2017 Program Evaluation: Business Refrigeration Incentive (BRI) Local Program

Submitted to Independent Electricity System Operator

November 15, 2018
Contents

1 Acronyms and Abbreviations ..................................................................................... 1

2 Executive Summary ................................................................................................. 1
   2.1 Background, Goals and Objectives .................................................................... 1
   2.2 Key Observations and Recommendations .......................................................... 1
      2.2.1 Impact Evaluation ....................................................................................... 1
      2.2.2 Net-to-Gross (NTG) .................................................................................... 3
      2.2.3 Process Evaluation ...................................................................................... 4

3 Evaluation Goals and Objectives ............................................................................. 6

4 Program Description ................................................................................................. 7

5 Methodology ............................................................................................................ 9
   5.1 Impact Evaluation Methodology ......................................................................... 9
      5.1.1 Sampling, Project Reviews and Evaluation .................................................. 9
      5.1.2 Lighting Baseline Shift ............................................................................... 10
      5.1.3 Net-to-Gross (NTG) Methodology .............................................................. 10
   5.2 Process Evaluation Methodology ....................................................................... 11
      5.2.1 Program Staff and Program Delivery Agents ............................................. 11
      5.2.2 Program Delivery Partners ....................................................................... 12
      5.2.3 Participants ................................................................................................. 12

6 Impact Evaluation Results ....................................................................................... 14
   6.1 Participation ....................................................................................................... 14
7.3.5 Barriers to Future Participation ................................................................. 47

8 Key Observations and Recommendations ...................................................... 48
  8.1 Impact Evaluation ................................................................................................ 48
    8.1.1 Impact Key Observations ............................................................................. 48
    8.1.2 Net-to-Gross Key Observations ................................................................. 49
  8.2 Process Evaluation ............................................................................................ 50

Appendix A Additional Process and NTG Results ................................................. 52
Appendix B Savings and Realization Rates per Measure Sub-Type ....................... 56
1 Acronyms and Abbreviations

BRI  = Business Refrigeration Incentive
CDM  = Conservation Demand Management
CFF  = Conservation First Framework
CFL  = Compact Fluorescent Light
DEER = (California) Database for Energy Efficiency Resources
EAP  = Energy action plan
ECM  = Electronically commutated motor
EM&V = Evaluation, measurement and verification
EUL  = Effective useful life
GHG  = Greenhouse gas
HP   = Horsepower
IESO = Independent Electricity System Operator
LDC  = local distribution company
LED  = Light emitting diode
MAL  = Measures and assumptions list
NTG  = Net-to-gross
NTGR = Net-to-gross ratio
OPA  = Ontario Power Authority
PAC  = Program administrator cost
PSC  = Permanent split capacitor
QA/QC= Quality assurance and quality control
SP   = Shaded pole
TRC  = Total resource cost
TRM  = Technical reference manual
2 Executive Summary

2.1 Background, Goals and Objectives

The Independent Electricity System Operator (IESO) retained Nexant, Inc. together with sub-consultant NMR Group, Inc. to conduct an evaluation of its Business Programs for the 2017 evaluation cycle. This report provides the results of the impact and process evaluation of the Business Refrigeration Incentive (BRI) local program for the 2017 program year.

The BRI local program was implemented by Alectra Utilities Corporation, which includes the four legacy Alectra LDCs: Enersource Hydro Mississauga, Inc., Horizon Utilities Corporation, Hydro One Brampton Networks, Inc, and PowerStream, Inc; and Collus PowerStream, who jointly implemented this program with the legacy Alectra LDCs.

The evaluation goals and objectives include:

- Verify energy and demand savings with a high degree of confidence, taking into account:
  - All measures implemented as part of the program
  - Spillover savings and local program-enabled savings
- Review and evaluate key program elements;
- Conduct annual cost-effectiveness analyses; and
- Report and attribute savings due to the local program.

2.2 Key Observations and Recommendations

This section provides a summary of the impact and process evaluation results and findings for the BRI local program for 2017 program year.

2.2.1 Impact Evaluation

In order to estimate the net energy and summer peak demand savings for the local program, the evaluation team conducted reviews of project documentation, followed by telephone and on-site surveys for sampled sites to verify gross reported savings. Attribution surveys were then created to determine the rates of free-ridership and spillover which will be used to calculate net savings. Net savings are a reflection of the degree to which the gross verified impacts are a result of the program-specific efforts and funds. These scaling factors (i.e. free ridership and spillover), along with the gross savings estimates, were developed using random sampling techniques to select projects that are representative of the overall participant population.

The BRI local program level savings are summarized in Table 2-1 below.
Table 2-1: BRI Local Program Level Savings Results

<table>
<thead>
<tr>
<th>Savings Type</th>
<th>Gross Reported Savings</th>
<th>Realization Rate</th>
<th>Gross Verified Savings</th>
<th>Net To Gross Ratio</th>
<th>Net Verified First Year Savings</th>
<th>Net Verified 2020 Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy (MWh)</td>
<td>8,545</td>
<td>65%</td>
<td>5,517</td>
<td>101%</td>
<td>5,544</td>
<td>4,990</td>
</tr>
<tr>
<td>Summer Peak Demand (MW)</td>
<td>1.01</td>
<td>61%</td>
<td>0.61</td>
<td>119%</td>
<td>0.73</td>
<td>0.62</td>
</tr>
</tbody>
</table>

ECM fan motors contributed 60% of the net verified energy savings while only making up 40% of the program’s measure quantity. The full list of measure quantity and energy savings contributions by measure type as well as the average reported and net verified energy savings per measure is presented in Table 2-2. ECM fan motor and condenser coil cleaning have the highest verified savings per measure while the LED lighting measures have the lowest verified savings per measure.

Table 2-2: Proportion of Measure Quantity and Net Verified Savings by Measure Type

<table>
<thead>
<tr>
<th>Measure Type</th>
<th>% of Total Program Measures Quantity</th>
<th>% of Total Program Energy Savings</th>
<th>Report kWh Savings/Measure</th>
<th>Average Net Verified kWh Savings/Measure in Evaluation Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECM Fan Motor</td>
<td>40%</td>
<td>60%</td>
<td>1007</td>
<td>544</td>
</tr>
<tr>
<td>Condenser Coil Cleaning</td>
<td>25%</td>
<td>10%</td>
<td>280&lt;sup&gt;1&lt;/sup&gt;</td>
<td>100</td>
</tr>
<tr>
<td>Strip Curtains</td>
<td>10%</td>
<td>7%</td>
<td>505&lt;sup&gt;2&lt;/sup&gt;</td>
<td>921</td>
</tr>
<tr>
<td>LED Case Lights</td>
<td>13%</td>
<td>5%</td>
<td>190</td>
<td>137</td>
</tr>
<tr>
<td>LED A19 Bulb</td>
<td>8%</td>
<td>1%</td>
<td>133</td>
<td>167</td>
</tr>
<tr>
<td>Night Curtains</td>
<td>1%</td>
<td>1%</td>
<td>1380</td>
<td>N/A&lt;sup&gt;4&lt;/sup&gt;</td>
</tr>
<tr>
<td>Business_Refrigeration_Program&lt;sup&gt;3&lt;/sup&gt;</td>
<td>3%</td>
<td>16%</td>
<td>3044</td>
<td>N/A&lt;sup&gt;3&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<sup>1</sup> Includes both freezer and cooler applications, with reported kWh savings of 243 and 289, respectively.

<sup>2</sup> Includes both freezer and cooler applications, with reported kWh savings of 480 and 548, respectively.

<sup>3</sup> “Business_Refrigeration_Program” was provided to IESO as a measure type. While these measures were later discovered to be projects and not individual measures, the program tracking data submitted to IESO used this measure type; therefore, the evaluated results reflect the measure types as reported to IESO.

<sup>4</sup> Night curtain measures were not captured in the evaluation sample.

Listed below are the key observations and recommendations from the 2017 impact evaluation. While some of these observations were previously noted in the 2016 program year report, these observations are considered important enough to warrant inclusion once again:
Relative to 2016 results, the 2017 BRI local program produced substantial results in both gross reported savings and net verified savings. Gross reported energy and summer peak demand savings increased by 386% and 335%, respectively, between 2016 and 2017 due to higher participation. Similarly, net verified energy savings increased 472% and net verified summer peak demand savings increased 456%. The higher percent difference in net verified savings compared to the percent difference in gross reported savings is indicative of both the higher realization rates and net-to-gross values found in 2017 compared to 2016. However, the net-to-gross ratios contributed much more to the higher 2017 net verified savings, with their ratios increasing over the 2016 net-to-gross ratios by 13.2% and 31.9% for energy and summer peak demand, respectively. Meanwhile, realization rates between 2016 and 2017 only increased by 3.7% for energy and decreased by 0.9% for summer peak demand.

Measure descriptions, such as ECM fan horsepower or LED case lighting length, were already captured in the program’s tracking database, but were not differentiated in savings values from the broader measure type.

**Recommendation:** Breaking out estimated savings by broad measure types (e.g. ECM evaporator fan motor) into specific measures (e.g. 1/20 Horsepower ECM evaporator fan motor) can allow for an improved precision in savings estimates.

**Recommendation:** To ensure consistent and transparent savings calculations, it is recommended that the program adopt standard savings algorithms for each offered measure or deemed savings values for common measure sub-types (e.g. ECM fan motor horsepowers, case lighting by foot length).

As was the case in the 2016 program year, the ECM fan motor replacement measure provided the program the majority of the program energy savings (60%) while also being a very cost effective measure, with TRC ratios of 2.7 to 4.8. These TRC ratios do not include program administrative costs but are useful for comparing among program measures.

**Recommendation:** It is recommended that future implementation of this program continue to focus on ECM fan motors.

### 2.2.2 Net-to-Gross (NTG)

The key observations from the 2017 local program impact evaluation pertaining to NTG include the following:

- Participant feedback indicates moderate levels of free-ridership (21.3%). The responses demonstrate that the program helped over one-half (57%) of the participants complete projects they would have had to cancel, delay, or reduce in size or scope. Room for improvement exists in terms of identifying customers most in need of the program’s support, as less than one-fifth (15%) of participants would have done the exact same upgrade in the absence of the program. However, when these same nine respondents were asked if they would have had the funds to cover the full cost of the same exact upgrade on their own, only two said they definitely would have had the funds. This
indicates that the program may have helped the other seven respondents in some capacity. The high Energy NTG score that was achieved in PY 2017 (100.5%) can largely be attributed to the amount of Spillover achieved (21.7%).

**Recommendation:** The program should continue to work on identifying and targeting customers who are most in need of support, and who would not be able to install the equipment without the program.

### 2.2.3 Process Evaluation

The process evaluation involved interviews with program staff, program delivery agent, suppliers and refrigerant technicians and participants. The key observations are as follows:

- Most surveyed participants (79%) were very satisfied with the program overall, and 84% would likely recommend the program to others. Participants were less satisfied with the energy savings achieved by the equipment upgrade (48% satisfied). Program delivery agent staff indicated the program needs to reach past the “low hanging fruit” to the harder-to-reach customers. A lack of proper education on potential savings and the challenges with providing long-term savings were the main barriers mentioned by program delivery agents, the program refrigeration technician, and the motor supplier.

**Recommendation:** Ensure that program delivery agents are well-versed in describing related savings opportunities and payback periods to customers when communicating about the program, especially when conducting audits. Program staff can leverage the established relationships to enhance the program experience by helping program delivery agents better educate customers on the potential energy savings.

**Recommendation:** Identify opportunities to educate customers on the energy savings potential of program-incentivized measures. The program could consider direct measurement of energy savings to develop additional case studies that could be used as “testimonials” of verified energy savings. Program materials and market outreach should also be refined to clearly describe the savings opportunities and payback periods to customers.

- The motor supplier and refrigeration technician appear to have contradictory perspectives on equipment availability. The motor supplier reported there were “no product or supply-related issues.” However, the refrigeration technician reported that shortage of program qualifying ECM motors was growing into a “consistent issue.”

