation*
(Open end and multiple responses allowed; n=15)

Customer Barriers	Respondents
They did not know about it	5
They did not think the upgrades are worth the trouble of participating	5
COVID-19 restrictions	4
Getting efficiency upgrades was not a priority given other priorities	2
They did not think the upgrades will save them any money	1
Limited assessor availability	1
Don't know/Refused	2

*Does not sum to 15 due to multiple response.

Table D-9 includes a list of suggestions to overcome barriers preventing customers from participating in the program, as reported by the responding assessors and installers. Section 5.2.3 includes more discussion around these participation pathways.

Table D-9: Suggestions to Overcome Participation Barriers
(Open end and multiple responses allowed; n=9)

Suggestions to Overcome Barriers	Respondents
Increase marketing	5
Customer education	1
Share customer testimonials	1
Direct promotion from IESO	1
Provide more options for lighting products	1
Provide eligible contractor lists	1
Hire more assessors	1

*Does not sum to 9 due to multiple response.

Project Incentive Cap Impacts

Table D-10 includes a list of ways the project incentive cap of $2,000 impacted how customers were able to participate in the program, if at all, as reported by the responding assessors and installers. Section 5.2.4 includes more discussion around incentive cap impacts.

Table D-10: Impacts of Incentive Cap on Project Scope (n=15)

Impacts of Incentive Cap	Respondents
It reduced the scope of *some* of my customers' projects	9
It reduced the scope of *all* my customers' projects	1
It increased the scope of *some* of my customers' projects	2
It had no impact on customer participation	2
Don't know	1

Table D-11 includes feedback regarding the reduction in customer project scopes due to the incentive cap, as reported by the responding assessors and installers. Section 5.2.4 includes more discussion around reductions in project scope.

Table D-11: Reduction in Project Scope due to Incentive Cap (n=10)

Reduction in Project Scope	Respondents
The project scope was reduced by 1% to 10% on average	1
The project scope was reduced by 11% to 25% on average	2
The project scope was reduced by 26% to 50% on average	4
The project scope was reduced by 51% to 75% on average	1
Don't know/Refused	2

Table D-12 includes feedback regarding whether any participants had installed additional energy-efficient equipment upgrades that exceeded the project incentive cap, as reported by the responding assessors and installers. Section 5.2.4 includes more discussion around this feedback.

Table D-12: Participants' Installation of Additional Upgrades that Exceeded Incentive Cap (n=-15)

Installation of Additional Upgrades	Respondents
Yes	11
No	3
Don't know/Refused	1

Table D-13 includes feedback regarding the additional energy-efficient equipment upgrades that participants had installed and that exceeded the incentive cap, as reported by the responding assessors and installers. Section 5.2.4 includes more discussion around reductions in project scope.

Table D-13: Description of Additional Upgrades Installed by Participants
(Open end and multiple response allowed; n=11)

Description of Additional Upgrades	Respondents
More lighting fixtures	7
Ballast replacements	2
Electrical upgrades to support retrofits	1
Don't know	1

Table D-14 includes feedback regarding the reasons why some participants had decided to install the additional upgrades that exceeded the project incentive cap, as reported by the responding assessors and installers. Section 5.2.4 includes more discussion around these reasons.

Table D-14: Reasons Why Participants May Have Installed Additional Upgrades
(Open end and multiple response allowed; n=11)

Reason for Installation of Additional Upgrades	Respondents
The incentive cap was not sufficient to complete the project	6
The energy or monetary savings justified the additional cost	4
Don't know/Refused	2

*Does not sum to 11 due to multiple response.

Table D-15 includes feedback regarding whether any participants had completed projects that did not reach the project incentive cap of $2,000, as reported by the responding assessors and installers. Section 5.2.4 includes more discussion around this feedback.

Table D-15: Participants' Completion of Projects that Did Not Reach the Incentive Cap (n=15)

Project Completion that Did Not Reach Incentive Cap	Respondents
Yes	10
No	3
Don't know/Refused	2

Table D-16 includes feedback regarding reasons why some projects had not reached the incentive caps, as reported by the responding assessors and installers. Section 5.2.4 includes more discussion around these reasons.

Table D-16: Reasons Why Participants May Have Completed Projects that Did Not Reach Incentive Cap
(Open end and multiple response allowed; n=10)

Reason for Completing Project that Did Not Reach Incentive Cap	Respondents
Did not need to install energy-efficient equipment	3
Cost prohibitive	2
Did not have enough lighting to reach cap	2
Did not want to install additional energy-efficient equipment	1
Don't know/Refused	2

Program Improvement Recommendations

Table D-17 includes feedback regarding recommendations to improve the program, as reported by the responding assessors and installers. Section 5.2.6 includes more discussion around these recommendations.

Table D-17: Recommendations to Improve Program (n=6)

Program Improvement Suggestion	Respondents
Hire quality assessors	1
Pay installers more	1
Reduce the reimbursement time for installers	1
Ensure projects meet ESA requirements	1
Provide different lighting offerings	1
More in-person training	1
Provide customers with more information	1
Make worksheets simpler	1
Reduce amount of product offerings	1
Reduce amount of paperwork	1

*Does not sum to 6 due to multiple response.

Table D-18 includes feedback regarding equipment or model recommendations to consider including in the program in future years, as reported by the responding assessors and installers. Section 5.2.6 includes more discussion around these recommendations.

Table D-18: Equipment or Model Recommendations for Future Program Years (n=10)

Equipment or Model Recommendations	Respondents
Exterior lighting	7
Exit signs	2
T12 fixtures	1
LED panels	1
UV lighting (light therapy)	1

*Does not sum to 10 due to multiple response.

Business Response to COVID-19

Respondents were asked to describe how the COVID-19 pandemic had affected their company and its operations, if at all. Respondents most often noted delays and shortages in the supply chain (ten out of fifteen) and increased cleaning and safety measures (seven out of fifteen). Table D-19 shows other ways in which the pandemic changed respondents' business operations. Only two said the pandemic had had no impact on business operations.

Table D-19: Impacts to Business Operations Due to COVID-19*
(Open end and multiple responses allowed; n=15)

Changes to Operation	Respondents
Delays or shortages in the supply chain	10
Increased cleaning and safety measures	7
Lower sales or revenues	5
Workforce issues (i.e., layoffs, difficulty hiring)	4
Closed part of business	3
More remote work	3
Increased measure costs	2
Changes in operating hours	2
No impact	2
Difficulty meeting targets/deadlines	1
Decreased productivity	1
Don't know/Refused	1

*Does not sum to 15 due to multiple response.

When asked to rate how difficult it was to adhere to the relevant health and safety standards associated with the COVID-19 crisis when visiting participating customer facilities to perform program

upgrades, respondents gave an average difficulty rating of 3.9 on a scale one (1) to five (5), where 1 meant "unduly difficult" and 5 meant "not difficult at all."

D.2 Additional Participant Net-to-Gross Results

This section includes detailed FR and SO results associated with the NTGR for SBL participants.

Free-Ridership (FR)

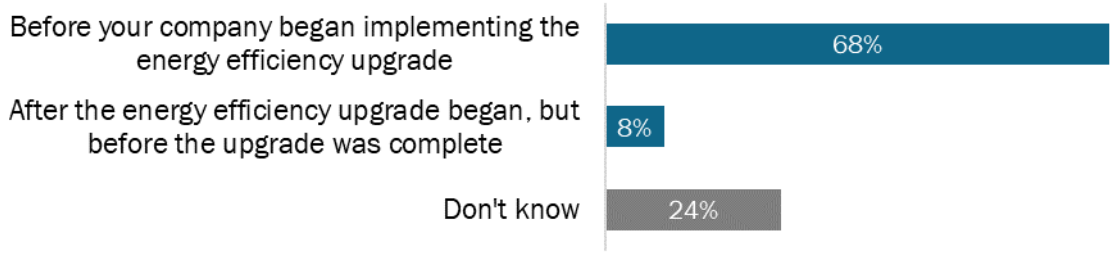
The extent of FR within the program was assessed by surveying the SBL participants to understand their experiences and plans before learning about the program, what they would have done in the program's absence, and how influential the program was on their decision to implement the energy-efficient upgrades.

Program Awareness and Timing of Program Participation

Participants were first asked whether they had considered or had plans to implement lighting upgrades before learning they could receive energy-efficiency incentives through the SBL program. Over one-half (51%) of the survey respondents had considered replacing their lights before being contacted by the program, while almost one-half (48%) had not.

Next, participants were asked about the timing of their participation in the program in relation to the start of their energy-efficient upgrade project (Figure D-1). Nearly two-thirds of respondents (68%) said they became a participant before their company began implementing the upgrade, which suggest most participants are being engaged by the program as intended. Less than one-tenth (8%) of respondents said that they initiated their participation after the upgrade began, but before completion. None of the respondents said they became a participant after their upgrade was complete. Almost one-fourth of respondents (24%) could not recall when they became a program participant.

