2014 EVALUATION OF INDUSTRIAL ENERGY EFFICIENCY PROGRAMS

INDEPENDENT ELECTRICITY SYSTEM OPERATOR

Final Report

December 2015
ABBREVIATIONS

BDM  Business Development Manager
BPA  Bonneville Power Administration
CI   Capital Incentives
CRM  Customer Relationship Management
DES  Detailed Engineering Study
EM   Energy Managers
EEM  Embedded Energy Manager
EMS  Energy Management Systems
EMIS Energy Management Information System
EUL  Effective Useful Life
FTE  Full-time Equivalent
IAP  Industrial Accelerator Program
IESO Independent Electricity System Operator
KAM  Key Account Manager
KPI  Key Performance Indicator
LC   Levelized Delivery Cost
LDC  Local Distribution Company
M&V  Measurement and Verification
M&T  Monitoring and Targeting
NRCan Natural Resources Canada
NPV  Net Present Value
NTGR Net-to-Gross Ratio
OA   Opportunity Accelerator
OPA  Ontario Power Authority
PES  Preliminary Engineering Study
PI   Project Incentives
POP  Performance Optimization Program
PPM  Program Performance Metrics
PSUI Process and Systems Upgrade Initiatives
REM  Roving Energy Manager
SEBs: Social-Economic Benefits
SEM: Strategic Energy Management
TR: Technical Reviewer
VFD: Variable Frequency Drive
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EXECUTIVE SUMMARY

The evaluation team, comprised of Econoler and Cadmus experts, was commissioned to perform the 2014 impact and process evaluation of the Industrial Accelerator Program (IAP) and the Process and Systems Upgrade Initiatives (PSUI).

Summary of Evaluation Goals and Objectives

The goals and objectives of the evaluation were the following:

› Impact Evaluation: To determine, with a high level of confidence, the annual verified gross energy savings and peak demand reductions of the two targeted programs and associated enabling initiatives.

› Savings Attribution: To establish the verified annual net energy and demand savings resulting from the programs and determine the level of program-driven savings attribution by employing a comprehensive and transparent methodology that factors in both free-ridership and participant spillover.

› Process Evaluation: To assess both programs’ overall effectiveness and comprehensiveness in terms of processes and delivery.

Summary of Impact Evaluation Results

IAP and PSUI Programs

The IAP is offered to all companies connected to the transmission system. As of 2014, it includes financial support through two different initiatives: Process and Systems and Retrofit. In 2014, three projects were completed under the Process and Systems initiative, and five projects under the Retrofit initiative.

The PSUI is offered to companies connected to the distribution systems of local distribution companies (LDCs) and is comprised of Capital Incentive (CI) initiatives and Enabling Initiatives. The Enabling Initiatives include Engineering Studies, Opportunity Accelerator (OA), which helps facilities to identify electrical efficiency opportunities, Energy Managers (EM) and Monitoring and Targeting (M&T). In 2014, 10 projects were completed under the CI initiative, 379 under the EM initiative and 2 under the M&T initiative.
Savings Results

The impact evaluation revealed that the IAP and the PSUI together achieved 150.567 GWh in verified gross annual energy savings and 19.82 MW in verified gross demand savings.

The initiative that generated the largest total energy and demand savings was the PSUI Capital Projects, followed by the PSUI Energy Managers and the IAP Capital Projects. In comparison, the IAP Retrofit initiative and the M&T initiative yielded significantly lower levels of savings.

Overall program realization rates for demand savings and energy savings were 95% and 97%, respectively. These high rates indicate that, overall, the reported savings were accurate and did not require significant adjustments to be made by the evaluation team.

All the initiatives achieved a program realization rate above 90%, except for the PSUI M&T initiative. PSUI M&T had a realization rate of 36% for energy savings and 59% for demand savings. Its relatively low rates are due to the fact that the reported savings were based on both the incented and non-incented measures resulting from the M&T systems, while the Evaluator adjusted the verified savings to include only non-incented measures (to avoid double counting).