**Recommendation:** Clarify the program needs between the supplier and refrigeration technician and improve communication pathways to ensure adequate available supply of product. This could be made possible by creating more opportunities for program partners to discuss implementation constraints or by expanding the number of program suppliers that support the program to alleviate any bottlenecks in supply.
Fifteen percent of surveyed participants said that they were not satisfied with the level of the incentive. Three surveyed participants indicated frustrations with the technician and/or equipment options offered by the technician, and two surveyed participants suggested expanding the equipment options covered by the program. The program delivery agent suggested streamlining the assessment and installation process by implementing a more “turn-key” type service, whereby the program delivery agent could be made responsible for all lead generation (rather than the LDC), and, in some instances, installations. For small business customers, it may alleviate the amount of time they need to dedicate to participating in the program.

**Recommendation:** Consider reviewing incentive types and levels and equipment covered for alignment with customer needs as it is feasible.

**Recommendation:** As the program has currently expanded to a province-wide program, consider implementing and promoting a BRI refrigeration technician network as a means of recommending quality technicians to program participants.

**Recommendation:** Improve customer experience by streamlining the process as much as possible. This could involve implementing even more of a “turn-key” service where possible to simplify the process for participants.
3 Evaluation Goals and Objectives

The goals and objectives of the 2017 evaluation of the Business Refrigeration Incentive (BRI) local program are to:

- Verify energy and demand savings with a high degree of confidence, taking into account:
  - All measures implemented as part of the program
  - Spillover savings and local program-enabled savings
- Review and evaluate key program elements;
- Conduct annual cost-effectiveness analyses; and
- Report and attribute savings due to the local program.

To estimate gross verified energy and peak-demand savings, the evaluation team conducted desk reviews of project documentation, followed by telephone and on-site surveys for a representative sample of projects. To estimate the direct influence of the local program in generating energy savings, the evaluation team conducted attribution surveys to calculate the rates of free ridership and spillover. This information was used to calculate a net-to-gross ratio, which was then applied to the gross verified savings to calculate the net savings. These scaling factors (i.e. free ridership and spillover), along with the gross savings, were developed using random sampling methods to select and survey projects that were representative of the population at large.
4 Program Description

The Business Refrigeration Incentive (BRI) local program’s goal is to overcome the substantial market barriers associated with promoting energy efficient refrigeration equipment upgrades to small businesses including: limited awareness of energy use and electricity costs of refrigeration equipment, limited availability of refrigeration equipment from distributors, and limited access to capital to upgrade refrigeration equipment.

The program offered participants a turn-key service which provided:

- Facility audit
- A customized Energy Action Plan (EAP) which includes:
  - Recommendations on how to improve energy efficiency based on information gathered during the audit (gas, water and electric);
  - Comparative benchmark of the facility’s electricity use against similar businesses; and
  - Information to cross-promote other efficiency programs (CDM, water and DSM) where applicable
- Up to $2,500 of eligible refrigeration measures and services provided and installed at no charge

The documentation provided for this evaluation included the program’s tracking database entries (e.g. applicant business information, site contact information, measures implemented) as well as specific projects’ field installation documents and pictures demonstrating the measures implemented.

PowerStream Inc., now Alectra Utilities Corporation, launched the BRI Pilot in September 2013 and offered the program to customers through December 2014. The program was not offered to customers in 2015. In the first quarter of 2016, PowerStream Inc. began to offer the BRI Program to its small business customers as a local program. In the first three quarters of 2017, all legacy Alectra utilities (Enersource, Horizon, Hydro One Brampton, and PowerStream) and Collus PowerStream jointly delivered this program. In the third quarter of 2017, the program transitioned to a province-wide program.

The specific refrigeration measures that are eligible in the local program are as follows:

- Anti-sweat heater controls
- Strip curtains for walk-in coolers and freezers
- Night curtains on display cases
- Cleaning cooler/freezer condenser units
- Electronically Commutated Motor (ECM) upgrades (condenser and evaporator)
- LED display case lighting
- LED bulbs (inside a walk-in cooler or freezer)
5 Methodology

The sections below describe the methodologies used to complete the impact and process-related components of the evaluation.

5.1 Impact Evaluation Methodology

5.1.1 Sampling, Project Reviews and Evaluation

The Nexant team’s impact evaluation sample frame targeted 90% confidence level and 10% precision for the program. The achieved sample during the evaluation of this program is broken out by evaluation activity in Table 5-1.

Table 5-1: Impact Evaluation Sample

<table>
<thead>
<tr>
<th>Participant Quantity</th>
<th>90/10 Sample (Cv* = 0.5)</th>
<th>Evaluation Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Desk Review</td>
</tr>
<tr>
<td>1,191</td>
<td>65</td>
<td>44</td>
</tr>
</tbody>
</table>

*Cv: coefficient of variance

Sampled sites were evaluated either by a desk review or on-site verification. Desk reviews consisted of first reviewing project documentation available in the program’s tracking database, such as installed measure types and quantities. Then Nexant contacted participants via phone to verify which measures were implemented by the program and confirmed measure characteristics such as measure quantity, size, capacity, and hours of use.

The site visits expanded upon the work conducted for the desk reviews and also included an on-site review of the measures implemented and an in-person interview with the site contact. For a subset of the projects visited, the Nexant team deployed data loggers to verify equipment hours of use.

For each measure type implemented in the program, Nexant created a calculator to automate and standardize savings algorithms across all evaluated projects, yet allow for data collected on site to be used as inputs when available. The algorithms used to determine savings primarily referenced Ontario Power Authority’s (OPA) 2011 Quasi-Prescriptive Measures and Assumptions Release (Version 1). In some instances, algorithms from other regional Technical Reference Manuals (TRMs) were used, as these other algorithms allowed for more detailed site-gathered data inputs to be used. For example, the ECM evaporator fan motor savings algorithm listed in the OPA reference document simply uses a savings factor based on display...
case length, baseline motor type, and presence of display case doors. Alternatively, the savings algorithm listed in the 2017 Pennsylvania TRM for ECM evaporator fan motors also includes input parameters such as evaporator fan motor input wattage and refrigeration system coefficient of performance.

5.1.2 Lighting Baseline Shift

Data collected during the 2016 lighting baseline study was leveraged to determine an appropriate lighting baseline adjustment for two BRI measures: case lighting and A19 lights. Assumed baselines used for the deemed reported savings were not provided in the program documentation; therefore, Nexant analyzed available program data and estimated the average assumed reported baseline wattages were 14, 60, 57, and 94 for A19 CFL, A19 incandescent, T8, and T12 light fixtures, respectively. The lighting baseline study data was used to update these assumed baselines, with the resulting adjusted baseline wattages being 65 watts for all linear fluorescents and 32 watts (program years 2015-2017) and 37 watts (program years 2018-2020) for A19 lamps. The new baseline assumptions were then used to derive the following adjustment factors in Table 5-2, which were applied to the verified estimates in the reporting template.

<table>
<thead>
<tr>
<th>Measure</th>
<th>Years 2015-2017</th>
<th>Years 2018-2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>LED A19 bulb</td>
<td>54.8%</td>
<td>71.4%</td>
</tr>
<tr>
<td>LED case light</td>
<td>126.0%</td>
<td>126.0%</td>
</tr>
</tbody>
</table>

5.1.3 Net-to-Gross (NTG) Methodology

To calculate net savings, the team evaluated the portion of gross verified savings that were specifically attributable to the local program. The evaluation team determined net savings by multiplying the gross verified savings by the NTG ratio, as shown in Equation 5-1.

\[
\text{Equation 5-1: Net Savings} \\
\text{Savings net} = \text{Savings verified} \times \text{NTG}
\]

Where:

- Savings net = Net savings impact (kW or kWh)
- Savings verified = Gross verified energy savings (kW or kWh)
- NTG = Net-to-gross ratio
To estimate the direct influence of the BRI local program in generating net energy savings, the evaluation team implemented an attribution survey to calculate the free-ridership (FR) and spillover (SO) rates, assessed as percentages of total reported savings. **Free-ridership** is the program savings attributable to free riders (program participants who would have implemented a program measure or practice in the absence of the program). **Spillover** refers to additional reductions in energy consumption or demand that is due to program influences beyond those directly associated with program participation.\(^1\) The **NTG ratio** is defined by Equation 5-2, where FR is the free-ridership percentage and SO is the spillover percentage:

\[
\text{Equation 5-2: Net-to-Gross Ratio}
\]

\[
\text{NTG} = 100\% - FR + SO
\]

### 5.2 Process Evaluation Methodology

The process evaluation focused on the design, implementation, and delivery of the BRI local program. The team evaluated program processes through interviews with pertinent program actors, including LDC program staff, program delivery agents (also known as “implementers”), program delivery partners (the technician and the supplier), and participants (see Table 5-3). For each population, the evaluation team developed a unique interview guide or survey to ensure responses produced comparable data as well as to draw meaningful conclusions.

#### Table 5-3: Process Evaluation Primary Data Sources

<table>
<thead>
<tr>
<th>Respondent Type</th>
<th>Methodology</th>
<th>Targeted</th>
<th>Completed</th>
</tr>
</thead>
<tbody>
<tr>
<td>LDC Program Staff</td>
<td>Phone</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Program Implementer</td>
<td>Phone</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Program Installation Technician</td>
<td>Phone</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Program Motor Supplier</td>
<td>Phone</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>BRI Participants</td>
<td>Web</td>
<td>481</td>
<td>72 (60 completes; 12 partial completes)</td>
</tr>
</tbody>
</table>

### 5.2.1 Program Staff and Program Delivery Agents

The evaluation team conducted telephone interviews with LDC program staff in March of 2017 and with two program delivery agents in April of 2017. The purpose of the interviews was to

---

better understand how the program was administered in 2017, and to attain program staff and program delivery agent perspectives regarding design and implementation. Topics covered included staff roles, any changes to the program, barriers to implementation, and perspectives on the success of the program. LDC program staff oversees the planning and implementation strategy. Program delivery agent oversees the program’s implementation and work closely with the refrigeration technician.

5.2.2 Program Delivery Partners

In April 2018, the evaluation team completed telephone interviews with two of the BRI local program delivery partners; the refrigeration technician and the motor supplier. The refrigeration technician coordinates with the program delivery agent to install the program equipment for BRI participants. The motor supplier provides the motor-related equipment offered through the program and coordinates with the refrigeration technician to ensure adequate supply. The purpose of the interviews was to better understand how the refrigeration technician and the motor supplier helped to deliver the BRI local program to customers, and to obtain their perspectives regarding program design and implementation.

Topics covered included staff roles, sales details, program-incentivized technologies, implementation, satisfaction with the program, training received, barriers to implementation, and suggestions for program improvement.

5.2.3 Participants

The evaluation team completed 72 web (60 completes and 12 partial completes) surveys from a sample of 481 unique contacts (Table 5-4), yielding a 12% response rate.

The evaluation team developed the sample from program records provided by IESO staff. Given the small sample size, a census of participants was attempted. The results of the survey did not achieve 90/10 confidence/precision, but this is not uncommon as small business participants are a hard to reach group and there was a limited sample size. The evaluation team administered the web survey and released the survey to the sample via email on March 20, 2018. The evaluation team sent out weekly email reminders over the course of three weeks before closing the survey on April 20, 2018.