Figure D-1: Timing of Program Participation (n=63)



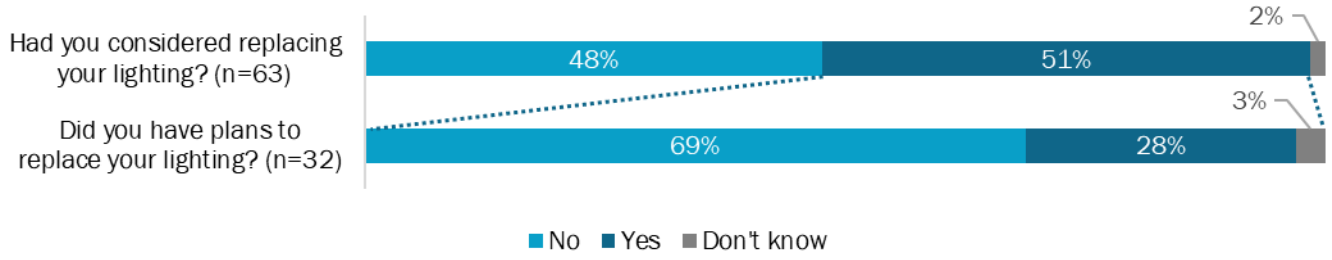
The few respondents who initiated their participation after the upgrade began provided the following reasoning:

- Needed to stick to an internal schedule to complete the upgrade (2 respondents)

- Needed to complete work for an unplanned replacement for recently failed existing equipment (1 respondent)
- Time or resource constraints at their organization (1 respondent)
- Was made aware of the program after beginning installation (1 respondent)

Of the survey respondents who stated they considered replacing their lights, almost one-third (28%) already had plans to install new lighting before learning about the program, indicating potential FR (Figure D-2). However, more than two-thirds (69%) of the respondents who considered new lighting did not plan for any installations prior to learning about the program, indicating the program had a strong influence on their decision to begin the project. While responses to these questions were not included in the estimation of the FR score, they provide additional context for understanding the participants' decision-making processes.

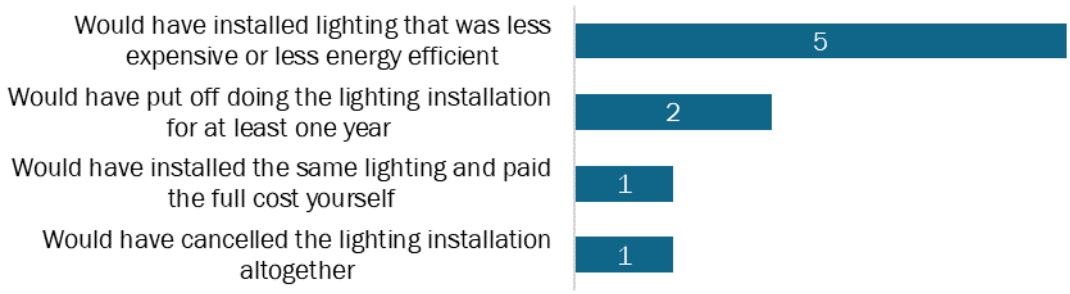
Figure D-2: Actions Taken Prior to Learning About the Program (n=63)



Actions in the Absence of the Program

Participants who stated they had planned for lighting upgrades before applying to the SBL program were then asked what their company would have done in the absence of the program's free audit and equipment installation (Figure D-3). Overall, their responses suggest relatively low FR as more than eight out of nine respondents would have put off or cancelled the upgrades or installed less expensive or less efficient lighting without the program's support. One respondent would have installed the same lighting equipment and paid the full cost themselves, which indicates a high level of FR for this respondent. Responses from this participant intent question were factored into the FR analysis.

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



* Counts displayed rather than percentage due to small n.

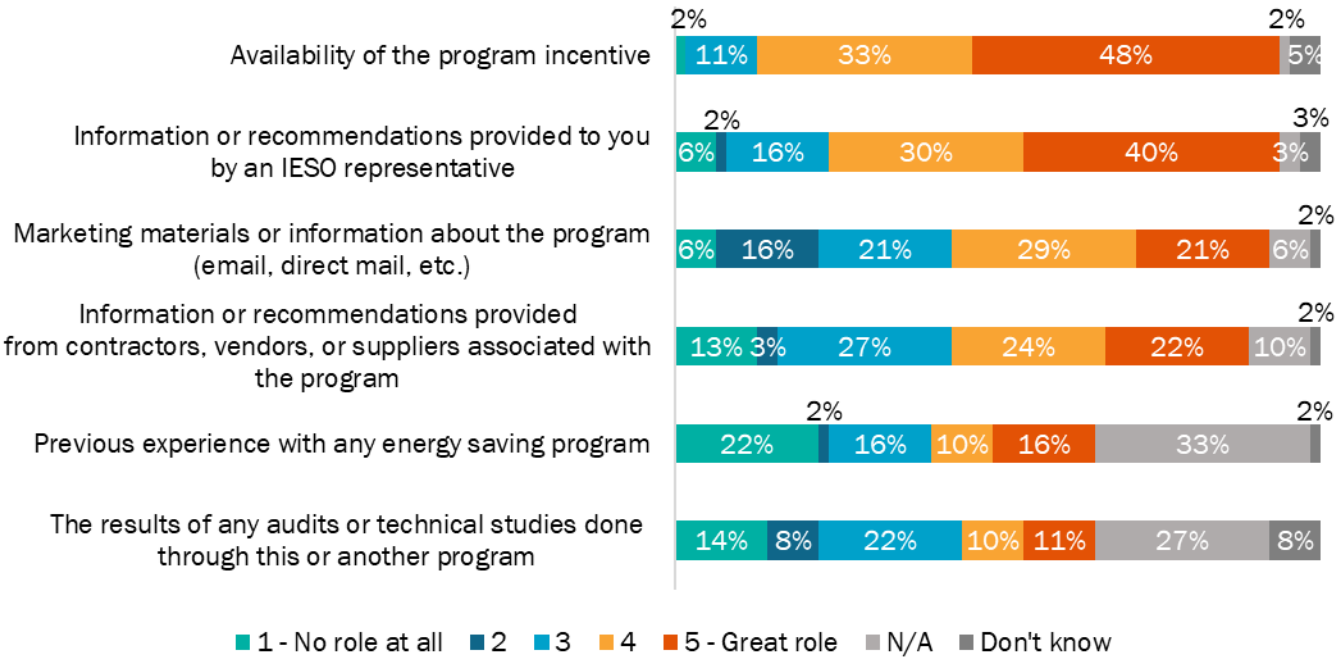
Respondents who indicated they would have installed less expensive or less energy-efficient lighting were then asked to describe how much they would have reduced the project's size, scope, or efficiency. Two of these respondents stated they would have reduced the size, scope, or efficiency by a large amount, one respondent would have reduced it by a moderate amount and one respondent would have reduced it by a small amount. The remaining respondent was unsure. These results indicate the program allowed these customers to increase their project's size and/or scope to a degree beyond what they might have achieved independently. This question was not used to calculate the FR score but provide additional context around participant intentions.

The one respondent who stated they would have installed the same lighting in the program's absence further confirmed that they would have paid for it themselves, indicating a high FR level for this respondent. It should be noted that while this respond was used to estimate FR, this participants' score constituted a small percentage of the total number of survey respondents and did not have a notable impact on the program's overall FR level.

Influence of Program Features on Participation

Participants were asked how influential various program features were on their decision to install energy-efficient lighting (Figure D-4). They rated each feature's influence on a scale from one (1) to five (5), where one indicates "no influence at all," and five indicates "it was extremely influential." The highest rated responses were the availability of incentives (81% with a rating of 4 or 5) and the information or recommendations provided by an IESO representative (70% with a rating of 4 or 5). Respondents rated the results of audits or technical studies completed through the SBL or other programs as the least influential (21% with a rating of 4 or 5). This may suggest an opportunity to assess the program's effectiveness in providing technical information to customers. This question, which focuses on the program's influence, was used along with the prior questions about customer intentions to estimate the FR score.

Figure D-4: Influence of Program Features on Participation (n=63)*



*May not sum to 100% due to rounding.

When participants were asked whether any other factors that greatly influenced their organization to install the energy-efficient lighting, the respondents' answers widely varied (Table D-20). The most common factors were saving money on electricity bills (47%), lighting improvements were needed (30%), the lack of cost to participate in the program (17%), and saving energy/concern for the environment (7%).