Interviews conducted with participants showed that no measurable spillover occurred for either program. However, some level of free-ridership was observed in most initiatives. The initiatives’ net-to-gross ratios (NTGRs) for demand savings and energy savings range from 0.79 to 1.0. The two programs’ overall combined NTGR is 0.83 for the demand savings and 0.84 for energy savings.

<table>
<thead>
<tr>
<th>Program Metric</th>
<th>IAP Process and Systems</th>
<th>IAP Retrofit</th>
<th>PSUI Capital Projects</th>
<th>PSUI Energy Managers</th>
<th>PSUI M&amp;T</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Projects/Measures</td>
<td>3</td>
<td>5</td>
<td>10</td>
<td>379</td>
<td>2</td>
<td>398</td>
</tr>
<tr>
<td>Program Realization Rate for Energy Savings (%)</td>
<td>116%</td>
<td>210%</td>
<td>96%</td>
<td>96%</td>
<td>36%</td>
<td>97%</td>
</tr>
<tr>
<td>Program Realization Rate for Demand Savings (%)</td>
<td>114%</td>
<td>119%</td>
<td>96%</td>
<td>91%</td>
<td>59%</td>
<td>95%</td>
</tr>
<tr>
<td>Verified Annual Gross Energy Savings (GWh)</td>
<td>13.773</td>
<td>0.899</td>
<td>90.464</td>
<td>44.929</td>
<td>0.503</td>
<td>150.567</td>
</tr>
<tr>
<td>Verified Gross Demand Savings (MW)</td>
<td>1.556</td>
<td>0.107</td>
<td>12.287</td>
<td>5.768</td>
<td>0.102</td>
<td>19.820</td>
</tr>
<tr>
<td>Net-to-gross Ratio for Energy Savings</td>
<td>0.92</td>
<td>0.88</td>
<td>0.80</td>
<td>0.90</td>
<td>1.00</td>
<td>0.84</td>
</tr>
<tr>
<td>Net-to-gross Ratio for Demand Savings</td>
<td>0.92</td>
<td>0.88</td>
<td>0.79</td>
<td>0.90</td>
<td>1.00</td>
<td>0.83</td>
</tr>
<tr>
<td>Net Annual Energy Savings (GWh)</td>
<td>12.671</td>
<td>0.793</td>
<td>72.053</td>
<td>40.436</td>
<td>0.503</td>
<td>126.457</td>
</tr>
<tr>
<td>Net Peak Demand Savings (MW)</td>
<td>1.432</td>
<td>0.094</td>
<td>9.692</td>
<td>5.191</td>
<td>0.102</td>
<td>16.511</td>
</tr>
</tbody>
</table>
Summary of Process Evaluation Results

Participation by Transmission Connected Customers and LDCs

Over one-half of IAP-eligible customers and LDCs have been involved in at least one industrial program initiative.

Table 2: Program Participation

<table>
<thead>
<tr>
<th>Population</th>
<th>Participants in at Least 1 Initiative</th>
<th>Non-participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>IAP-eligible Customers (n=60)</td>
<td>68%</td>
<td>32%</td>
</tr>
<tr>
<td>LDCs (n=76)</td>
<td>74%</td>
<td>26%</td>
</tr>
</tbody>
</table>

Project Applications

The following table summarizes the number of individual applications submitted to the industrial programs. Although a very small percentage of projects have been completed (2% to 5%) in comparison to the number of engineering study applications received, many projects are still in the process of being completed. This situation can be partly explained by the lengthy application process required for the engineering study and the capital incentive, with some projects taking over a year to complete.

Table 3: Project Applications Summary

<table>
<thead>
<tr>
<th>Initiative</th>
<th>IAP</th>
<th>PSUI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering Study Applications</td>
<td>158</td>
<td>673</td>
</tr>
<tr>
<td>Process and Systems/Capital Incentive Applications</td>
<td>65</td>
<td>111</td>
</tr>
<tr>
<td>Completed Capital Projects</td>
<td>9</td>
<td>16</td>
</tr>
<tr>
<td>EEM/REM Applications</td>
<td>NA</td>
<td>77</td>
</tr>
<tr>
<td>M&amp;T Applications</td>
<td>NA</td>
<td>33</td>
</tr>
</tbody>
</table>
Barriers

› Customers cited a number of barriers to participation, including: the contract’s complexity, rigid and strict contract terms, a slow approval process for CI and engineering studies, the large amount of documentation required, and the lack of staff resources. Despite these barriers, many customers found the incentives sufficiently attractive to persuade them to start undertaking the effort.