The purpose of this survey was to better understand BRI participant perspectives related to program delivery, and to capture information to support participant NTG estimates. The survey addressed how participants learned about the program, motivations for installing the equipment, satisfaction with various aspects of the program process, participant intent to complete the upgrade in the absence of the program, and whether respondents would have undertaken energy efficiency projects without program incentives.
### Table 5-4: Program Participant Survey Disposition

<table>
<thead>
<tr>
<th>Disposition Report</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completes</td>
<td>60</td>
</tr>
<tr>
<td>Partial completes</td>
<td>12</td>
</tr>
<tr>
<td>Deceased</td>
<td>1</td>
</tr>
<tr>
<td>Out of business</td>
<td>1</td>
</tr>
<tr>
<td>Bad contact info</td>
<td>25</td>
</tr>
<tr>
<td>Non-responsive</td>
<td>382</td>
</tr>
<tr>
<td><strong>Total in sample</strong></td>
<td><strong>481</strong></td>
</tr>
</tbody>
</table>
6 Impact Evaluation Results

6.1 Participation

The 2017 BRI local program data submitted to IESO contained both local and provincial participants combined, as there was no significant difference between how the programs were implemented. For evaluation purposes, the local program population was defined as projects meeting the following two criteria:

- IESO reporting period occurred between January 2017 and September 2017
- LDC was with one of the four legacy Alectra LDCs – Enersource, Horizon, Hydro One Brampton, and PowerStream – or Collus PowerStream, who jointly implemented this program with the legacy Alectra LDCs.

The raw list of projects provided to the evaluation team by IESO included 1388 projects that met the local program criteria. After removing duplicate entries, projects with no associated measures, projects already taken into account in the previous year’s evaluation, and projects that were implemented in 2018, and the total project count in the BRI local program became 1,191.

The tracking database provided business types for each project. Figure 6-1 presents the relative frequency of each type of business contained in the tracking database at the project level for 2017. For reference, Figure 6-2 presents the data shown in Figure 6-1 alongside the 2016 data for comparison purposes. Generally, the same relative frequency by business type was observed in both years, with “Restaurants” and “Fast Food Restaurant” categories making up the majority of participant quantities in both program years.
**Figure 6-1: Business Type Frequency**

- Restaurant: 32%
- Fast Food Restaurant: 28%
- Convenience Store: 14%
- Tim Hortons: 11%
- Bakery & Deli: 5%
- Dairy or Frozen: 2%
- Butcher: 2%
- Other: 6%

**Figure 6-2: Relative Frequency of Business Types in Program Years 2016 and 2017**

- 2016
- 2017
6.2 Energy Savings

The program level savings are summarized in Table 6-1 below.

<table>
<thead>
<tr>
<th>Savings Type</th>
<th>Gross Reported Savings</th>
<th>Gross Realization Rate</th>
<th>Gross Verified Savings</th>
<th>Net To Gross Ratio</th>
<th>Net Verified First Year Savings</th>
<th>Net Verified 2020 Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy (MWh)</td>
<td>8,545</td>
<td>65%</td>
<td>5,517</td>
<td>101%</td>
<td>5,544</td>
<td>4,990</td>
</tr>
<tr>
<td>Summer Peak Demand (MW)</td>
<td>1.01</td>
<td>61%</td>
<td>0.61</td>
<td>119%</td>
<td>0.73</td>
<td>0.62</td>
</tr>
</tbody>
</table>

Three measure types accounted for over 92% of the local program’s net verified energy savings. The breakout of the local program’s net verified energy savings by measure type is depicted in Figure 6-3 below.

Figure 6-3: Net Verified Energy Savings Contributions by Measure

* “Business_Refrigera\_tion\_Program” was provided to IESO as a measure type. While these measures were later discovered to be projects and not individual measures, the program tracking data submitted to IESO used this measure type; therefore, the evaluated results reflect the measure types as reported to IESO.

ECM fan motors contributed 60% of the net verified energy savings while only making up 40% of the program’s measure quantity. The full list of measure quantity and energy savings...
contributions by measure type are presented in graphical and tabular form in Figure 6-4 and Table 6-2. Table 6-2 also shows the average reported and net verified energy savings per measure. The per measure reported savings values match those used in the 2016 BRI local program, which were provided in the program’s business case. However, the business case did not provide measure-specific details regarding how these savings assumptions were derived. Therefore, it was not possible to compare underlying assumptions used in the calculation of reported and verified savings estimates. Table 6-2 also shows that the ECM fan motor had the highest verified savings per measure while the LED lighting measures had the lowest verified savings per measure.

**Table 6-2: Proportion of Measure Quantity and Net Verified Savings by Measure Type**

<table>
<thead>
<tr>
<th>Measure Type</th>
<th>% of Total Program Measures Quantity</th>
<th>% of Total Program Energy Savings</th>
<th>Reported kWh Savings/Measure</th>
<th>Average Net Verified kWh Savings/Measure In Evaluation Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECM Fan Motor</td>
<td>40%</td>
<td>60%</td>
<td>1007</td>
<td>544</td>
</tr>
<tr>
<td>Condenser Coil Cleaning</td>
<td>25%</td>
<td>10%</td>
<td>280(^1)</td>
<td>100</td>
</tr>
<tr>
<td>Strip Curtains</td>
<td>10%</td>
<td>7%</td>
<td>505(^2)</td>
<td>921</td>
</tr>
<tr>
<td>LED Case Lights</td>
<td>13%</td>
<td>5%</td>
<td>190</td>
<td>137</td>
</tr>
<tr>
<td>LED A19 Bulb</td>
<td>8%</td>
<td>1%</td>
<td>133</td>
<td>167</td>
</tr>
<tr>
<td>Night Curtains</td>
<td>1%</td>
<td>1%</td>
<td>1380</td>
<td>N/A(^4)</td>
</tr>
<tr>
<td>Business_Refrigeration_Program(^3)</td>
<td>3%</td>
<td>16%</td>
<td>3044</td>
<td>N/A</td>
</tr>
</tbody>
</table>

\(^1\) Includes both freezer and cooler applications, with reported kWh savings of 243 and 289, respectively.

\(^2\) Includes both freezer and cooler applications, with reported kWh savings of 480 and 548, respectively.

\(^3\) “Business_Refrigeration_Program” was provided to IESO as a measure type. While these measures were later discovered to be projects and not individual measures, the program tracking data submitted to IESO used this measure type; therefore, the evaluated results reflect the measure types as reported to IESO.

\(^4\) No night curtain measures were captured in the evaluation sample.
The low energy realization rate of 64% (see Table 6-1) primarily appeared to stem from the assumptions used to determine savings for each measure. The reported savings used only one deemed savings per measure type while the verified savings took key measure characteristics into account such as size (e.g. motor HP) and baseline type. Breaking out estimated savings by broad measure types (e.g. ECM evaporator fan motor) into specific measures (e.g. 1/20 Horsepower ECM evaporator fan motor) can allow for an improved precision in savings estimates. This is particularly pertinent to the ECM fan motors, as motor sizes vary substantially and application types differ (condenser vs. evaporator).

Table 6-3 shows some examples of instances where, within a given measure type, measure sub-type verified savings estimates varied significantly while the reported savings estimates remained constant.
To add more context, below is a short discussion regarding each measure type’s realization rate. The observations noted below match those found in 2016, which is indicative of the same approaches used in estimating both reported savings and verified savings in 2016 and 2017.

- ECM fan motor: Motor size had a significant impact on each measure’s realization rate. As Table 6-3 illustrates, verified energy savings for a single ECM fan motor measure varied from 183 kWh to 1267 kWh. While the reported savings estimate of 1007 kWh is within the range of verified savings, it is closer to the higher end of the verified savings estimates, indicating the reported savings may have assumed a relatively large size motor would be replaced on average.

- A19 LED: Assumed baseline type had a significant impact on each measure’s realization rate. Table 6-3 shows that verified energy savings for CFL baseline lights only averaged about 12% of the verified savings of their incandescent counterparts.

- LED case lighting: The measure characteristic with the most influence on the realization rate of each LED case lighting measure was the lamp length. Longer length lights use more energy, and therefore, tended to have greater magnitudes of savings. When these verified savings are compared to a fixed reported savings value, larger magnitude verified savings estimates from the longer lamp lengths therefore had higher realization rates. Table 6-3 gives a more complete list of measure sub-type realization rates and shows the trend that realization rate is directly related to lamp length.

- Clean condenser coil: The verified savings methodology referenced the 2011 OPA Quasi Prescriptive Measures and Assumptions Release (Version 1) approach while the reported savings were based on deemed values assumed by the program. There were two input parameters that relied on site specific input and influenced findings significantly: assumed refrigeration equipment coefficient of performance (COP) and cooling capacity. Verified savings assumed COP values almost always followed
prescriptive values listed in the OPA reference document but cooling capacity was always derived from site specific information. Therefore, assuming the same approach was used to derive the reported savings, the low realization rate indicates the reported saving’s assumed refrigeration capacity is much larger than what was verified for this program.

- **Strip curtains**: The 2011 IESO *Quasi Prescriptive Measures and Assumptions Release (Version 1)* did not include all of the necessary deemed input parameters in order to calculate savings. Therefore the 2016 *Pennsylvania Technical Reference Manual (PA TRM)*\(^2\) was used to derive verified savings, which applies a kWh and kW savings per square foot of strip curtain installed. The realization rates indicate that the assumptions used in the PA TRM assume a slightly smaller savings for walk-in coolers, but a much larger savings for walk-in freezers.

The impact evaluation sample frame targeted 90% confidence level and 10% precision for the program. However, the evaluation achieved 90%/11% confidence and precision for both energy and demand. Since the 2016 and 2017 BRI programs were identical in all key aspects, including target market, measures offered, and delivery process, the evaluation samples from the two years could be merged for the purposes of calculating a realization rate with an improved statistical precision. Therefore, the 2017 local program sample was merged with the 2016 program sample to achieve 90/10 confidence and precision for both energy and demand.

### 6.3 Summer Peak Demand Savings

The reported and verified summer peak demand savings approaches mirrored their energy savings counterparts. In that, reported summer peak demand savings were deemed values assumed by the program and verified savings utilized algorithms from technical reference manuals and logged data. Accordingly, the summer peak demand savings realization rates by measure were generally consistent with the energy savings realization rates. That is, as energy realization rates increased or decreased by measure sub-type, the summer peak demand realization rate also increased or decreased in a similar manner. The full list of energy and summer peak demand savings realization rate values by measure sub-type can be found in Figure B 1 in Appendix B.

6.4 Lifetime Savings

Each measure in the program was given an effective useful life (EUL) based on the IESO’s *Measures and Assumptions List* (MAL)\(^3\) or the California Database for Energy Efficiency Resources (DEER)\(^4\). Table 6-4 presents each of these estimated measure EULs.

<table>
<thead>
<tr>
<th>Measure Type</th>
<th>EUL (years)</th>
<th>Data Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECM Fan Motor</td>
<td>15</td>
<td>MAL</td>
</tr>
<tr>
<td>A19 LED</td>
<td>11</td>
<td>MAL</td>
</tr>
<tr>
<td>LED Case Lighting</td>
<td>10</td>
<td>MAL</td>
</tr>
<tr>
<td>Night Curtains</td>
<td>5</td>
<td>DEER</td>
</tr>
<tr>
<td>Strip Curtains</td>
<td>4</td>
<td>DEER</td>
</tr>
<tr>
<td>Condenser Coil Cleaning</td>
<td>3</td>
<td>DEER</td>
</tr>
</tbody>
</table>

Table 6-5 displays the estimated program-level net verified savings at year 2017 and year 2020. The difference in the two savings amounts is due to condenser coil cleaning and strip curtain measures reaching their expected lives before 2020 and the decline in savings on lighting measures with dual baselines.

<table>
<thead>
<tr>
<th>Savings</th>
<th>2017</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>MWh</td>
<td>5,544</td>
<td>4,990</td>
</tr>
<tr>
<td>MW</td>
<td>0.73</td>
<td>0.62</td>
</tr>
</tbody>
</table>

Figure 6-5 and Figure 6-6 compare first year and 2020 net verified savings for program years 2016 and 2017. Both energy and summer peak demand savings went up by about 450% between 2016 and 2017, indicating a substantial program expansion.