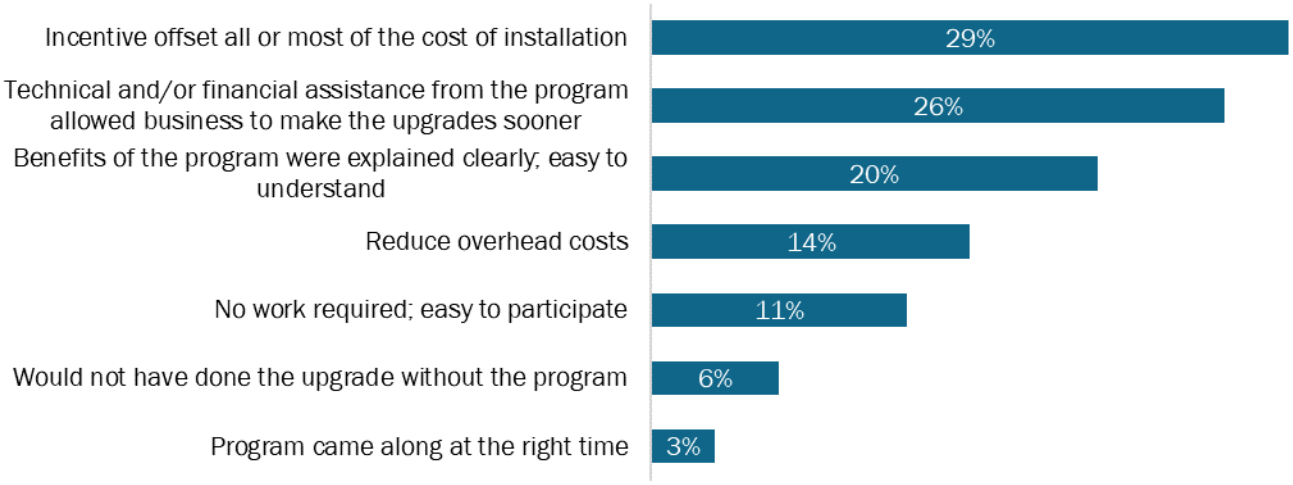
Table D-20: Other Influential Factors on Upgrade Decision
(Open-end and multiple response allowed; n=30)*

Other Influential Factors	Respondents
Saving money on electric bill	47%
Lighting improvements were needed	30%
No cost to participate	17%
Energy/environmental concerns	7%
Ease of participation in the program	3%
Quick delivery on installation	3%
Positive program experience of other companies	3%
Improved relationship with tenants	3%
Referral from a friend or colleague	3%

*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 D-5). Of the more than one-half (56%) of those who responded, the most common responses were related to the financial incentive offsetting for most or all of the installation cost (29%) and the financial incentive or technical assistance allowing their business to make their upgrades sooner (26%).

Figure D-5: Program Impact on Decision to Install Equipment
(Open end and multiple response allowed; n=35)



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

In summary, the FR results among the SBL program participants indicate very low levels of FR (8.8% FR score). In combination with the other responses shown in this section, this low FR score

demonstrates the program is generally reaching the participants who would not have implemented lighting upgrades without the program.

Spillover (SO)

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 the SBL program. One-fourth (25%) of the participants reported installing new equipment.

Table D-21 displays the types of non-incentivized equipment installed by companies after their SBL project was completed. Some survey respondents installed multiple equipment types. Non-incentivized lighting was the most common equipment type installed (13 respondents) followed by ENERGY STAR ® Appliances (5 respondents).

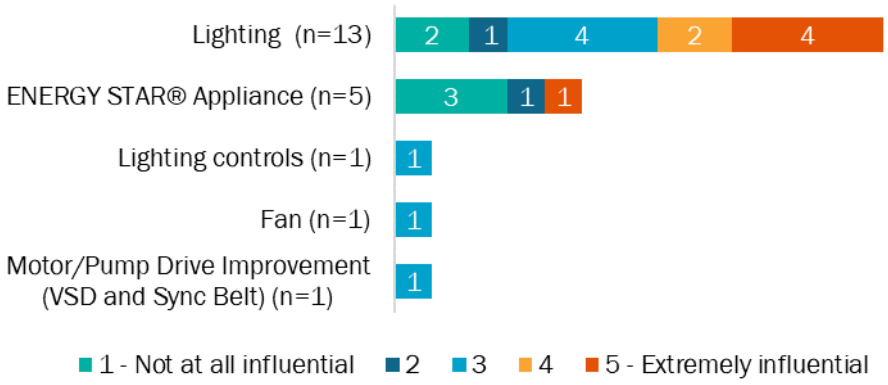
Table D-21: Types of Upgrades Installed after Program Participation
(Multiple responses allowed; n=16)*

Type of Upgrades Installed	Equipment Installed
Lighting	13
ENERGY STAR® Appliance	5
Fan	1
Lighting Controls	1
Motor/Pump Drive Improvement (VSD and Sync Belt)	1

*Does not sum to 16 due to multiple response.

Respondents were asked what level of influence their participation in the SBL program 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." The number of survey respondents influenced by the program (a rating of 3 or higher) is shown in Figure D-6 for each equipment type. All the respondents who installed fans, lighting controls, and motor/pump drive improvements reported being influenced by the SBL program.

Figure D-6: Measures Installed Due to Spillover and Program Influence
(Multiple response allowed, n=16)



* Counts displayed rather than percentage due to small n.

Participants who indicated they installed the program-influenced non-incentivized equipment were asked a series of follow-up questions (for example, capacity, efficiency, and annual hours of operation). These detailed questions are displayed in Table D-22, Table D-23, and Table D-24 and were used within the NTG algorithm to attribute SO savings to each equipment installation. SO savings were driven mainly by the installation of 128 new LED screw base bulb upgrades completed by four respondents and 26 new linear LED fixture upgrades completed by three respondents.

Table D-22: Spillover Measures – ENERGY STAR Appliances

ENERGY STAR Appliance	Number of Respondents	Number of Appliances
Clothes Washer	1	1

Table D-23: Spillover Measures – Lighting & Lighting Controls

Lighting or Lighting Control Type	Number of Respondents	Number of Bulbs	Number of Fixtures	Wattage/ Type	Fixture Location
Compact fluorescent (CFL)	1	20			
LED exterior	3	4			Against building
LED linear	3		26		
LED screw base	4	128		11-20 (3), 31+ (1)	
Timer	1				

Table D-24: Spillover Measures – Fans and Motors

Equipment Type	Number of Respondents	Number Installed	Size	Horsepower
Fan	1	2	2-3.99 feet	
Motor/Pump Drive Improvement (VSD and Sync Belt)	1	1		1.1-5.0 hp

D.3 Additional Participant Process Results

This section provides additional detail regarding the process evaluation results collected as part of the SBL participant survey.

Firmographics

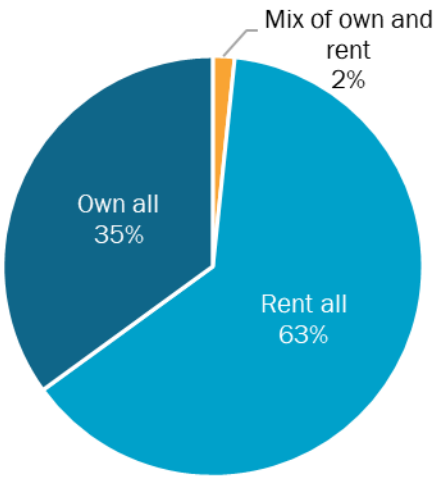
Participants were asked various questions to collect information on their job title, ownership status, and responsibilities in relation to the program. Detail on participants' companies (for example, primary activities, chain or franchise status, facility floor space, and whether the facility participated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

Roles and Ownership Status

Over four-fifths of survey respondents (82%) were owners or presidents of their companies, while almost one-fifth (18%) were managers. Over two-thirds (67%) were the primary employee responsible for the SBL lighting upgrades, and almost one-third (28%) shared the responsibility.

Most (63%) participating companies rented the property where the program upgrades were conducted, but more than one-third (35%) owned the property (Figure D-7).

Figure D-7: Ownership Status (n=60)



Primary Activity at Facility

The facilities served by the program were mainly in the retail and wholesale sector (27%) (Table D-25). The next most common sectors were repair, maintenance, and operations (15%), lodging and food service (10%), and manufacturing (8%). Almost nine out of ten respondents (88%) stated their company was not part of a franchise or chain.