› Most trade allies believed that the lack of internal project funding was a barrier for customers who were seeking to complete a capital incentive project.

› LDC staff and IESO business development managers (BDMs) did not perceive lack of financing as a barrier. Some customers, however, (58% of PSUI Embedded Energy Managers (EEMs) and 54% of IAP partial participants) indicated that financing would aid participation.

Program Awareness

› IAP participants (90%) and partial-participants (78%) learned about IAP through their BDMs.

› Most EEMs (90%) learned of PSUI through their LDCs.

› Trade allies learned about the IAP and PSUI programs through their customers, the LDCs, IESO, word of mouth, and the Technical Reviewer (TR).

Program Design

› IAP customers tend to bypass the preliminary engineering study (PES), going directly to the detailed engineering study (DES) (or even self-funding the DES) to speed up the capital incentive application process.

› LDCs also encourage their customers to directly conduct the DES, because a customer completing a PES would still have to complete a DES to apply for a capital incentive.

› LDCs consider the PSUI Energy Managers initiative a success. Energy managers, however, faced challenges in reaching their non-incentivized savings targets after the first year, once the “low-hanging fruit” (i.e., easy opportunities) had been picked.

Satisfaction

› The majority of IAP customers (71%) expressed satisfaction with the program. Customers reported the least satisfaction (50%) with the capital incentive initiative due to its burdensome application process.

› Most EEMs (91%) expressed satisfaction with PSUI. All EEMs said they were somewhat or very satisfied with the capital incentive initiative.

› EEMs expressed satisfaction with the resources and support provided to them, with 81% satisfied with the SharePoint Hub, 93% satisfied with training they attended, and 96% satisfied with the program’s support.
Best Practices Review

- The best practices review findings indicated that customer participation improves when providers reduce the paperwork burden brought on by lengthy and complicated applications, contracts, and M&V document requirements. Programs and customers also benefit when providers take a common sense approach to imposing non-performance penalties, balancing achieved energy savings against remaining financial risks to the program or damage to customer relationships that could result in customers moving their facilities outside of the territory or state.

- Although all the jurisdictions studied utilized best practices in some areas, none of them employed these practices across all of their program areas. IESO’s programs are aligned with some of these best practices, such as offering a comprehensive menu of services that targets large and small industrial customers and utilizing engineering studies to drive participation in their other programs.
INTRODUCTION

The evaluation team, comprised of Econoler and Cadmus experts, was assigned to perform the 2014 impact and process evaluation of the Industrial Accelerator Program (IAP) and the Process and Systems Upgrade Initiatives (PSUI). The goals and objectives of the evaluation are the following:

› **Impact Evaluation:** To determine, with a high level of confidence, the verified annual gross energy savings and peak demand reductions of the two targeted programs and associated enabling initiatives.

› **Savings Attribution:** To establish the verified annual net energy and demand savings resulting from the programs and determine the level of program-driven savings attribution by employing a comprehensive and transparent methodology that factors in both free-ridership and participant spillover.

› **Process Evaluation:** To assess both programs’ overall effectiveness and comprehensiveness in terms of processes and delivery.

The present report describes the programs and the methodology used for their evaluation. The findings of the impact evaluation, savings attribution and process evaluation are also presented along with recommendations aimed at improving the IAP and PSUI.
1 PROGRAM BACKGROUND AND DESCRIPTION

In the province of Ontario, over 50 percent of all the industrial-sector electricity consumption is accounted for by approximately 200 companies, which are all considered as large electricity consumers. About a quarter of these companies are connected to the high-voltage transmission system, while the remaining companies are connected to local distribution companies (LDCs). Given the high consumption of these industrial companies, the Ontario Power Authority (OPA) launched the Industrial Accelerator Program (IAP) in 2010 and the Process and Systems Upgrade Initiatives (PSUI) in 2011. For both programs, the OPA contracted an external firm to act as a technical reviewer (TR). The TR is responsible for: (1) reviewing the savings calculations, (2) developing the measurement and verification (M&V) plans for applicable projects, (3) processing the applications in PSUI and (4) providing technical support to the LDC. On January 1, 2015, the OPA merged with the Independent Electricity System Operator (IESO) to create a new organization that combines the OPA and IESO mandates.