---


Figure 6-5: Net Verified Energy Savings by Program Year

Figure 6-6: Net Verified Summer peak demand Savings by Program Year

Figure 6-7 shows the BRI local program’s total estimated net energy savings over the expected lifetime of the measures installed. For reference, Figure 6-7 also shows the 2016 BRI local program’s estimated net verified savings each year. Comparing the two years, the 2017 program year consistently yielded roughly five times the energy savings as the 2016 program year. Also, the savings profiles generally mirror one another, with drops around the 3 year and 10 year marks due to consistent program measure compositions and expected unchanging measure life assumptions between the two program years.
6.5 Net-To-Gross (NTG)

NTG findings for the BRI local program are presented in the following subsections. This information was collected as part of the participant survey. Responses have been summarized and detailed feedback can be found in Appendix A.

6.5.1 Net-to-Gross Results

The NTG survey achieved 60 responses. The results from this survey are presented in Table 6-6. The relative precision at the 90% confidence level exceeds the target threshold of 10% for both energy and demand NTG (21.4% and 39.8%, respectively). Therefore, these results should be viewed with caution and may at best be considered directional. Reasons behind why the relative precision values exceed 10% are related to the project size of responding participants and the hard-to-reach nature of this respondent group.

<table>
<thead>
<tr>
<th>NTG Assignment</th>
<th>Sample Size</th>
<th>Savings Weighted FR*</th>
<th>Energy SO*</th>
<th>Demand SO*</th>
<th>Energy Savings Weighted NTG**%</th>
<th>Demand Savings Weighted NTG**%</th>
<th>Energy Relative Precision at 90% Confidence Level</th>
<th>Demand Relative Precision at 90% Confidence Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Province-wide</td>
<td>60</td>
<td>21.3%</td>
<td>21.7%</td>
<td>40.5%</td>
<td>100.5%</td>
<td>119.2%</td>
<td>21.4%</td>
<td>39.8%</td>
</tr>
</tbody>
</table>

*Note: FR: Free-ridership; SO: Spillover; NTG: Net-to-Gross
6.5.2 Free ridership

The evaluation team first asked respondents a series of introductory questions related to their program participation. These questions are intended to provide additional context about the respondent’s decision-making and are not used to directly calculate free-ridership. The survey asked respondents when they first learned that they could get energy efficiency incentives through the BRI local program (Table 6-7). Just under one-half (47%) of respondents said they learned about the incentives before they started making plans to do the upgrade. Ten percent (10%) of respondents said they learned about the incentives after they had started planning, but before they started implementing the upgrades. Six percent (6%) learned about the incentive after they had started implementing, but before they completed their upgrade. Three percent (3%) learned about the incentive after the upgrade was completed, and just over one-third (34%) of respondents either did not know when they first learned about the incentive or declined to answer the question.

<table>
<thead>
<tr>
<th>When did you first learn you could get energy efficiency incentives through your LDC?</th>
<th>Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before you started planning this upgrade</td>
<td>47%</td>
</tr>
<tr>
<td>After you started planning, but before you started implementing this upgrade</td>
<td>10%</td>
</tr>
<tr>
<td>After you started implementing but before you completed this project</td>
<td>6%</td>
</tr>
<tr>
<td>After you completed this upgrade</td>
<td>3%</td>
</tr>
<tr>
<td>Don’t know/ Refused</td>
<td>35%</td>
</tr>
</tbody>
</table>

The survey asked participants about the timing of their BRI application (also known as a participant agreement) in relation to the beginning of their upgrades (Table 6-8). Over three-fifths (62%) submitted their application before their organization began implementing the energy efficiency upgrades. Just under one-third (30%) did not know, refused to answer, or were unclear about the timing of their application. Those who submitted the application after the project began but before it was complete (5%) or after the upgrade was complete (35%) said that they did not submit their applications earlier because of the time needed to submit the application through the program application system (3 respondents), time or resource constraints at their organization (1 respondent), or they did not know the reason (1 respondent).
Table 6-8: Timing of Application (n=61)

<table>
<thead>
<tr>
<th>When did you submit your application to the BRI Program?</th>
<th>Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before your organization began implementing the energy efficiency upgrade</td>
<td>62%</td>
</tr>
<tr>
<td>After the energy efficiency upgrade began, but before the upgrade was complete</td>
<td>5%</td>
</tr>
<tr>
<td>After the energy efficiency upgrade was complete</td>
<td>34%</td>
</tr>
<tr>
<td>Don’t Know/Refused/Reason unclear</td>
<td>30%</td>
</tr>
</tbody>
</table>

The survey asked respondents what they would have done in the absence of the program. Please note that this question, along with the following question regarding the program’s influence on respondent decision-making, are both used to estimate free-ridership. Responses suggested that the program helped nearly one-half of these participants (48%) with upgrades they otherwise would not have been able to implement (23%) or would have had to postpone for at least one year (25%) (Table 6-9). Some instances of free-ridership exist, as 23% would have either done the exact same upgrade anyway (15%) or done the upgrade but scaled it back (8%).

Table 6-9: Actions in Absence of Program Incentives (n=60)

<table>
<thead>
<tr>
<th>If you had never learned you could get incentives from your LDC, which of the following best describes what your business would have done?</th>
<th>Respondents*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Put off doing the upgrade for a least one year</td>
<td>25%</td>
</tr>
<tr>
<td>Cancelled the upgrade altogether</td>
<td>23%</td>
</tr>
<tr>
<td>Done the upgrade, but scaled back the size or extent of the upgrade</td>
<td>8%</td>
</tr>
<tr>
<td>Done the exact same upgrade anyway</td>
<td>15%</td>
</tr>
<tr>
<td>Don’t know/Refused</td>
<td>28%</td>
</tr>
</tbody>
</table>

*Does not sum to 100% due to rounding.

The survey asked the 8% of respondents who said they would have scaled back on the project how much they would have scaled it back (five respondents in total). Two out of the five respondents would have scaled back by a moderate amount, one would have scaled back by a small amount, one would have scaled back by a large amount, and one respondent did not know.

Of the nine respondents who reported they would have done the exact same upgrade anyway, two reported that the funds to cover the entire cost of the project would have definitely been available; one reported that they might have had the funds, and three reported that they definitely would not have had the funds to cover the project. Three respondents did not know if
their company would have had the funds to cover the cost of the project without the LDC incentive.

The evaluators also asked respondents how program features, such as the availability of the program incentive, information provided by LDC program staff, program delivery agents, or refrigeration technicians, and marketing efforts influenced their decision to make upgrades (Figure 6-8). Please note that this question, along with the previous question regarding what the respondent would have done in the absence of the program, are both used to estimate free-ridership. Results suggest that the availability of program incentives and the outreach from LDCs and program delivery agents played important roles in participants’ upgrade decisions. Respondents indicated that the following factors strongly influenced (4 or 5 rating) their decision to do the energy efficient upgrades:

- Availability of the program incentive (72%)
- Information or recommendations from an LDC program staff or program delivery agents (60%)

Information or recommendations from an IESO representative also had a notable influence (4 or 5 rating) on over one-half (54%) of respondents. However, information or recommendations from program-affiliated auditors, refrigeration technicians, or suppliers were somewhat less influential (45% gave a 4 or 5 rating). Audits or technical studies were also less influential (40% gave a 4 or 5 rating) on the decision to do the energy efficient upgrades.
When the survey asked whether there was anything else that played a great role in influencing the organization to install the energy efficient equipment upgrades, participants provided the following responses:

- Four participants mentioned the ease of applying to the program/no cost option
- Four participants mentioned overall energy savings/saving money on energy bills
- Two participants mentioned replacing/updating old or failing equipment

In summary, the free-ridership results for BRI local program participants were mostly positive as it helped nearly one-half of these participants (48%) with upgrades they otherwise would not have been able to implement or would have had to postpone. Room for improvement still exists, though, as 8% would have completed a scaled back version of the project. Additionally 15% (nine respondents) would have done the same exact upgrade without the program, however, when these same respondents were asked if they would have had the funds to cover the full cost of the upgrade on their own, only two said they definitely would have had the funds. This indicates that the program may have helped the other seven respondents in some capacity.
6.5.3 Spillover

Fourteen out of fifty-six (25%) survey respondents reported installing or upgrading additional energy efficiency equipment without an incentive after they participated in the BRI local program. A total of 17 equipment installations occurred over the 14 respondents, with lighting equipment mentioned most often by six out of 14 respondents.

The survey asked respondents what level of influence their prior participation in the BRI local program had on their decision to install this additional energy efficiency equipment (Figure 6-9). Participants rated the influence of the BRI local program on their decision using a 1 to 5 scale, where 1 means ‘it played no role at all’ and 5 means ‘it played a great role’ on their decision to install the additional energy efficiency equipment. Participants generally reported that the program had some influence (3 rating or higher) on their decision. The program had some influence over approximately two-thirds (67%) of equipment installed outside the program. Hence, the program has evidence of spillover, which ultimately resulted in a NTG of greater than 100%. The evaluation team asked survey respondents who indicated that they installed program-influenced non-incentivized equipment a series of follow-up questions. These questions allowed the evaluation team to attribute spillover savings to each equipment installation.

Figure 6-9: Program Influence on Equipment Installed Outside the Program (n=14)

(Rating of 3, 4, or 5 on a scale of 1 to 5)

Fan (n=5) 80%
Motor/Pump upgrade (n=4) 75%
Lighting (n=6) 67%

6.6 Avoided Greenhouse Gas Emissions

The evaluation team used the IESO Conservation and Demand Management (CDM) Energy Efficiency Cost Effectiveness Tool to calculate avoided greenhouse gas (GHG) emissions. Avoided GHG emissions were calculated for the first year or the 2017 program year and for the lifetime of the measures. Table 6-10 below presents the results of these calculations.
### 6.7 Cost Effectiveness

The evaluation team conducted a cost effectiveness analysis for the BRI local program. This analysis was completed in accordance with the IESO requirements as set forth in the IESO *CDM Cost Effectiveness Test Guide* and using IESO’s *CDM Energy Efficiency Cost Effectiveness Tool*. The energy and demand savings results from the impact evaluation were inputs into the IESO *Cost Effectiveness Tool* as well as budget information supplied from IESO. Cost effectiveness results are presented in Table 6-11. The local program passed the Total Resource Cost (TRC) and Program Administrator Cost (PAC) test with both having benefits greater than their respective costs.

#### Table 6-10: BRI Local Program Avoided Greenhouse Gas Emissions

<table>
<thead>
<tr>
<th>Program Year</th>
<th>First Year GHG Avoided (Tonnes CO₂ equivalent)</th>
<th>Lifetime GHG Avoided (Tonnes CO₂ equivalent)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Electric</td>
<td>Gas</td>
</tr>
<tr>
<td>2017</td>
<td>1,127.80</td>
<td>-</td>
</tr>
</tbody>
</table>

#### Table 6-11: Program Level Cost Effectiveness Key Metrics

<table>
<thead>
<tr>
<th>Cost Effectiveness Test</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Resource Cost (TRC)</td>
<td></td>
</tr>
<tr>
<td>TRC Costs ($)</td>
<td>3,017,015</td>
</tr>
<tr>
<td>TRC Benefits ($)</td>
<td>3,827,713</td>
</tr>
<tr>
<td>TRC Net Benefits ($)</td>
<td>810,699</td>
</tr>
<tr>
<td>TRC Net Benefit (Ratio)</td>
<td>1.27</td>
</tr>
<tr>
<td>Program Administrator Cost (PAC)</td>
<td></td>
</tr>
<tr>
<td>PAC Costs ($)</td>
<td>3,008,196</td>
</tr>
<tr>
<td>PAC Benefits ($)</td>
<td>3,328,446</td>
</tr>
<tr>
<td>PAC Net Benefits ($)</td>
<td>320,250</td>
</tr>
<tr>
<td>PAC Net Benefit (Ratio)</td>
<td>1.11</td>
</tr>
</tbody>
</table>

---

Cost effectiveness was also analyzed at the measure level. It is important to note that program-level administrative costs were not taken into account in the calculations of measure level cost effectiveness results. As Table 6-12 shows, ECM fan motors and LED lights were determined to be the most cost effective measures while condenser coil cleaning, night curtains, and strip curtains were the least cost effective measures. Therefore, it is recommended that the program remain focused on ECM fan motors and LED lighting in order to maximize the program’s cost effectiveness.