Table D-25: Primary Activity at Facility
(Multiple responses allowed; n=60)

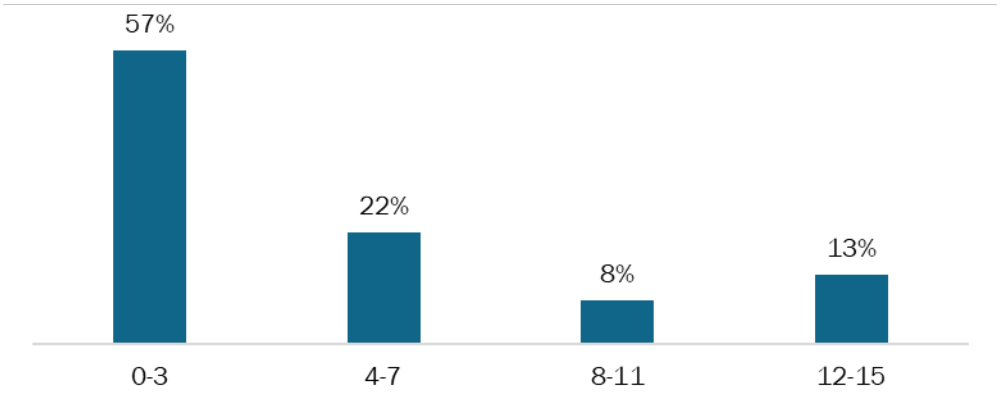
Primary Business Categories	Respondents
Retail and wholesale	27%
Repair, maintenance, and operations	15%
Lodging and food service	10%
Manufacturing	8%
Non-profit	7%
Agriculture, forestry, husbandry, mining, and extraction	7%
Finance, insurance, real estate, and property management	5%
Educational services	3%
Arts, entertainment, recreation, advertising, and travel	3%
Construction	2%
Scientific, technical, and information services	2%
Healthcare services	2%
Other services	13%

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

Number of Employees

Participants were asked to provide the number of employees (Figure D-8). Almost three-fifths (57%) of respondents said they had fewer than four employees.

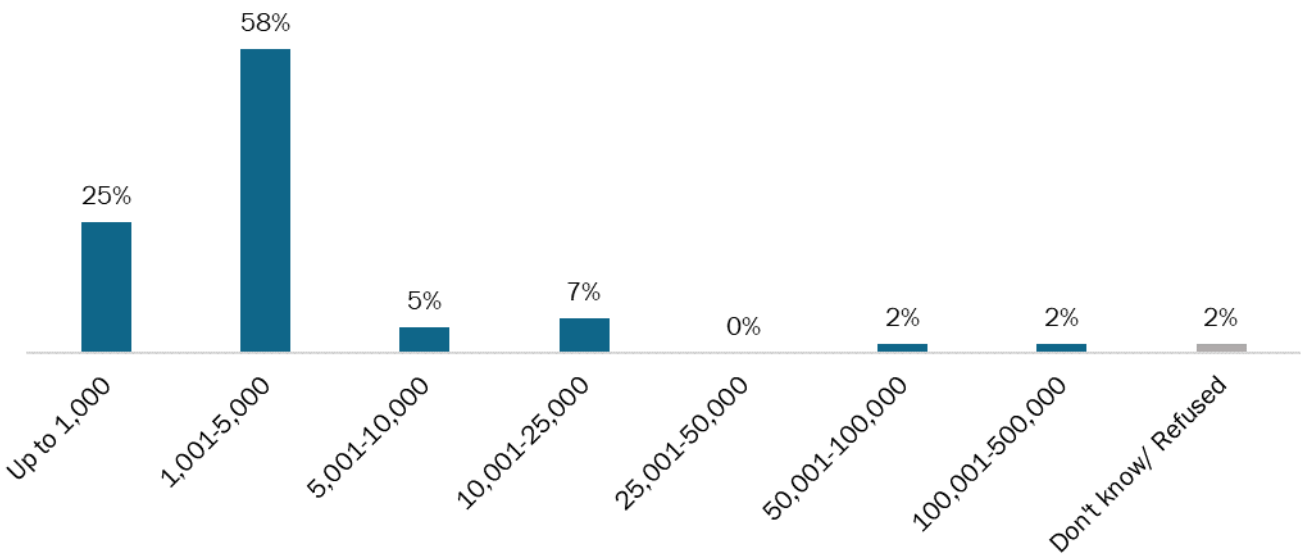
Figure D-8: Number of Employees (n=60)



Facility Size

Participants were asked to provide the square footage of the project facilities. If multiple facilities received lighting upgrades, participants were asked to provide the total square footage for all of them (Figure D-9). Almost three-fifths (58%) of respondents stated the total square footage of their facility(ies) was between 1,001 and 5,000 square feet.

Figure D-9: Total Square Footage for All Buildings (n=60)*



*Does not sum to 100% due to rounding.

Other Program Participation

Most (60%) of the respondents said they were not offered information about any other Save on Energy programs (Table D-26). Of the two respondents (3%) who said they were offered information on the Save on Energy Retrofit program, one respondent had participated in the program. Overall, nearly one-tenth (7%) participated in the Retrofit program, and one-fiftieth (2%) participated in the Refrigeration Efficiency program.

Table D-26: Participation in Other Business Programs in PY2021
(Multiple responses allowed, n=60)

Other Programs	Percent Offered Information	Percent Participated*
Retrofit Program	3%	7%
Refrigeration Efficiency Program	0%	2%
No other programs	60%	83%
Don't know	37%	10%

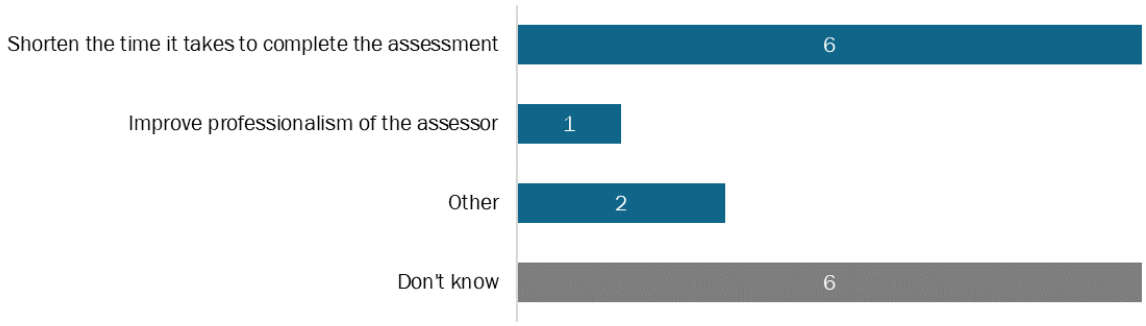
*Does not sum to 100% due to multiple response.

Site Visit Improvement Suggestions

Initial Site Assessment Visits

Figure D-10 includes a list of initial site visit improvement suggestions, as reported by the participants. Section 5.3.2 includes more discussion around these improvement suggestions.

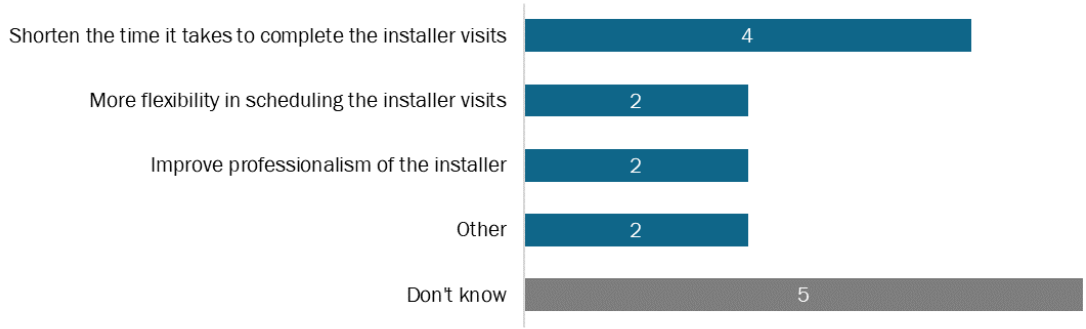
Figure D-10: Suggestions to Improve the Initial Site Assessment Visit
(Open-end and multiple response allowed; n=15)



Installation Visits

Figure D-11 includes a list of instillation site visit improvement suggestions, as reported by the participants. Section 5.3.2 includes more discussion around these improvement suggestions.

Figure D-11: Suggestions to Improve the Installation Site Visit
(Open-end and multiple response allowed; n=14)



*Does not sum to 14 due to multiple response.

Overall Installation Process

Table D-27 includes a full list of improvement suggestions for the installation process overall, as reported by the participants. Section 5.3.2 includes more discussion around these improvement suggestions.