1.1 Overview of the Industrial Accelerator Program

Launched in 2010, the IAP provides transmission-connected companies with incentives for their electric efficiency projects. The IAP provides financial support through two initiatives: Process and Systems and Retrofit. The major focus of the 2014 IAP evaluation has been placed on the Process and Systems Initiative. Following is a brief description of these three initiatives:

1 The Process and Systems initiative is a five to 10-year contractual commitment to assist customers in making their major processes and equipment more energy-efficient. Incentives include funding for Preliminary Engineering Studies (PES) and Detailed Engineering Studies (DES), and project incentives of up to $10 million per application. Incentives are available under four tracks: (1) Projects, (2) Micro-projects, (3) Portfolio, and (4) Self-Generation.

2 The Retrofit initiative, launched in December 2013, is more flexible in terms of contractual duties than the Process and Systems initiative, thus allowing customers to withdraw at any time. The program provides customers with incentives to purchase high-efficiency equipment. Popular retrofits include lighting, HVAC, motors, variable frequency drives, and new control systems. The Retrofit initiative includes three tracks: (1) Prescriptive, (2) Engineered and (3) Custom.

Table 4 summarizes the eligibility criteria and available incentives of each IAP initiative.

---

1 Financial incentives for capital projects can be higher than $10 million with the board’s approval.
Table 4: Key Attributes of the IAP Initiatives

<table>
<thead>
<tr>
<th>Initiative</th>
<th>Eligible Projects</th>
<th>Incentive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process and Systems</td>
<td>1) Projects: minimum 350 MWh, maximum $10 million incentive.</td>
<td>Financial incentives of up to $10 million for capital projects based on the lesser of:</td>
</tr>
<tr>
<td></td>
<td>2) Micro-projects: minimum 100 MWh.</td>
<td>› $230 per MWh in annual electricity savings;</td>
</tr>
<tr>
<td></td>
<td>3) Portfolio: two or more projects, maximum $10 million incentive.</td>
<td>› 70% of the eligible project costs; or</td>
</tr>
<tr>
<td></td>
<td>4) Self-generation: less than 20 MW.</td>
<td>› Achieving a one-year simple payback.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Preliminary engineering studies funded up to $10,000. Detailed engineering studies for viable energy projects fully funded. Study funding is deducted from total incentive amount.</td>
</tr>
<tr>
<td>Retrofit</td>
<td>1) Prescriptive track: minimum incentive of $100.00.</td>
<td>Financial incentives cover up to 50% of eligible costs.</td>
</tr>
<tr>
<td></td>
<td>2) Engineered and Custom tracks: minimum estimated demand reduction of 1 kW of first-year annual energy savings of 2,000 kWh.</td>
<td>1) Prescriptive track: incentives are offered on a per-unit basis.</td>
</tr>
<tr>
<td></td>
<td>Projects must deliver energy savings for at least 48 months.</td>
<td>2) Engineered and Custom tracks: incentives are based on the greater of:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>For lighting projects:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>› $400 per KWh of demand savings; or</td>
</tr>
<tr>
<td></td>
<td></td>
<td>› $0.05 per KWh of first-year electricity savings.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>For non-lighting projects:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>› $800 per KWh of demand savings; or</td>
</tr>
<tr>
<td></td>
<td></td>
<td>› $0.10 per KWh of first-year electricity savings.</td>
</tr>
</tbody>
</table>

Participants from the IAP can choose between receiving their incentive payments during their project (Performance Security option) or once the project is completed and that measures have been verified (Incentive Security option). When choosing the latter, participants must provide the IESO with a letter of credit and demonstrate a performance requirement of 90% of the electricity savings anticipated by the TR.
1.2 Overview of the Process and Systems Upgrade Initiatives

Launched in 2011, the PSUI provides incentives to industrial customers served by LDCs so that all regional industrial customers have access to an incentive program to encourage them to improve energy efficiency. LDCs deliver PSUI program offerings on behalf of the IESO, with the the TR being responsible for making technical reviews of applications.