Table 6-12: Measure Type Cost Effectiveness Key Metrics

<table>
<thead>
<tr>
<th>Measure Type</th>
<th>Total Resource Cost Ratio</th>
<th>Program Administration Cost Ratio</th>
<th>Levelized Unit Energy Cost ($/kWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECM Fan Motor</td>
<td>2.68 – 4.85</td>
<td>2.34 – 4.24</td>
<td>0.02 – 0.03</td>
</tr>
<tr>
<td>A19 LED Bulb</td>
<td>1.97 – 2.15</td>
<td>1.66 – 1.93</td>
<td>0.04 – 0.05</td>
</tr>
<tr>
<td>Clean Condenser Coils</td>
<td>0.90 – 0.98</td>
<td>0.78 – 0.86</td>
<td>0.08 – 0.09</td>
</tr>
<tr>
<td>Night Curtains</td>
<td>0.81 – 0.99</td>
<td>0.71 – 0.87</td>
<td>0.05 – 0.06</td>
</tr>
<tr>
<td>LED Case Lighting</td>
<td>1.27 – 4.92</td>
<td>1.11 – 4.30</td>
<td>0.02 – 0.09</td>
</tr>
<tr>
<td>Strip Curtains</td>
<td>1.05 – 1.13</td>
<td>0.91 – 0.99</td>
<td>0.07 – 0.08</td>
</tr>
</tbody>
</table>

1 Note: ranges of cost effectiveness are due to different sub-types within a particular measure type. Sub-types vary based on parameters such as measure size and measure application.

Figure 6-10 displays the frequency of reported incentive levels per project in groups of $500 increments. The program did not report most project incentives reaching near the program cap of $2,500. Instead, the program reported a fairly consistent distribution of project level incentives, with the average reported incentive per project being $1,256. This observed trend may indicate any one or more of the following: the average participant may have/operate fewer refrigeration equipment than the program anticipated, the average participant may have already implemented some of the program measures themselves, or program technician may have not
implemented all anticipated measures at each site due to unforeseen constraints (e.g. time on site, equipment shortages, not enough time, customer comfort level)

Figure 6-10: Frequency of Incentive Amount Per Project
7 Process Evaluation Results

The sections below provide the process evaluation results.

7.1 Program Staff and Program Delivery Agent Perspectives

The evaluation team interviewed LDC program staff and program delivery agents to obtain their perspectives regarding design and implementation of the BRI local program. Feedback from these interviews is summarized below.

7.1.1 Program Roles

LDC program staff oversees the program design and administration, market the program, and are primarily responsible for generating program leads. The program delivery agents are responsible for program delivery; they coordinate with the LDC and the refrigeration technician to ensure that the program is delivered as intended. Additionally, program delivery agents help the LDCs generate some leads, perform all customer audits and some benchmarking, provide customers with energy action plans, and schedule the site visits between the customer and the refrigeration technician. The program delivery agent is not directly involved with the installation or supplier component; the refrigeration technician conducts all installations and procures the needed materials from the suppliers.

7.1.2 Barriers to Implementation

The LDC program staff and program delivery agents discussed some of the barriers to the implementation of the BRI local program. In general, LDC program staff and the program delivery agents thought that the program has been successful and has had a positive impact on the market. However, program delivery agents feel the need to increase efforts to get past the “low hanging fruit” and achieve deeper savings.

The main barrier mentioned by the program delivery agents was the challenge of providing proof of the long-term savings, an essential component to client education. One program delivery agent mentioned this was particularly a barrier to increasing the uptake of additional energy efficient equipment beyond the $2,500 program incentive cap. One suggestion was to perform in situ (onsite) metering to get a better estimate of “the real savings,” which could in turn provide customers with more accurate and real-world examples of what savings they might achieve as program participants. Another suggestion was to streamline the assessment and installation process, or to create a more “turn-key” type service, whereby the program delivery agent is responsible for all the lead generation, and, in some instances, installations. Currently, the LDC is primarily responsible for generating leads; the program delivery agent suggested that
the program may be further streamlined if the program delivery agent was responsible for all lead generation.

Additionally, under the current delivery model, only the refrigeration technician is responsible for installing equipment; special training is needed to install most program-supported equipment. The program delivery agent suggested that there may be an opportunity for the program delivery agent to install at least some of the equipment that does not require special training to install. They could do so while onsite conducting the audit rather than requiring the customer to wait for the refrigeration contractor to install the equipment during a later visit. They suggested that this approach could alleviate the amount of time needed for small business customers in deciding to participate in the program.

### 7.1.3 Success of the Program to Date

The evaluation team asked the LDC program staff and program delivery agent for their perspectives on the success of the program to date; both mentioned their satisfaction with program participation, as well as with their projections for program participation in the future. One program delivery agent mentioned that they expect to take on program implementation for additional LDCs soon. Program staff also mentioned satisfaction with the sole refrigeration technician working with the program. The program delivery agent mentioned satisfaction with the refrigeration technician’s performance as well.

### 7.2 Suppliers and Refrigeration Technicians

#### 7.2.1 Program Roles

The refrigeration technician was responsible for most of the installation work performed for the BRI local program in 2017, and the supplier interviewed was the primary supplier who provides electronically commutated motors (ECMs) – one of the program’s most commonly installed equipment types. These two interviews elucidate the impact of the program on market diffusion of ECMs among non-residential customers, such as grocery stores, restaurants, convenience stores, and similar businesses. While many more efficient refrigeration technologies are covered by the BRI local program, interviews with the program delivery partners largely focused on the impact of the program on ECMs because ECMs account for a large percentage of the program’s savings.

The motor supplier works with the BRI local program to develop specifications and supply ECMs to the refrigeration technician. The refrigeration technician works closely with the program delivery agent to update program supported measures, including ECMs. The program delivery agents conduct the audits, make recommendations on what technology to install, and schedule the installation with the refrigeration technician. The refrigeration technician installs the technology and coordinates with equipment suppliers. In 2017, the refrigeration technician’s firm
had started providing refrigeration training to the BRI audit staff to help improve the assessment and equipment recommendation process.

### 7.2.2 Firmographics

The refrigeration technician interviewed was the sole BRI local program refrigeration technician in charge of performing installations and working with the suppliers. Both respondents from the motor supplier and the refrigeration technician are the president of their company. The motor supplier’s company consisted of eight full-time employees and had been in operation for over 20 years.

### 7.2.3 Sales and Market Adoption

The ECM motor supplier did not report any issues with the program. The motor supplier reported there were “no issues with communications” and “no product or supply-related issues.” The motor supplier believes he sold approximately 10,000 motors to an unknown number of sites in 2017, and stocks roughly 2,500 to 3,000 motors at any given time in large part due to demand associated with the program.

The refrigeration technician also reported no issues with program communications, but did mention that the shortage of program-qualifying ECM motors was growing into a “consistent issue.” The motor supplier and installation technician appear to have contradictory perspectives on equipment availability. Program implementers, or the IESO, may have an opportunity to clarify program needs between the supplier and installation technician. The technician reported installing motors in roughly 2,500 individual sites in 2017. The refrigeration technician installs motors both within and outside the BRI local program.

The motor supplier thought that the number of motor sales would decline if the program was discontinued. However, he also expects sales of ECMs will continue to increase by 10 to 15% over the next year or two. While incentive programs play a role in market demand and product acceptance, he points out that they are not the only driver of ECM demand. He states, “The BRI [local] program affects a certain portion of the market, but there is a lot more happening outside [the small commercial sector]. He also pointed out that ECM technology is improving, and more customers are confident in the product.

The evaluation team asked whether some commercial customers or contractors were more receptive to purchasing ECMs than others. The motor supplier said that it “depends on the size of the business, and if they have someone designated to address equipment upgrades.” The smaller businesses “just don’t have the time.”

The motor supplier indicated that the main barriers to adoption he faced when selling ECMs were price and customer unfamiliarity with the product. He explained that there is usually a premium on ECMs, resulting in a large price differential between ECMs and conventional motors. He thought that installers are not providing the proper information on energy savings for
the customer to make an informed decision, which leaves business owners “wary” to install ECMs due to lack of education.

The refrigeration technician said projects that participated in the BRI local program represented about 35% of their total sales in 2017. They also have a separate division in charge of providing service and installation for existing customers. The motor supplier said BRI motor upgrades accounted for approximately 95% of their total sales in 2017.

The evaluation team asked the refrigeration technician if customers decided not to install any specific program-qualifying technologies due to the technology increasing the project cost beyond what was covered under the program funding threshold. He indicated that participants often decided not to install anti-sweat heater controls, as they are “more expensive and customers are a bit afraid of installing [them]” as “[they] don’t want display cases to fog up and/or malfunction.”

When evaluators asked the refrigeration technician for recommendations on how the program can motivate customers to install recommended technologies, he said that customers need “targeted education on the program and the [savings] potential of the equipment. If they understood, then why would they say no?” The refrigeration technician monitors the savings for a few of their larger customers. “It is very exciting to see what is actually saved.” There may be an opportunity for the program to use testimonials, such as these, to help spread the word and educate other businesses on the potential energy savings.

### 7.2.4 Program Outreach and Marketing

The evaluation team asked the refrigeration technician to identify the primary way that his customers would have learned about or come to participate in the BRI local program. The refrigeration technician said the most successful outreach was going door-to-door and talking with customers directly. Cold calling and explaining the program over the phone was also working, but not proving as successful as the face-to-face interactions.

The motor supplier said his company did not play a direct role in marketing the program, but he does encourage the specification of ECMs to customers.

### 7.2.5 Program Delivery Partner Influence

The refrigeration technician thought that auditors were extremely influential in recommending and explaining upgrades to the customers. Auditors are responsible for making recommendations to customers on what equipment to install. The refrigeration technician emphasized the importance for auditors to be able to effectively explain the benefits of the equipment upgrades to the customer, which the program is now supporting by having the refrigeration technician provide training to the audit staff.
The refrigeration technician said he had first heard of the BRI local program through a program representative. He started participating in 2014 while the program was in its early stages (a pilot at the time). He collaborated with the BRI local program to ensure the rollout of the pilot was effective. Besides early collaboration, the technician said his only role was to install the equipment. The motor supplier first heard about the BRI local program when a customer inquired about the program, and he became involved with the program in 2015. The motor supplier stated his role was primarily to provide technical and product support.

### 7.2.6 Program Delivery Partner Satisfaction

The evaluation team asked the refrigeration technician and motor supplier to rate their satisfaction with the program overall, their interactions with the LDC, program delivery agent, and IESO representatives; and aspects specific to the program and equipment (Table 7-1). The rating scale used ranged from 1 to 5, where 1 means “not all satisfied” and 5 means “completely satisfied.”

The refrigeration technician and the motor supplier were completely satisfied with the program overall. They also indicated complete satisfaction with the value of the program incentivized equipment and their interactions with the program delivery agents and the LDC’s program representatives. Furthermore, the refrigeration technician indicated he was satisfied (4 rating) with the number and types of equipment incentivized through the BRI local program, program marketing and outreach, and the program application process.

<table>
<thead>
<tr>
<th>Satisfaction</th>
<th>Refrigeration Technician Rating</th>
<th>Motor Supplier Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>The program overall</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>The value that the equipment covered by the program provides to customers</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>The interactions you had with a BRI local program representative from program delivery agent firm A</td>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td>The interactions you had with a BRI local program representative from program delivery agent firm B</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>The interactions you had with a BRI local program representative from the LDCs</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Program worksheets</td>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td>Number and types of equipment incentivized through the program</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Program marketing and outreach</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Program application process</td>
<td>4</td>
<td>NA</td>
</tr>
<tr>
<td>The interactions you had with a BRI local program technician</td>
<td>NA</td>
<td>5</td>
</tr>
<tr>
<td>The interactions you had with a BRI local program representative from IESO</td>
<td>NA</td>
<td>5</td>
</tr>
</tbody>
</table>
When asked how valuable the program is to the buyers of the incentivized motor upgrades, the motor supplier felt the program was “extremely valuable” because of the cost savings. He also indicated that the buyers and end users were completely satisfied with the equipment and did not have additional products for the BRI local program to consider offering in future program years.