Table D-27: Participant Suggestions on How to Improve the Installation Process Overall
(open end and multiple response allowed; n=7)

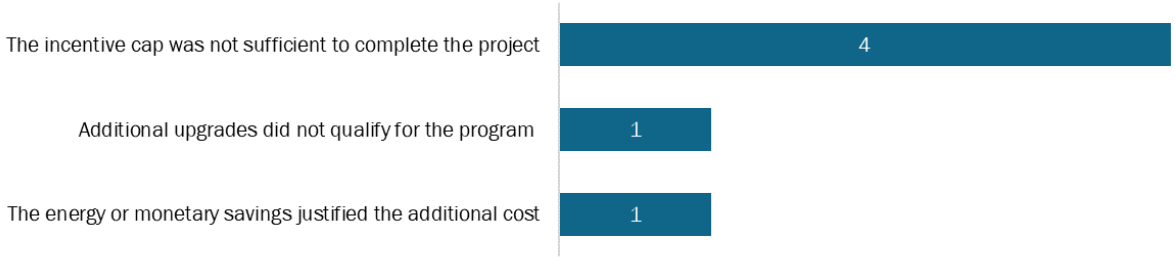
Improvement Suggestions for Overall Installation Process	Respondents
Improve site clean up	3
Improve scheduling and communication	3
Installer to replace all lighting	2
Installer to complete the unfinished work	1
Ensure the installer does not damage property during installation	1
Installer to be more cautious with installation	1

*Does not sum to 7 due to multiple response.

Additional Lighting Upgrades

Figure D-12 includes a list of reasons that participants installed additional energy-efficient lighting upgrades following participation in the program. Section 5.3.3 includes more discussion around these additional energy-efficient lighting upgrade decisions.

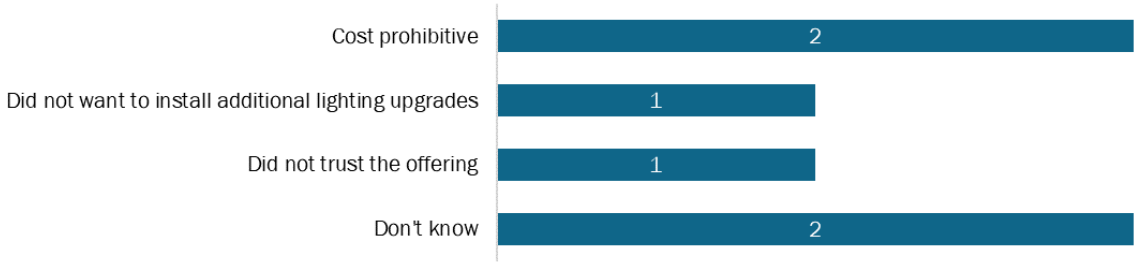
Figure D-12: Reasons for Installing Additional Energy-Efficient Equipment Upgrades
(Open end and multiple response allowed; n=4)



*Does not sum to 4 due to multiple response.

Figure D-13 includes a list of reasons that participants did not install additional energy-efficient lighting equipment upgrades following participation in the program. Section 5.3.3 includes more discussion around these additional energy-efficient lighting upgrade decisions.

Figure D-13: Reasons for Not Installing Additional Efficient Equipment Upgrades
(Open-end and multiple response allowed; n=5)



*Does not sum to 5 due to multiple response.

Control Equipment

Participants were asked to describe how their control equipment was used. Of the 11 respondents who installed smart thermostats at their facility(ies), the most common response was to schedule operations (5 respondents). Other responses included frequent use of override features (1 respondent), infrequent use of override features (1 respondent), and manual operation (1 respondent).

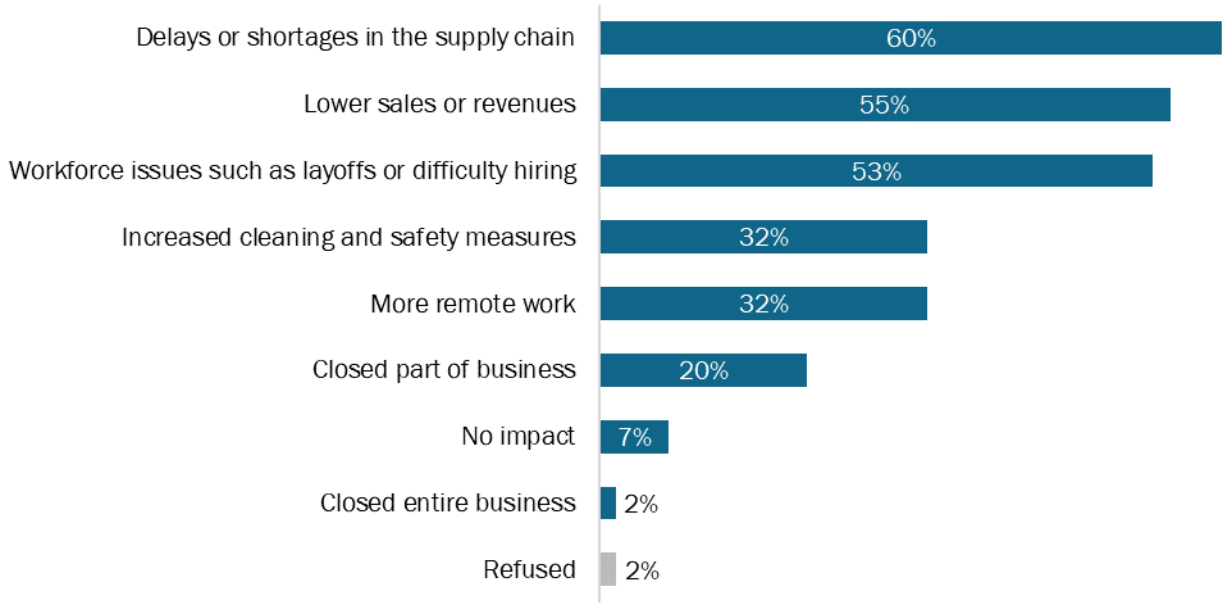
Less than one in 20 respondents (3%) stated they installed lighting controls at the facility(ies). The most common use for lighting controls were on/off controls (3 respondents), timer controls (3 respondents), and infrequent use of override features (2 respondents).

One respondent stated they installed advanced HVAC controls for heating and cooling use depending on the season.

Business Response to COVID-19

Respondents were asked about how the COVID-19 pandemic had impacted their company and its operations (Figure D-14). Most respondents (93%) reported their businesses were impacted by COVID-19 crisis. They reported various effects from the COVID-19 pandemic. The most common impacts were delays or shortages in the supply chain (60%), lower sales or revenues (50%), and workforce issues (53%). More than one-fifth (22%) of respondents reported at least part of their business were closed due to the COVID-19 crisis.

Figure D-14: Impacts to Business Operations of COVID-19
(Open end and multiple response allowed; n=60)*



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

Participants were asked to rate how closely the Save on Energy program 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 in four (77%) participants stated assessors and installers adhered to health and safety standards (Figure D-15). Respondents who provided lower ratings did not have any suggestions on improving the assessor and installer adherence to health and safety standards.

Figure D-15: Adherence to Health and Safety Standards
(Rating of 4 or 5 on a scale of 1 to 5; n=60)

Appendix E Job Impacts Methodology

This appendix provides a detailed breakdown of the Jobs Impact Evaluation methodology.

E.1 Developed Specific Research Questions

The first step in modeling the job impacts from the SBL program was to determine which specific research questions (RQs) the model would answer. In a scenario without the existence of the SBL program, customers receive electricity from the IESO and pay for it via the monthly billing process. Implementing the SBL program introduces a set of economic supply and demand shocks to different sectors of the economy. The four research questions below illustrate these shocks:

1. **What are the job impacts from new demand for EE measures and related program delivery services?** Funds collected for the SBL program generate a demand for efficient equipment and appliances. They also generate demand for services related to program delivery, such as general overhead for program implementation and staffing. This demand creates jobs among firms that supply these products and services. Third party implementers collect funds from the IESO to cover a portion of the project cost, while the participant covers the remainder of the costs.
2. **What are the job impacts from business reinvestments?** Once energy-efficient equipment is installed, the customers realize annual energy savings for the useful life of the measures. Businesses can choose to use this money to pay off debt, disburse it to shareholders as dividends, or reinvest it in the business. This additional money and the decision to save or spend has implications for additional job creation. For instance, additional business spending on goods and services generates demand that can create jobs in other sectors of the economy.
3. **What are the job impacts from funding the EE program?** IESO EE programs are funded via volumetric bill charges for all customers—both residential and non-residential. This additional charge can reduce the money that households have for savings and for spending on other goods and services, which results in a negative impact on jobs in the Canadian economy.
4. **What are the job impacts from reduced electricity production?** The energy efficient measures will allow businesses to receive the same benefit while using less electricity. The program as a whole will reduce the demand for electricity in the commercial sector. This reduced demand could have upstream impacts on the utility industry (for example, generation) and related industries, such as companies in the generator fuel supply chain.