The PSUI is comprised of the following initiatives:

1. **Capital Incentives** (CI) covers energy-saving projects of various sizes for a minimum of 100 MWh in annualized electricity savings for Small Capital Projects and for 350 MWh for Projects. Financial incentives of up to $10 million for capital projects are based on the lesser of: (1) $200 per MWh in annual electricity savings; (2) 70% of the eligible project costs; or (3) achieving a one-year simple payback.

2. **Enabling Initiatives** do not offer incentives for measures implemented, but rather offer technical support, specialized staff and metering that help achieve non-incentivized savings or feed projects to the Capital Incentives initiative:
   
   - Engineering Studies offers 100% of study costs up to $10,000 in incentive funding for completing a Preliminary Engineering Study (PES), while a Detailed Engineering Study (DES) for viable energy projects is funded up to $50,000.
   
   - Opportunity Accelerator (OA) is a free service that provides a preliminary analysis and report on the potential electrical efficiency opportunities in a facility. These opportunities may be eligible for capital incentives projects.
   
   - Energy Managers (EM) (roving and embedded) offers funding for hiring the services of an energy manager who serves either (1) an eligible participant with one or more facilities and employed by the eligible participant (Embedded Energy Manager) or (2) multiple industrial facilities, when employed by the LDC or a group of LDCs (Roving Energy Manager). All energy managers funded through the PSUI must identify 0.3 MW of potential savings per year. Among these opportunities, some projects may benefit from Capital Incentives, but a minimum of 30% of the savings must be achieved through non-incentivized projects.
   
   - Monitoring and Targeting (M&T) provides funding for up to 80% of actual eligible costs (less any third-party contributions), or up to $75,000 per site, to purchase and install a monitoring and targeting system and make it operational. In addition, energy savings and demand savings targets are set for each site. These targets must be met over a full two-year period after the M&T system is installed.

Participants of Capital Incentives projects can choose between receiving their incentive payments during their project (Advanced Payment option) or once the project is completed and the measures have been verified (Deferred Payment option). If they choose the latter, participants must provide the IESO with a letter of credit and demonstrate a performance requirement of 80% of the electricity savings expected by the technical reviewer.
2 METHODOLOGY

This section presents the evaluation team and the methodology used to evaluate the IAP and the PSUI.

2.1 Presentation of the Team

To carry out the 2014 evaluation, Econoler and Cadmus have partnered with each other to form the evaluation team. Tasks were divided as follows:

› Econoler acted as the team leader and was responsible for the overall project management, including coordinating all evaluation activities, as well as reviewing all the deliverables. Econoler led the gross and net impact evaluation work.

› Cadmus was responsible of the process evaluation, as well as the surveys and interviews conducted as part of the evaluation. Cadmus also provided support for the impact evaluation activities.

In addition, Posterity was commissioned as a local sub-contractor to assist the evaluation team in conducting project desk review and on-site visits under Econoler’s supervision.

2.2 Methodological Model

Figure 1 illustrates the research strategy and data collection activities used for the 2014 process and impact evaluation. Copies of the data collection tools used are included in the appendices.
2.3 Methodology Description

This section describes each of the tasks carried out as part of the 2014 evaluation.

2.3.1 Program Documentation and Database Review

Analyzing documentation was the first task in the evaluation. At this stage, all of the available program information was reviewed.

The information analyzed was obtained primarily from the following sources:

› Monthly reports and dashboards
› Project tracking systems: I-Con and SharePoint
› Database extracts provided by the IESO or the TR
› Program websites:
   - http://www.industrialaccelerator.ca/

Figure 1: Methodological Model
2.3.2 Interviews with IESO and the TR Staff

The evaluation team conducted seven interviews with the IESO staff in August 2014 to (1) discuss the evaluation plan and schedule, (2) learn about the two program management systems (SharePoint and i-Con), (3) plan the on-site visits and (4) understand how demand and net savings are calculated in the database.