### 7.2.7 Suggestions for Program Improvement

The refrigeration technician stressed the importance of customer education on energy savings and payback for the ECMs, but also recommended that the program delivery agent, who is responsible for conducting all of the audits need to receive proper training so they are equipped to educate the customer. The refrigeration technician’s firm “is helping out with that process,” so he thought this issue had been addressed, but still felt the LDCs could do more to educate end use customers on the benefits of participating in the program.

The motor supplier stressed that the program could do more to “reach out to [other] contractors” and educate them on the ECM technology and potential savings. He thought there may be some skepticism coming from the other refrigeration contractors, who install original equipment, on the benefits of ECMs, which is likely translated to the customer. When asked if certain contractors were more likely to install ECMs, the motor supplier stated:

“Some are satisfied with the old fashion and some like the newer equipment. Some are keener, [more] exposed to lots of products, some are more receptive to energy efficiency. The contractor should give the customer the knowledge to make the right decision, but they don’t all do it and are not versed in why it’s more efficient.”

### 7.3 Participant Perspectives

The following subsections highlight the feedback received from the BRI local program participant survey. Responses have been summarized and detailed feedback can be found in Appendix A. Sample sizes differ given that not all respondents provided answers to all questions; the following subsections show percentages or counts depending on sample size.

#### 7.3.1 Firmographics

The evaluation team asked respondents questions about their position in the company, ownership status, primary activities, chain or franchise status, size of labor force, and square footage of the facility where the upgrades were made. Companies that received the BRI incentive tend to be small to moderate, independent businesses operating in the food sales or service industry. Almost all (96%) of these businesses have fewer than 100 employees on staff.

Just under three-fourths of respondents (72%) stated that their title was the owner/president (Figure 7-1). General, management and maintenance/facility managers made up nearly one-fourth (23%) of respondents. Ninety-three percent of respondents had responsibility for the
budget or expenditure for the upgrades or retrofits at their company, with 68% having primary responsibility and 25% having shared responsibility.

Figure 7-1: Title of Respondent (n=72)

About two-fifth of respondents (42%) rented their facility, a similar percentage (39%) owned their facility, and the remaining 11% both owned and rented their facility (Table 7-2).

Table 7-2: Ownership Status (n=55)*

<table>
<thead>
<tr>
<th>Do you own or rent the facility(ies) where the program upgrades were made for this project in 2017?</th>
<th>Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Own all</td>
<td>40%</td>
</tr>
<tr>
<td>Rent all</td>
<td>41%</td>
</tr>
<tr>
<td>Mix of own and rent</td>
<td>15%</td>
</tr>
<tr>
<td>Don't know/Refused</td>
<td>6%</td>
</tr>
</tbody>
</table>

*Does not sum to 100 % due to rounding.

A large portion of the respondents (89%) operated in the food sales or service industry (Table 7-3).
The evaluation team asked respondents whether their company was part of a chain or franchise (Figure 7-2). Nearly two-thirds of respondents (65%) reported that their business is not part of a chain or franchise, compared to one-third of respondents (33%) who reported that their business is part of a chain or franchise.

**Figure 7-2: Chain or Franchise Status (n=54)**

The evaluation team asked respondents how many employees work at the facilities where the upgrades were made (Table 7-4). Just under one-half of the facilities (48%) were small businesses with ten or fewer employees. About two-fifths of the facilities (39%) had between eleven and fifty employees. Just under one-tenth of the facilities (9%) had 51 to 100 employees, and only 4% (two out of fifty-four) had 9,997 employees or more.
Table 7-4: Employment Count (n=54)

<table>
<thead>
<tr>
<th>How many employees are located in the facility(ies)?</th>
<th>Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to 10</td>
<td>48%</td>
</tr>
<tr>
<td>11 to 30</td>
<td>30%</td>
</tr>
<tr>
<td>31 to 50</td>
<td>9%</td>
</tr>
<tr>
<td>51 to 100</td>
<td>9%</td>
</tr>
<tr>
<td>Don’t know/Refused</td>
<td>4%</td>
</tr>
</tbody>
</table>

The survey asked respondents what the square footage was of the facility(ies) where the program upgrades were made. They provided either the total square footage for all buildings, or an average square footage per building. As seen in Table 7-5, just over three-fifths of these participants (67%) reported that the total square footage of the facility where the upgrades were made is 5,000 square feet or less. A similar trend was seen in Table 7-6 with 17 of 18 respondents indicating the average square footage per building was 5,000 square feet or less.

Table 7-5: Total Square Footage for All Buildings (n=24)

<table>
<thead>
<tr>
<th>Total Square Footage for All Buildings</th>
<th>Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 1,000 square feet</td>
<td>25%</td>
</tr>
<tr>
<td>1,000 up to 5,000 square feet</td>
<td>42%</td>
</tr>
<tr>
<td>5,000 up to 10,000 square feet</td>
<td>17%</td>
</tr>
<tr>
<td>10,000 up to 25,000 square feet</td>
<td>8%</td>
</tr>
<tr>
<td>25,000 up to 50,000 square feet</td>
<td>4%</td>
</tr>
<tr>
<td>500,000 square feet or more</td>
<td>4%</td>
</tr>
</tbody>
</table>

Table 7-6: Average Square Footage per Building (n=18)

<table>
<thead>
<tr>
<th>Average Square Footage Per Building</th>
<th>Counts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 1,000 square feet</td>
<td>2</td>
</tr>
<tr>
<td>1,000 up to 5,000 square feet</td>
<td>15</td>
</tr>
<tr>
<td>5,000 up to 10,000 square feet</td>
<td>1</td>
</tr>
</tbody>
</table>

The evaluation team asked participants the average monthly kWh usage of their facility(ies) (Table 7-7). Just over three-fourths of survey respondents (76%) did not know or did not want to answer the question. The remaining one-fourth provided a range of responses, with 13% reporting their facility(ies) used under 5,000 kWh per month.
Table 7-7: Average Monthly kWh Consumption at Facility(ies) (n=72)

<table>
<thead>
<tr>
<th>What is the average monthly electricity consumption in kilowatt-hours (kWh) at the facility(ies) where the program upgrades were made for this project in 2017?</th>
<th>Respondents</th>
<th>Average kWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 5,000</td>
<td>13%</td>
<td>2,472</td>
</tr>
<tr>
<td>5,000 - 10,000</td>
<td>4%</td>
<td>7,833</td>
</tr>
<tr>
<td>10,000 - 15,000</td>
<td>3%</td>
<td>11,500</td>
</tr>
<tr>
<td>15,000 - 20,000</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>20,000 - 25,000</td>
<td>1%</td>
<td>24,000</td>
</tr>
<tr>
<td>25,000 - 30,000</td>
<td>1%</td>
<td>27,000</td>
</tr>
<tr>
<td>30,000 and above</td>
<td>1%</td>
<td>1,200,000</td>
</tr>
<tr>
<td>Don’t know/Refused</td>
<td>76%</td>
<td>N/A</td>
</tr>
</tbody>
</table>

7.3.2 Program Outreach and Marketing

Just over one-third of respondents (36%) stated that they first heard about the BRI local program through a representative from their LDC (Table 7-8). Just over three-fourths (77%) of the respondents reported that the LDC made the initial contact with their company about the program. About one-fifth (21%) of the respondents heard about the BRI local program through energy efficiency advertising from their LDC, and just under one-sixth (14%) of respondents heard about the BRI local program through a representative from the IESO.

Table 7-8: How Participants First Heard about the Program (n=72)*

<table>
<thead>
<tr>
<th>How did you first hear about the Business Refrigeration Incentive (BRI) Program?</th>
<th>Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>A representative from your LDC</td>
<td>36%</td>
</tr>
<tr>
<td>Energy efficiency advertising from your LDC</td>
<td>21%</td>
</tr>
<tr>
<td>A representative from Ontario’s Independent Electric System Operator (IESO)</td>
<td>14%</td>
</tr>
<tr>
<td>A contractor or equipment vendor</td>
<td>7%</td>
</tr>
<tr>
<td>A colleague or competitor</td>
<td>7%</td>
</tr>
<tr>
<td>Upper level management</td>
<td>4%</td>
</tr>
<tr>
<td>Energy efficiency advertising from Ontario’s Independent Electric System Operator (IESO)</td>
<td>1%</td>
</tr>
<tr>
<td>Other energy efficiency advertising</td>
<td>1%</td>
</tr>
<tr>
<td>Friends/family/community</td>
<td>1%</td>
</tr>
<tr>
<td>Don’t know</td>
<td>7%</td>
</tr>
</tbody>
</table>

*Does not sum to 100% due to rounding.
The survey asked respondents about their knowledge of other Business Programs offered through their LDC (Table 7-9). About two-thirds of respondents (65%) were aware of the Small Business Lighting Program, and about one-fourth of respondents (24%) were aware of the Retrofit Program. These BRI local program participants had low awareness (<10%) of all other Save on Energy programs, with only one respondent aware of these other programs.

<table>
<thead>
<tr>
<th>What other business programs offered through your LDC are you aware of?</th>
<th>Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small Business Lighting (SBL) Program</td>
<td>65%</td>
</tr>
<tr>
<td>Retrofit Program</td>
<td>24%</td>
</tr>
<tr>
<td>Small &amp; Medium Business Energy Management System Innovation Pilot</td>
<td>7%</td>
</tr>
<tr>
<td>High Performance New Construction (HPNC) Program</td>
<td>3%</td>
</tr>
<tr>
<td>Audit Funding Program</td>
<td>3%</td>
</tr>
<tr>
<td>Existing Building Commissioning (EBCx) Program</td>
<td>3%</td>
</tr>
<tr>
<td>Process and Systems Upgrades (PSU) Program</td>
<td>3%</td>
</tr>
</tbody>
</table>

7.3.3 Participation Motives and Decision Making

The evaluation team asked respondents if their organization has a corporate policy related to energy efficiency or sustainability (Figure 7-3). Just under one-sixth of respondents (14%) had a corporate energy efficiency policy at the time of the survey, while nearly three-fourths (71%) reported they did not have a corporate energy efficiency or sustainability policy. Just under one-tenth (8%) of respondents had an unofficial commitment to energy efficiency. Two out of the seventy respondents (3%) had an official policy that encouraged energy savings, and a similar percentage (3%) had an official policy that required demonstrated energy savings. Of the corporations that required demonstrated energy savings, only one respondent reported a specific target of reduced energy saving over a specific period. This respondent reported their corporation’s policy targeted a 2.5% energy reduction on an annual basis.
The evaluation team asked respondents to rate the influence of certain factors on their decision to participate in the program on a scale of 1 to 5, where 1 means “it played no role at all” and 5 means “it played a great role” (Figure 7-4). Over nine-tenths of respondents (93%) indicated that saving energy or lowering their energy bills and the ease of participating in the program played a large role in their decision to participate (16% and 77% gave a 4 or 5 rating, respectively). About three-fourths of respondents (74%) said they participated in the program because it was easy for them to do so. About three-fifths of the respondents (61%) indicated that being associated with “green” or “sustainable” actions played a large role in their decision-making. About three-fifths (59%) indicated that increasing comfort and/or productivity played a large role in their decision to participate in the BRI local program.