E.2 Developed Model Inputs

The second step in modelling job impacts was to gather the data required for the StatCan IO model to answer each of the research questions. Model input data included the dollar values of the exogenous shocks from program implementation. The sources of data for each research question were as follows:

1) **Demand for EE measures and related program delivery services:** The StatCan IO Model divides the Canadian economy into 240 industry classifications and 500 SUPCs. Each measure installed as part of the program was classified into one of the SUPCs. The dollar value for each product-related demand shock was calculated using the project cost and measure savings data from the impact evaluation. Services that were part of the implementation process were also classified into SUPCs. These services were entirely program administrative services, the value of which was obtained from program budget actuals.

   It was necessary to specify the amount of each demand shock attributed to labour versus non-labour. For the product categories, we used a representative sample of invoices to estimate the average labour versus non-labour cost proportions. For the service categories, the IO model contained underlying estimates that defined the portion of labour versus overhead (non-labour).

2) **Business energy bill savings:** This value was calculated for the model as the net present value (NPV) of the discounted future stream of energy bill savings by participants. It was calculated by multiplying net energy savings (in kWh) in each future year by that future year's retail rate ($/kWh). This calculation was performed for each future year through the end of the measure's expected useful life (EUL). Savings beyond the EUL were assumed to be zero. Project-level net energy savings were obtained using results from the impact evaluation, and already accounted for other calculation parameters (i.e. discount rate, measure EULs, and retail rate forecast).

   Customers' intentions for whether to reinvest, save, or distribute to owners/shareholders the money saved on energy bills was obtained via a short section on the participant surveys, as follows:

   J1. *How do you anticipate your company will spend the money it saves on its electricity bill from the energy efficient equipment upgrades?*

   1. Pay as dividends to shareholders or otherwise distribute to owners
   2. Retain as savings
   3. Reinvest in the company (labour/additional hiring, materials, equipment, reduce losses, etc.)
   4. Split – Reinvest and pay as dividends/retain as savings

   96. Other, please specify:

   98. Don't know

   99. Refused

J2. Do you anticipate the distribution of these electricity bill savings to be treated differently than any other earnings?

1. Yes – More distributed to shareholders/owners
2. Yes – More to savings
3. Yes – More to reinvestment
4. No

98. Don't know

99. Refused

J3. Approximately what would be the split between distribution, retention, and reinvestment of money saved on electricity bills? [ALLOW MULTIPLE RESPONSE OPTION]

1. *Percent distribute [NUMERIC RESPONSE BETWEEN 0 AND 100]*
2. *Percent save/retain earnings [NUMERIC RESPONSE BETWEEN 0 AND 100]*
3. *Percent reinvest [NUMERIC RESPONSE BETWEEN 0 AND 100]*

For estimating job impacts, the key input value was the amount of bill savings that businesses would reinvest as opposed to paying down debt or redistributing to shareholders.

3) **SBL funding:** IESO EE programs are funded by a volumetric charge on electricity bills and, volumetrically, residential customers accounted for 35 percent of consumption and non-residential customers accounted for 65 percent in 2021. The overall program budget was distributed between these two customer classes by these percentages and used as input values for the analysis.

4) **Reduced electricity production:** The NPV of retail savings (estimated as part of RQ2) was also the input for examining the potential impact of producing less electricity.

E.3 Run Model and Interpret Results

Determining the total job impacts from the SBL program required considering possible impacts from each of the four shocks represented by the research questions. Addressing the four research questions above required three runs of the StatCan IO model, as certain components of the shocks could be consolidated, and others addressed without full runs of the model. The three shocks that were modelled were as follows:

1. Demand shock, as outlined in RQ1, representing the impact of the demand for EE products and services due to the SBL program.
2. Business Reinvestment shock representing the net amount of additional spending that the commercial sector would undertake as described in RQ2. This was estimated by taking the

NPV of energy bill savings and subtracting the amount of project costs covered by participants.

3. Household Expenditure shock representing the portion of household funds that are captured by increased bill charges and thus acts as a negative shock on the economy (RQ3). This was estimated by taking the portion of program funding that is paid for by increases to residential electricity bills.

The model output generated three types of job impact estimates:

Direct Impacts

Jobs created during the initial round of spending from the exogenous shocks. For the demand shock for EE products and services, direct impacts would be from first adding employees to install measures and handle administrative duties. For the business reinvestment shock, direct impacts could be internal jobs created by businesses reinvesting savings back into the company, or they could be jobs created by businesses buying additional goods and services with energy bill savings.

Indirect Impacts

Job impacts due to inter-industry purchases as firms respond to the new demands of the directly affected industries. These include jobs created up supply chains due to the demand created by the EE program – such as the manufacturing of goods or the supply of inputs.

Induced Impacts

Job impacts due to changes in the production of goods and services in response to consumer expenditures induced by households' incomes (i.e., wages) generated by the production of the direct and indirect requirements.

The IO model provides estimates for each type of job impact in the unit of *person-years* or a job for one person for one year. It further distinguishes between two types of job impacts:

Total number of jobs: This covers both employee jobs and self-employed jobs (including persons working in a family business without pay). The total number of jobs includes full-time, part-time, temporary jobs and self-employed jobs. It does not take into account the number of hours worked per employee.

Full-time Equivalent (FTE) number of jobs: This includes only employee jobs that are converted to full-time equivalence based on the overall average full-time hours worked in either the business or government sectors.

Model run results are presented in terms of the above job impact types (direct, indirect, and induced) and also the type of job (total jobs vs. FTEs). These results—along with the model input shock values—are presented and discussed at a high level in Section 6.2, and in more detail in Appendix F.

Appendix F Detailed Job Impacts Inputs & Results

This section presents the detailed results of the job impact analysis, as summarized in Section 6.2. Table F-1 presents the total jobs impacts by type. As the fourth and fifth columns indicate, the analysis estimated that the SBL program would create 57 total jobs in Canada, with 51 jobs created in Ontario. Of the 57 estimated total jobs, 30 are direct jobs, 14 are indirect jobs, and another 14 are induced. In terms of FTEs, the numbers are slightly lower, with 42 FTEs created in Ontario and 47 FTEs created nationwide. Of these 47 FTEs, direct jobs account for 26 FTEs, 11 FTEs are indirect jobs and 11 FTEs are induced jobs. In total, the SBL Program created 29.6 jobs per million dollars of investment (i.e. program budget).

Table F-1: Total Job Impacts by Type

Job Impact Type	Ontario FTE *(In Person-Years)*	Total FTE *(In Person-Years)*	Ontario Total Jobs *(In Person-Years)*	Total Jobs *(In Person-Years)*	Total Jobs per $1M Investment *(In Person-Years)*
Direct	25	26	29	30	15.5
Indirect	9	11	11	14	7.0
Induced	8	11	11	14	7.1
Total[1]	**42**	**47**	**51**	**57**	**29.6**

Appendix F.1 details the values of the inputs used in the model runs. Appendix F.2 presents the analysis results, including the details of job impacts and assumptions.

F.1 Model Inputs

The model was used to estimate the impacts of three economic shocks:

- The demand shock, representing the demand for energy-efficient products and services from SBL
- The business reinvestment shock, representing the increased business reinvestment due to bill savings (and net of project funding)
- The household expenditure shock, representing decreases in household spending on goods and services due to increases in the residential portion of program funding.

Table F-2 below displays the input values for the demand shock representing the products and services related to SBL. Each measure installed as part of the program was categorized according to the StatCan IO Supply and Use Product Classifications (SUPCs).

The first two rows of Table F-2 contain the categories corresponding to products, which were the measures installed in businesses. The last row contains the services. Lighting fixtures had the

highest total cost of the two product categories and accounted for $1.5 million of the overall program cost. The other product category, Electric light bulbs and tubes, had $0.2 million of total costs. The similarities of the product categories reflect the relatively narrow range of measures typically installed as a part of SBL, compared to other programs such as Commercial Retrofit. Each measure's cost was divided into labour and non-labour, as the IO Model required this distinction to determine direct versus indirect impacts. Program implementers were asked to estimate the approximate split between labour and non-labour costs. Program implementers stated that, on average, 47% of a project's cost is spent on labour. This estimate was used as the labour portion for the model input.

The single service category in the table, Office administrative services, included general overhead and administrative services associated with program delivery. The labour and non-labour amounts are not specified for this category, as the IO Model has built-in assumptions for this category.

Table F-2: Summary of Input Values for Demand Shock

Category Description	Non-Labour *($ Thousands)*	Labour *($ Thousands)*	Total Demand Shock *($ Thousands)*
Lighting Fixtures	785	696	1,481
Electric Light Bulbs and Tubes	95	84	179
Subtotal	**880**	**781**	**1,661**
Office Administrative Services	-	-	451
Total			**2,112**

The second shock modelled by the IO Model was the business reinvestment shock. This shock represented the amount that businesses would reinvest and thus inject back into the economy. The net amount that businesses have available to either reinvest, pay off debt, or distribute to owners/shareholders ($7.9 million) was the net of electricity bill savings (NPV = $8.1 million[8]), and the portion of project costs not covered by incentives ($0.2 million). The portion of this $7.9 million that was to be reinvested was estimated using the surveys administered to participants as part of the SBL Process Evaluation. The surveys included several questions about what businesses would do with the money they saved on their electricity bills and the type of business. Overall, respondents indicated that 77% of bill savings would be reinvested ($6.0 million). The remaining savings would either be used to pay off debt or disbursed to owners/shareholders.

To properly model the effects of the business reinvestment shock, the IO Model required the reinvestment estimates by industry. Each industrial category has a production function in the model, and these functions were adjusted to account for the reinvestment shock. Table F-3 presents the

[8] A small error with the NPV calculations was discovered after the models had been run; this represented an overall decline in the reinvestment shock of 4%. The NPV, reinvestment shock and jobs impacts resulting from the reinvestment shock presented in the report reflect the corrected values.

input values for the business reinvestment shock by industry. The total business expenditure shock would be $6.0 million over 26 industries, as shown in the table.

Table F-3: Summary of Input Values for Business Reinvestment Shock

Category Description	Business Reinvestment Shock *($ Thousands)*
Accommodation and food services	517
Advertising, promotion, meals, entertainment, and travel	32
Arts, entertainment and recreation	206
Crop and animal production	247
Crop, animal, food, and beverage	82
Educational services	155
Finance, insurance, real estate, rental and leasing and holding companies	73
Forestry, logging, paper, and printing	73
Health care and social assistance	526
Machinery	82
Non-profit institutions serving households	311
Non-residential building construction	41
Other	828
Other aboriginal government services	41
Other activities of the construction industry	41
Other municipal government services	0
Other services (except public administration)	311
Owner occupied dwellings	64
Primary and fabricated metal	82
Professional, scientific and technical services	41
Repair construction	41
Repair, maintenance and operating and office supplies	476
Residential building construction	82
Retail trade	1,322
Support activities for agriculture and forestry	82
Transportation and warehousing	41
Wholesale trade	197
Total	**5,996**

The third model input is the household expenditure shock.[9] This shock represents the incremental increase in electricity bills to the residential sector from funding the program. The assumption is that the IESO programs are funded by all customers in proportion to the overall consumption of electricity. Thus, the residential funding portion was 35% of the $1.9M program budget or $0.68M.

F.2 Results

The StatCan IO Model generated results based on the input values detailed in Sections 6.2.2 and Appendix F.1. Table F-4 shows the results of the model run for the demand shock for products and services. This shock accounts for just over one-third of job impacts. As the two right columns show, the model estimated that the demand shock will result in the creation of 21 total jobs (measured in person-years) in Canada, of which 20 will be in Ontario. Of the 21 jobs, 13 were direct, 4 indirect and 5 induced. In terms of FTEs the numbers are slightly lower; 16 FTEs were estimated to be created in Ontario and 18 in total across Canada. Of those 18 FTEs, 10 were direct, 3 indirect and 4 induced. Direct jobs impacts were realized exclusively in Ontario, as shown in the table. As we move to indirect and induced jobs, impacts are dispersed outside of the province.

Table F-4: Job Impacts from Demand Shock

Job Impact Type	Ontario FTE *(In Person-Years)*	Total FTE *(In Person-Years)*	Ontario Total Jobs *(In Person-Years)*	Total Jobs *(In Person-Years)*
Direct	10	10	13	13
Indirect	2	3	3	4
Induced	3	4	5	5
Total	**16**	**18**	**20**	**21**

Table F-5 shows the results of the model run for the business reinvestment shock. Job impacts generated by business investment were equal to 16 direct total FTEs and 18 direct total jobs. Overall, business investments were responsible for 31 FTEs and 38 total jobs across Canada.

Table F-5: Job Impacts from Business Reinvestment Shock

Job Impact Type	Ontario FTE *(In Person-Years)*	Total FTE *(In Person-Years)*	Ontario Total Jobs *(In Person-Years)*	Total Jobs *(In Person-Years)*
Direct	15	16	17	18
Indirect	7	8	8	10
Induced	5	7	7	9
Total	**27**	**31**	**32**	**38**

[9] The model is actually run with a normalized value of $1 million in extra household expenditures, and the job results can be scaled by the actual demand shock.

The third shock was the reduction in household spending from the increase in electricity bills to fund the program. Table F-6 presents the job impacts from the model run. It represents the number of jobs attributed to reduced household spending; this amount could have been spent in other sectors of the economy, but was instead spent on funding the SBL program. The model estimated a reduction of 1 FTE and 2 total jobs across Canada due to the decreased household spending.

Table F-6: Job Impacts from Residential Funding Shock

Job Impact Type	Ontario FTE *(In Person-Years)*	Total FTE *(In Person-Years)*	Ontario Total Jobs *(In Person-Years)*	Total Jobs *(In Person-Years)*
Direct	1	1	1	1
Indirect	0	0	0	0
Induced	0	0	0	0
Total	**1**	**1**	**1**	**2**

The non-residential sector also contributes to program funding. The StatCan IO Model does not adjust production functions for all industries experiencing marginally higher electricity price changes, so this portion of the shock would be modeled by assuming that surplus would be reduced by the extra amount spent on electricity. The model captures energy bill increases from program funding as an impact on direct GDP (value-added) and not as a reduction in employment. The GDP impact is equivalent to the profit loss resulting from the increase in electricity bills from program funding.

The economic impact of the reduction of electricity production as a result of the increase in energy efficiency was another potential economic shock. Technically speaking, it can be estimated using StatCan Input-Output multipliers without running the model. However, the IO model is linear, and not well suited to model small decreases in electricity production. Total electricity demand has been increasing over time and is projected to continue increasing[10]. The relatively small decrease in overall consumption attributed to SBL program savings may work to slow the rate of consumption growth over time but would likely not result in actual job losses in the utility industry or upstream suppliers. The linearity of the IO model means that it will provide estimates regardless of the size of the impact. Given the nature of electricity production, it is reasonable to conclude that the linear IO multiplier is not appropriate for estimating job impacts. This analysis assumes that job losses from decreased electricity production are negligible.

Table F-7 shows the total estimated job impacts by type, calculated by combining the jobs estimated in Table F-4, Table F-5, and Table F-6. Of the 57 estimated total direct jobs, 51 were in Ontario. A slightly smaller proportion of the indirect and induced jobs were in Ontario; 11 out of 14 jobs were estimated to be created within the province for both categories. The FTE estimates were slightly lower overall than the total jobs, with a total of 42 FTEs (of all types) created in Ontario and 47 FTEs added nationwide. Almost all direct FTEs (25 of 26) were added in Ontario, with this number representing approximately 59% of the total FTEs added in Ontario and 53% of all FTEs created across Canada. In 2021, each $1M of program spend resulted in the creation of 29.6 total jobs compared to 32.2 jobs per $1M in 2020.

[10] Annual Planning Outlook – A view of Ontario's electricity system needs; 2021. IESO.

Table F-7: Total Job Impacts by Type

Job Impact Type	Ontario FTE *(In Person-Years)*	Total FTE *(In Person-Years)*	Ontario Total Jobs *(In Person-Years)*	Total Total Jobs *(In Person-Years)*	Total Jobs per $1M Investment *(In Person-Years)*
Direct	25	26	29	30	15.5
Indirect	9	11	11	14	7.0
Induced	8	11	11	14	7.1
Total[1]	**42**	**47**	**51**	**57**	**29.6**

The model does not provide year-by-year results for job impacts, but we are able to make some estimates about the temporal nature of the impacts. Table F-8 shows the total jobs created due to program activities and energy savings in the first year versus from after the first year. The table assumes that "first year activities" are the initial demand shock for EE products and services, the program funding shock, and the first-year energy savings (resulting in bill savings and reinvestment). Job impacts after the first year are due to energy savings over the course of the measures' EULs. Job impacts from first year activities make up roughly 7% of the total, with 4 out of the total of 57 person-years. Three of these person-years come from first year energy savings. The remaining 53 total job-years are due to energy savings after the first year—and the reinvestment generated by the bill savings.

Table F-8: Job Impacts from First Year Shocks

Job Impact Type	From First Year Activities Total Jobs *(In Person-Years)*	From Bill Savings After First Year Total Jobs *(In Person-Years)*	Total Jobs *(In Person-Years)*
Direct	2	28	30
Indirect	1	13	14
Induced	1	13	14
Total[1]	**4**	**53**	**57**

[1] Columns may not add to totals due to rounding. Real values are rounded to the nearest whole number and the whole numbers do not sum exactly to the whole number total in every column.