As seen previously in Figure 7-3, four respondents (6%) indicated that their company has an official energy efficiency policy, and three of the four respondents (75%) indicated that adhering to their corporate energy efficiency policy played a large role in their company’s decision to participate in the BRI local program (giving a 4 or 5 rating).
7.3.4 Participant Satisfaction

The evaluation team asked respondents to rate whether the program materials provided by their LDC and IESO were clear and sufficient and whether the program application was easy to complete (Figure 7-5). Respondents used a scale of 1 to 5, where 1 means “do not agree at all” and 5 means “completely agree.” Most respondents (81%) agreed the program application was easy to complete (4 or 5 rating). Roughly two-thirds agreed the program materials from IESO (67%) or the LDC (65%) were clear. Just over three-fifths agreed the program materials from IESO or the LDC were sufficient. However, approximately one-eighth (12%) of respondents did not agree that the program materials provided by the LDC were sufficient.

The evaluation team asked respondents who had low satisfaction (1 or 2 rating) with program materials and the application process for any suggestions on how to improve them. One respondent suggested that participants be provided paper versions of program materials, when requested, and have the option to complete the application in writing.
The evaluation team asked respondents to rate their satisfaction with several other aspects of the program on a scale of 1 to 5, where 1 means “not at all satisfied” and 5 means “completely satisfied” (Figure 7-6). Most of the respondents (79%) were very satisfied (4 or 5 rating) with the program overall. When asked about their satisfaction with aspects of the participation process, most respondents gave a rating of 4 or 5 to the quality of the work performed by the contractor (85%), the interactions with LDC representatives (82%) or IESO representatives (77%), and the time it took to receive the incentive (80%). The two respondents who had previously indicated they were aware of the Process and Systems Upgrade Program were both satisfied (4 or 5 rating) with the content and presentation of any technical study or report related to that program.

The team also asked respondents about their satisfaction with the quality of work completed by the program auditors and EM&V contractors who performed the QA/QC on the installed equipment. About three-fourths indicated they were satisfied (4 or 5 rating) with the quality of work done by the auditor (74%). A similar percentage (76%) was satisfied with the quality of work conducted by the EM&V contractor who performed QA/QC, and over two-thirds (68%) were satisfied with the performance of the efficient equipment.

Respondents indicated somewhat lower levels of satisfaction with the energy savings achieved by the upgrades, as well as the dollar amount of the incentive. Just over one-half of respondents (55%) said they were satisfied (4 or 5 rating) with the level of the incentive; just under one-sixth of respondents (15%) reported they were not satisfied (1 or 2 rating). Just under one-half of
respondents (48%) said they were satisfied (4 or 5 rating) with the energy savings achieved; about one-eighth of respondents (12%) reported they were not satisfied (1 or 2 rating).

**Figure 7-6: Participant Satisfaction (n=66)
(Rating of 4 or 5 on a scale of 1 to 5)**

<table>
<thead>
<tr>
<th>Area</th>
<th>Satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>The program overall</td>
<td>79%</td>
</tr>
<tr>
<td>The content and presentation of any technical study or report related to the Process and Systems Upgrade program</td>
<td>100%</td>
</tr>
<tr>
<td>The quality of work done by the contractor who installed the equipment</td>
<td>85%</td>
</tr>
<tr>
<td>The interactions you had with representatives from your utility</td>
<td>82%</td>
</tr>
<tr>
<td>The time it took to receive the incentive</td>
<td>80%</td>
</tr>
<tr>
<td>The interactions you had with a representative from IESO</td>
<td>77%</td>
</tr>
<tr>
<td>The quality of work done by the EM&amp;V contractor who performed QA/QC on the installed equipment</td>
<td>76%</td>
</tr>
<tr>
<td>The quality of work done by the auditor who performed the facility audit</td>
<td>74%</td>
</tr>
<tr>
<td>The performance of the efficient equipment</td>
<td>68%</td>
</tr>
<tr>
<td>The dollar amount of the incentive</td>
<td>55%</td>
</tr>
<tr>
<td>The energy savings achieved by the equipment upgrade</td>
<td>48%</td>
</tr>
</tbody>
</table>

The evaluation team asked respondents who had low satisfaction (1 or 2 rating) with the program overall for suggestions on improvements in these areas. Two respondents suggested expanding coverage of the program incentive by raising the cap to cover more of the project costs. Three respondents indicated frustrations with the technician and/or equipment options.
offered by the technician, and two of these respondents suggested expanding the equipment options covered by the program incentive.

When the evaluators asked how likely respondents would be to recommend the program to others, 84% of the participants surveyed indicated they would be very likely to do so (4 or 5 rating).

7.3.5 Barriers to Future Participation

Figure 7-7 shows the responses when asked about why it could be difficult for respondents to make future energy efficient equipment upgrades. Using a scale of 1 to 5 to rate the extent to which they agreed with a statement, where 1 means “not at all relevant” and 5 means “completely relevant,” respondents reported that the primary barriers towards future efficient upgrades were the benefits not outweighing the costs and not having the time to research equipment upgrades (43% and 40%, respectively).

Other common challenges mentioned were not being able to afford the upgrades (37%), and being unaware of where to get the necessary help (32%). Very few respondents said that leased equipment would be a potential barrier, implying that the respondents typically owned all their equipment. One respondent added that they had already upgraded all their equipment, hence, they would not be making future upgrades. Although one-fourth (25%) of respondents gave 4 or 5 ratings to the electric bill not being a concern, this statement also received ratings of 1 or 2 from close to one-half of respondents (48%), suggesting that the electric bill was a substantial concern to many respondents when considering future upgrades.

Figure 7-7: Barriers to Future Participation (n=63)
(Rating of 4 or 5 on a scale of 1 to 5)
8 Key Observations and Recommendations

The evaluation team offers the following key findings and recommendations for maintaining and improving program success. These key observations and recommendations were developed as a result of the team’s evaluation activities and analysis. Since local program has ended the areas of improvements should be considered and investigated further as part of the provincial program.

8.1 Impact Evaluation

8.1.1 Impact Key Observations

Overall, the 2017 BRI local program mirrored the 2016 program in terms of implementation, assumed reported savings, evaluation approach, and evaluation observations. The major difference between the two program years was simply the size of the program, with the 2017 program year having net verified savings of roughly five times that of the 2016 program year. Therefore, much of the key observations from the 2017 local program impact evaluation reflect those found in the 2016 program year, but are considered important enough to warrant their inclusion again this year:

- Relative to 2016 results, the 2017 BRI local program grew substantially in both gross reported savings. Gross reported energy and summer peak demand savings increased 386% and 335%, respectively, between 2016 and 2017.

- Similar to the gross reported savings, net verified energy savings increased substantially, with an increase of 469% and 448% for energy and summer peak demand savings, respectively. The higher percent difference in net verified savings compared to the percent difference in gross reported savings between 2016 and 2017 program years is indicative of both the higher realization rates and net-to-gross values found in 2017 compared to 2016. However, the net-to-gross ratios contributed much more to the higher 2017 net verified savings, with their ratios increasing over the 2016 net-to-gross ratios by 13.2% and 31.9% for energy and summer peak demand, respectively. Meanwhile, realization rates between 2016 and 2017 only increased by 3.7% for energy and decreased by 0.9% for summer peak demand.

<table>
<thead>
<tr>
<th>Program Year</th>
<th>Energy</th>
<th>Peak Demand</th>
<th>Energy</th>
<th>Peak Demand</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>60.7%</td>
<td>60.9%</td>
<td>87.3%</td>
<td>87.3%</td>
</tr>
<tr>
<td>2017</td>
<td>64.4%</td>
<td>60.0%</td>
<td>100.5%</td>
<td>119.2%</td>
</tr>
</tbody>
</table>
• Measure-level data submitted to IESO sometimes did not align with the program’s menu of measure types and did not reflect a single measure – i.e. the use of “Business_Refrigeration_Program” as a measure in the measure-level data.

**Recommendation:** Data submitted to IESO should contain a complete set of measure and project level data. Consider setting up a standard list of measure options to select from during data entry (e.g. Microsoft Excel’s ‘data validation’ feature) to avoid non-standard entries.

• Measure descriptions, such as ECM fan horsepower or LED case lighting length, were already captured in the program’s tracking database, but were not differentiated in savings values from the broader measure type.

**Recommendation:** Breaking out estimated savings by broad measure types (e.g. ECM evaporator fan motor) into specific measures (e.g. 1/20 Horsepower ECM evaporator fan motor) can allow for an improved precision in savings estimates. This is particularly pertinent to the ECM fan motors, as motor sizes vary substantially and application types differ (condenser vs. evaporator).

**Recommendation:** To ensure consistent and transparent savings calculations, it is recommended that the program adopt standard savings algorithms for each offered measure or deemed savings values for common measure sub-types (e.g. ECM fan motor horse powers, case lighting by foot length).

• As was the case in the 2016 program year, the ECM fan motor replacement measure provided the program the majority of the program energy savings (60%) while also being a very cost effective measure, with TRC ratios of 2.7 to 4.8. These TRC ratios do not include program administrative costs but are useful for comparing among program measures.

**Recommendation:** It is recommended that future implementation of this program maintain a focus on ECM fan motors.

### 8.1.2 Net-to-Gross Key Observations

The key observations from the 2017 local program impact evaluation pertaining to net-to-gross include the following:

• Participant feedback indicates moderate levels of free-ridership (21.3%). The responses show that the program helped over one-half (57%) of the participants complete projects they would have had to cancel, delay, or reduce in size or scope. Room for improvement exists in terms of identifying customers most in need of the program’s support, as close to one-fourth (15%) of participants would have done the exact same upgrade in the absence of the program. However, when these same nine respondents were asked if they would have had the funds to cover the full cost of the same exact upgrade on their own, only two said they definitely would have had the funds. This indicates that the
The program may have helped the other seven respondents in some capacity. The high Energy NTG score that was achieved in PY 2017 (100.5%) can largely be attributed to the amount of Spillover achieved (21.7%).

**Recommendation:** The program should continue to work on identifying and targeting customers who are most in need of support, and who would not be able to install the equipment without the program.

### 8.2 Process Evaluation

The key observations and recommendations from the 2017 program process evaluation include the following:

- Most surveyed participants (79%) were very satisfied with the program overall, and 84% would likely recommend the program to others. Participants were less satisfied with the energy savings achieved by the equipment upgrade (48% satisfied). Program delivery agent staff indicated the program needs to reach past the “low hanging fruit” to the harder-to-reach customers. A lack of proper education on potential savings and the challenges with providing long-term savings were the main barriers mentioned by program delivery agents, the program refrigeration technician, and the motor supplier. The refrigeration technician and motor supplier stressed the importance of ensuring that the program delivery agents can clearly describe the savings and payback periods of equipment to customers when conducting the audits to ensure the acceptance of new technologies and products (such as ECM motors). Given that the program delivery agents are tasked with assessing, and then deciding the energy-saving opportunities to recommend to the customer when they are onsite conducting audits; it is critical that they have the education, guidance, and resources necessary to communicate the benefits of the program to the customer.

**Recommendation:** Ensure that program delivery agents are well-versed in describing related savings opportunities and payback periods to customers when communicating about the program, especially when conducting audits. Program staff can leverage the established relationships to enhance the program experience by helping program delivery agents better educate customers on the potential energy savings.

**Recommendation:** Identify opportunities to educate customers on the energy savings potential of program-incentivized measures. The program could consider direct measurement of energy savings to develop additional case studies that could be used as “testimonials” of verified energy savings. Program materials and market outreach should also be refined to clearly describe the savings opportunities and payback periods to customers.
The motor supplier and refrigeration technician appear to have contradictory perspectives on equipment availability. The motor supplier reported there were “no product or supply-related issues.” However, the refrigeration technician reported that shortage of program qualifying ECM motors was growing into a “consistent issue.”

**Recommendation:** Clarify the program needs between the supplier and refrigeration technician and improve communication pathways to ensure adequate available supply of product. This could be made possible by creating more opportunities for program partners to discuss implementation constraints or by expanding the number of program suppliers that support the program to alleviate any bottlenecks in supply.