Table F-9 shows the job impacts in more detail, with jobs added by type and industry category. Industries are sorted from top to bottom by those with the most impacts to the least, with industries that showed no impacts not included in the table. The table shows that the industry with the largest job impacts was Administrative and support, waste management and remediation services, which added 14.6 jobs. This category is large and non-specific, and reflects the need to hire individuals to fill a large range of roles based on program need (e.g. office administration, call centre operations, program management, etc.). Non-residential business construction and Retail trade were the industries with the next most added jobs, gaining 7.4 and 5.6 jobs respectively.

Table F-9: Job Impacts by Industry

Output Industry Category	Ontario FTE *(In Person-Years)*	Total FTE *(In Person-Years)*	Ontario Total Jobs *(In Person-Years)*	Total Jobs *(In Person-Years)*
Administrative and support, waste management and remediation services	11.4	11.7	13.8	14.2
Non-residential building construction	6.3	6.3	7.2	7.2
Retail trade	3.7	4.1	5.0	5.5
Manufacturing	3.5	5.0	3.6	5.2
Professional, scientific and technical services	2.9	3.6	3.7	4.5
Wholesale trade	3.4	4.0	3.5	4.2
Finance, insurance, real estate, rental and leasing and holding companies	2.0	2.3	2.6	3.0
Transportation and warehousing	1.2	1.6	1.5	1.9
Accommodation and food services	0.9	1.2	1.3	1.8
Information and cultural industries	0.8	1.0	0.8	1.2
Other services (except public administration)	0.6	0.8	0.9	1.1
Government education services	0.8	0.8	0.9	1.0
Residential building construction	0.6	0.6	0.7	0.7
Engineering construction	0.6	0.6	0.7	0.7
Health care and social assistance	0.4	0.4	0.6	0.7
Repair construction	0.4	0.5	0.5	0.5
Arts, entertainment and recreation	0.2	0.2	0.3	0.5
Educational services	0.1	0.1	0.3	0.3
Other municipal government services	0.2	0.3	0.3	0.3
Other federal government services	0.3	0.3	0.3	0.3
Crop and animal production	0.1	0.1	0.2	0.3
Non-profit institutions serving households	0.2	0.2	0.2	0.3
Utilities	0.1	0.2	0.1	0.2
Government health services	0.1	0.2	0.1	0.2
Total[1]	**41**	**46**	**49**	**56**

[1] Columns may not add to totals due to rounding. Real values are rounded to the nearest whole number and the whole numbers do not sum exactly to the whole number total in every column. Values presented in this table are rounded to the nearest 0.1 to better show the distribution of small jobs impacts.

Due to the temporal nature of jobs impact assessments, it is understood that the jobs created in a given year are applicable to only that year (i.e., employment impacts are actually measured in job-years created and not jobs created in perpetuity). As a result, it is possible to sum up jobs between program years to gain an understanding of holistic program jobs impacts. Table F-10 displays the overall FTE and total jobs created for the province of Ontario – and for Canada as a whole – over the three years during which the IF SBL program was evaluated. The majority of the jobs created over the three years fell in the direct employment category, with 212 total direct jobs created across Canada from 2019-2021. Indirect and induced jobs made up a smaller portion, accounting for the creation of 119 and 100 total jobs across Canada, respectively. Overall, it is estimated that the SBL program

created 431 total jobs across all of Canada, of which, 379 were created in Ontario. Similar to the individual program years, FTEs created were less than total jobs created; 355 were estimated to be gained over the three-year period across all of Canada, and 313 of the 355 created jobs were in Ontario.

Table F-10: Total Jobs Impacts by Type, PY2019 – PY2021

Job Impact Type	Ontario FTE *(In Person-Years)*	Total FTE *(In Person-Years)*	Ontario Total Jobs *(In Person-Years)*	Total Jobs *(In Person-Years)*
Direct	172	181	203	212
Indirect	81	98	95	119
Induced	59	76	81	100
Total[1]	**313**	**355**	**379**	**431**

The SBL Assessors and Installer survey responses support the results of the model showing positive job impacts. The survey instrument contained questions for contractors and applicant representatives related to the impact of the SBL program on their firms and employment levels. Two questions in particular were informative to understand the nature of the impacts to respondents, which would be considered direct impacts. These two questions are below, with relevant illustrative verbatim responses below:

1) Did the 2021 program help or hinder the growth of your business in any way? If so, please explain how:

   The program helped the growth of my business in the following ways:

   - *"The program provided me with great work and I did not need to chase people for money."*
   - *"Increased sales, residual work after installation."*
   - *"New client relationships were formed; client satisfaction with the program enabled more contracts and word of mouth advertising was an incurred result."*
   - *"First time customers called to get more work done as they were happy with our electrician's work ethic."*

   The program hindered the growth of my business in the following ways:

   - "*Profit margin was low."*
   - *"It was confusing for us and customers as materials we delivered were broken/damaged or wrong."*

2) Did the 2021 program have an impact on the number of people you hired in the last year? Yes, the program impacted the number of people hired in the last year in the following ways:

Positive Impacts:

- *"3 extra [employees]."*
- *"Extra 3 to 4 men working on program."*

Negative Impacts:

- *"Was hoping to hire more workers to be employed but there was not enough work being given throughout the year. The program didn't help us achieve our goal.*

Respondents indicated that the program generally resulted in slight increases in staffing overall. Participants additionally stated that the program afforded steady revenue streams during times that business would otherwise be slower, as well as affording secondary business opportunities with clients that were initially contracted through the program. No respondents indicated decreases in staffing due to the SBL program. Customer verbatims further support the direct job gains estimated by the model, with customers indicating that additional staff members had been hired as a result of the SBL program. One respondent indicated that they had a desire to hire additional employees, but were unable to because of lower than expected revenue from the program. In general, responses reveal the potential for beneficial impacts the program can have on firms. Respondents that indicated a negative effect on their business primarily stated that the biggest driver was smaller than anticipated revenue streams, which resulted in further investments in the program not being financially viable. This issue could be examined further if parts of the program were to be redesigned in order to enhance job impacts.

Input-Output models are informative for understanding the potential magnitudes and dynamics of economic shocks created by policies and programs. While useful, the StatCan IO Model is a simplified representation of the Canadian economy and thus has limitations. The model is based on the assumption of fixed technological coefficients. It does not take into account economies of scale, constraint capabilities, technological change, externalities, or price changes. This makes analyses less accurate for long term and large impacts, where firms would adjust their production technology and the IO technological coefficients would become outdated. Assuming that firms adjust their production technology over time to become more efficient implies that the impact of a change in the final demand will tend to be overestimated. For household consumption, the model is based on the assumptions of constant consumption behaviour and fixed expenditure shares relative to incomes.

Appendix G SBL Building Types and Delivery Regions

Table G-1: 2021 SBL Program Reported Building Types

Building Type Reported in SBL Database	Resource Innovations Designation
Cattle Farm	Agricultural
Agricultural Other	Agricultural
Swine Farm	Agricultural
Dairy Farm	Agricultural
Greenhouse	Agricultural
Convenience Stores	Convenience Stores
Convenience Stores	Convenience Stores
Hotels: Corridors	Hotels/Motels
Hotels/Motels: Public Spaces	Hotels/Motels
Hotels/Motels: Guest Rooms	Hotels/Motels
Office (small suite)	Office
Low Rise Office Bldgs - Core	Office
Industrial Plants: Offices	Office
Schools	Others
Nursing Homes	Others
Laboratories	Others
Computer Rooms	Others
Clubhouses	Others-Entertainment
Museums	Others-Entertainment
Beauty Parlors	Others-Service
Medical Centres & Clinic	Others-Service
Barber Shops	Others-Service
Dental Offices	Others-Service
Fire Stations	Others-Service
Funeral homes	Others-Service
Places of Worship	Others-Service
Municipal Bldgs - Town Halls	Others-Service
Places of Worship	Others-Service
Police Stations	Others-Service
Libraries	Others-Service
Banks	Others-Service
Full Service Restaurants	Restaurants
Fast Food Restaurant	Restaurants
Bars & Taverns	Restaurants
Small Retail Stores	Retail
Retailer Stores	Retail

Grocery Stores	Retail
Supermarkets	Retail
Department Stores	Retail
Retail Stores in Malls	Retail
Warehouses	Warehouses

Table G-2: 2021 SBL Geographic Regions

Postal Code First Character	Resource Innovations Geographic Region	Project Count
L	Central	259
K	Eastern	278
N	Southwestern	185
P	Northern	198
M	Toronto	51