Fifteen percent of surveyed participants said that they were not satisfied with the level of the incentive. Three surveyed participants indicated frustrations with the technician and/or equipment options offered by the technician, and two surveyed participants suggested expanding the equipment options covered by the program. The program delivery agent suggested streamlining the assessment and installation process by implementing a more “turn-key” type service, whereby the program delivery agent could be made responsible for all lead generation (rather than the LDC), and, in some instances, installations. For small business customers, it may alleviate the amount of time they need to dedicate to participating in the program.

**Recommendation:** Consider reviewing incentive types and levels and equipment covered for alignment with customer needs as it is feasible.

**Recommendation:** As the program has currently expanded to a province-wide program, consider implementing and promoting a BRI refrigeration technician network as a means of recommending quality technicians to program participants.

**Recommendation:** Improve customer experience by streamlining the process as much as possible. This could involve implementing even more of a “turn-key” service where possible to simplify the process for participants.
Appendix A  Additional Process and NTG Results

The following figures are the expanded results from the process and NTG evaluation of the BRI Local Program. They are meant to provide additional support to the analysis summary. All key observations from the analysis are discussed in the main body of the report.

Figure A 1: Participant Motives for Participating in the BRI Local Program Expanded Results (n=69)

- **Energy savings**: 3% (1% no role), 16% (2), 77% (4), 3% (5)
- **Easy to participate**: 4% (1), 12% (2), 13% (3), 61% (4), 6% (5)
- **To be "green" or "sustainable"**: 9% (1), 7% (2), 12% (3), 28% (4), 33% (5), 6% (N/A), 6% (Don't Know/Refused)
- **Comfort and/or productivity**: 10% (1), 6% (2), 14% (3), 22% (4), 38% (5), 3% (N/A), 7% (Don't Know/Refused)
- **Reliable equipment**: 10% (1), 7% (2), 23% (3), 13% (4), 30% (5), 7% (N/A), 9% (Don't Know/Refused)
Figure A 2: BRI Participant Satisfaction Expanded Results (n=66)

The program overall
- 5% 3% 12% 35% 44% 2%
Program technical study or report
- 2% 50% 50% 2%
Contractor work quality
- 2% 11% 33% 52% 2%
Utility rep interactions
- 2% 11% 29% 53% 3%
Time to receive incentive
- 2% 14% 27% 53% 3%
IESO rep interactions
- 3% 12% 18% 59% 5%
EM&V contractor work quality
- 2% 12% 27% 48% 6%
Auditor work quality
- 11% 30% 44% 6% 8%
Equipment performance
- 6% 3% 14% 35% 33% 9%
Incentive dollar amount
- 6% 9% 11% 17% 38% 8% 12%
Energy savings
- 6% 6% 18% 23% 26% 20%

1 = Not at all satisfied  2  3  4  5 = Completely satisfied  N/A  Don’t Know/Refused

Figure A 3: BRI Participant Program Recommendation Expanded Results (n=64)

Likelihood of recommending the program to others?
- 3% 8% 23% 61% 2%

1 = Not at all likely  2  3  4  5 = Extremely likely  Don’t know
### Figure A 4: Participant Satisfaction with Program Materials Expanded Results (n=69)

- **The program application was easy to complete**
  - 1% 10% 19% 62% 4%
  - 3%

- **Program materials provided to you by IESO were clear**
  - 3% 16% 26% 41% 12%
  - 3%

- **Program materials provided to you by your utility were clear**
  - 4% 17% 25% 41% 10%
  - 3%

- **Program materials provided to you by IESO were sufficient**
  - 4% 19% 26% 35% 13%
  - 3%

- **Program materials provided to you by your utility were sufficient**
  - 9% 14% 28% 33% 13%

- 1=Do not agree at all  2  3  4  5=Completely agree  Don’t know/Refused

### Figure A 5: Influence on Participant Upgrade Decision Expanded Results (n=60)

- **Availability of the program incentive**
  - 14% 15% 56% 12%
  - 3% 2%

- **Information and recommendations provided to you by an LDC representative**
  - 12% 5% 12% 29% 31% 10%
  - 2% 3%

- **Information and recommendations provided to you by an IESO representative**
  - 15% 14% 27% 27% 12%
  - 3%

- **Previous experience with any energy saving program**
  - 31% 19% 32% 12%
  - 3% 2%

- **Marketing materials provided by your LDC about the program (email, direct mail, etc.)**
  - 17% 14% 24% 27% 14%
  - 3%

- **Information or recommendations provided from auditors, contractors, vendors or suppliers associated with the program**
  - 24% 5% 10% 27% 19% 12%
  - 3%

- **Results of audits or technical studies done through this or another program provided by IESO or your LDC**
  - 25% 7% 7% 20% 20% 7% 14%

- 1=No role at all  2  3  4  5=Great role  N/A  Don’t know/Refused
Figure A 6: Influence of BRI Local Program on Equipment Installed Outside the Program Expanded Results (n=14)

- Fan (n=5) 20% 40% 20% 20%
- Motor/Pump upgrade (n=4) 25% 50% 25%
- Lighting (n=6) 17% 17% 33% 17% 17%
- ENERGY STAR® Appliance (n=1) 100%
- Lighting controls (n=1) 100%

1 = No influence at all  2  3  4  5 = Great influence
Appendix B  Savings and Realization Rates per Measure Sub-Type

Average reported savings, verified savings, and realization rates for each measure sub-type sampled in the BRI program.

**Figure B 1: Measure Sub-Type Realization Rates**

<table>
<thead>
<tr>
<th>Measure</th>
<th>Sub-Type</th>
<th>Reported kWh</th>
<th>Verified kWh</th>
<th>Reported kW</th>
<th>Verified kW</th>
<th>Realization Rate kWh</th>
<th>Realization Rate kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECM Evaporator Fan Motor</td>
<td>1/15 HP ECM Evaporator Fan PSC Motor Replacement</td>
<td>1007</td>
<td>497</td>
<td>0.12</td>
<td>0.06</td>
<td>49%</td>
<td>51%</td>
</tr>
<tr>
<td>ECM Evaporator Fan Motor</td>
<td>1/15 HP ECM Evaporator Fan SP Motor Replacement</td>
<td>1007</td>
<td>1267</td>
<td>0.12</td>
<td>0.15</td>
<td>126%</td>
<td>127%</td>
</tr>
<tr>
<td>ECM Evaporator Fan Motor</td>
<td>1/20 HP ECM Evaporator Fan PSC Motor Replacement</td>
<td>1007</td>
<td>383</td>
<td>0.12</td>
<td>0.05</td>
<td>38%</td>
<td>37%</td>
</tr>
<tr>
<td>ECM Evaporator Fan Motor</td>
<td>1/20 HP ECM Evaporator Fan SP Motor Replacement</td>
<td>1007</td>
<td>1104</td>
<td>0.12</td>
<td>0.13</td>
<td>110%</td>
<td>108%</td>
</tr>
<tr>
<td>ECM Evaporator Fan Motor</td>
<td>24 Watt ECM Evaporator Fan Motor Replacement</td>
<td>1007</td>
<td>450</td>
<td>0.10</td>
<td>0.05</td>
<td>45%</td>
<td>52%</td>
</tr>
<tr>
<td>ECM Evaporator Fan Motor</td>
<td>16 Watt ECM Evaporator Fan Motor Replacement</td>
<td>1007</td>
<td>478</td>
<td>0.10</td>
<td>0.05</td>
<td>47%</td>
<td>55%</td>
</tr>
<tr>
<td>A19 LED Bulb</td>
<td>9 Watt ECM Evaporator Fan Motor Replacement</td>
<td>1007</td>
<td>183</td>
<td>0.12</td>
<td>0.02</td>
<td>18%</td>
<td>19%</td>
</tr>
<tr>
<td>A19 LED Bulb</td>
<td>9 Watt ECM Evaporator Fan Motor Replacement - Sq. Frame</td>
<td>1007</td>
<td>194</td>
<td>0.11</td>
<td>0.02</td>
<td>19%</td>
<td>21%</td>
</tr>
<tr>
<td>LED Case Lighting</td>
<td>12 Watt LED A19 Bulb - CFL</td>
<td>133</td>
<td>32</td>
<td>0.01</td>
<td>0.01</td>
<td>24%</td>
<td>88%</td>
</tr>
<tr>
<td>LED Case Lighting</td>
<td>12 Watt LED A19 Bulb - Incandescent</td>
<td>133</td>
<td>269</td>
<td>0.01</td>
<td>0.06</td>
<td>202%</td>
<td>615%</td>
</tr>
<tr>
<td>LED Case Lighting</td>
<td>36&quot; LED Case Lighting - Canopy - (T8)</td>
<td>190</td>
<td>49</td>
<td>0.08</td>
<td>0.01</td>
<td>26%</td>
<td>10%</td>
</tr>
<tr>
<td>LED Case Lighting</td>
<td>36&quot; LED Case Lighting - Shelf - (T8)</td>
<td>190</td>
<td>45</td>
<td>0.07</td>
<td>0.01</td>
<td>24%</td>
<td>21%</td>
</tr>
<tr>
<td>LED Case Lighting</td>
<td>48&quot; LED Case Lighting - Canopy - (T8)</td>
<td>190</td>
<td>83</td>
<td>0.06</td>
<td>0.01</td>
<td>44%</td>
<td>23%</td>
</tr>
<tr>
<td>LED Case Lighting</td>
<td>48&quot; LED Case Lighting - Center - (T8)</td>
<td>190</td>
<td>49</td>
<td>0.06</td>
<td>0.01</td>
<td>26%</td>
<td>15%</td>
</tr>
<tr>
<td>LED Case Lighting</td>
<td>48&quot; LED Case Lighting - Left - (T8)</td>
<td>190</td>
<td>76</td>
<td>0.07</td>
<td>0.01</td>
<td>40%</td>
<td>18%</td>
</tr>
<tr>
<td>LED Case Lighting</td>
<td>48&quot; LED Case Lighting - Right - (T8)</td>
<td>190</td>
<td>71</td>
<td>0.07</td>
<td>0.01</td>
<td>37%</td>
<td>17%</td>
</tr>
<tr>
<td>LED Case Lighting</td>
<td>48&quot; LED Case Lighting - Shelf - (T8)</td>
<td>190</td>
<td>54</td>
<td>0.06</td>
<td>0.01</td>
<td>28%</td>
<td>17%</td>
</tr>
<tr>
<td>LED Case Lighting</td>
<td>60&quot; LED Case Lighting - Center - (T8)</td>
<td>190</td>
<td>236</td>
<td>0.06</td>
<td>0.04</td>
<td>124%</td>
<td>71%</td>
</tr>
<tr>
<td>LED Case Lighting</td>
<td>72&quot; LED Case Lighting - Right - (T12)</td>
<td>190</td>
<td>712</td>
<td>0.05</td>
<td>0.08</td>
<td>375%</td>
<td>163%</td>
</tr>
<tr>
<td>Clean Condenser Coils</td>
<td>Clean condenser coils - Cooler</td>
<td>289</td>
<td>95</td>
<td>0.06</td>
<td>0.02</td>
<td>33%</td>
<td>26%</td>
</tr>
<tr>
<td>Clean Condenser Coils</td>
<td>Clean condenser coils - Freezer</td>
<td>243</td>
<td>153</td>
<td>0.02</td>
<td>0.03</td>
<td>63%</td>
<td>109%</td>
</tr>
<tr>
<td>Strip Curtains</td>
<td>Strip Curtains - Walk-in Cooler</td>
<td>480</td>
<td>563</td>
<td>0.10</td>
<td>0.06</td>
<td>117%</td>
<td>63%</td>
</tr>
<tr>
<td>Strip Curtains</td>
<td>Strip Curtains - Walk-in Freezer</td>
<td>548</td>
<td>1731</td>
<td>0.10</td>
<td>0.20</td>
<td>316%</td>
<td>199%</td>
</tr>
</tbody>
</table>
Nexant Canada, Inc.
TD Canada Trust Tower
161 Bay Street, 27th Floor
M5J 2S1 Toronto
Canada

www.nexant.com