In August 2014, the evaluation team also conducted three interviews with the TR staff, who are responsible for monitoring the project pipeline, making a technical review of each project, as well as measurement and verification (M&V). The goal of these interviews was to learn about the TR’s involvement in the IAP and the PSUI and its processes in preparation for the on-site visits and project desk reviews to be conducted by the evaluation team as part of the 2014 evaluation.

2.3.3 Project Reviews and On-site Visits

As part of the 2014 impact evaluation, two main types of project reviews were conducted.

The first type, the IAP’s Process and System and the PSUI’s Capital Incentives projects, included a complete M&V procedure. So, their project reviews focused on the completeness and accuracy of this procedure to estimate energy and demand savings.

As for the second type, the smaller projects, such as Enabling Initiatives and IAP Retrofit, they generally had their savings established based on engineering calculations and limited metering activities. For these projects, the review process mainly involved validating the assumptions and equations used. As a result, the evaluation team developed a good understanding of the measures implemented to ensure that the savings substantiation methodology was thorough and adequate.

As part of the impact evaluation, the evaluation team reviewed 13 projects, whose M&V was completed in 2014, with three through the IAP Process and Systems initiative and ten through the PSUI Capital Incentives initiative. Following the desk review of these projects, an on-site visit was made to all but two of these projects.

When preparing for the on-site visits for those projects, the evaluation team developed a standardized data collection protocol to ensure consistency of the collected information and to provide the evaluation team with a map of the projects carried out on each of the eleven visited sites.

For the projects with no M&V conducted (IAP Retrofit and PSUI Enabling Initiatives), a shorter on-site visit protocol was prepared mainly to validate the equations and values used in the engineering calculations. Copies of the desk review and on-site visit protocols are included in Appendices I and II.
As part of the 2014 evaluation, 40 EM measures were selected to be reviewed, and on-site visits were conducted where possible. If the EM was not available for a visit or could not be met because of geographical constraints, the review was limited to a desk review, followed by a phone interview if necessary. The two M&T projects were reviewed, and one of the two M&T sites was visited. All the five 2014 IAP Retrofit projects were reviewed, and one of the two sites was visited.

### 2.3.4 Impact and Savings Attribution Analysis

The evaluation team used the result of its desk reviews and on-site visits to establish the verified energy and demand savings for each program initiative. In cases where the on-site visit provided additional information or information different from that contained in the project documentation, or where errors were found in the calculations, modifications to the engineering calculation were made to account for these new elements.

When an M&V plan and an M&V report were available, the impact evaluation focused on assessing the validity of the plan and the measured savings. Since demand savings are generally not measured as part of the M&V procedure, they were estimated based on the operation schedule validated on site and the power reduction, according to the IESO methodology.

The evaluation team also reviewed the effective useful life (EUL) used for each sampled project or measure to ensure that they were applied consistently. This value was then multiplied by verified annual savings to obtain lifetime verified savings.

Finally, the answers provided by the participant to the free-ridership and spillover questionnaires were used to calculate the net-to-gross ratio (NTGR) for both energy and demand savings for program initiatives where distortion effects were considered. The questionnaires were administered to participants either during the on-site visit (PSUI and IAP Retrofit) or during the participant phone survey (IAP Process and Systems). For Enabling Initiatives, distortion effects were considered nil. The NTGR calculated for each initiative was applied to gross savings to obtain net savings.

### 2.3.5 Process Interviews and Surveys

Table 5 gives an overview of the surveys and interviews the evaluation team completed as part of the process evaluation. The team conducted most of these by telephone, though the team used web-based surveys for the PSUI embedded energy managers (EEM). Using these interviews and surveys, the evaluation team collected feedback about the levels of satisfaction, barriers to participation, and program experience, as well as suggestions for improvements. The team also collected information on the following: awareness of and participation in the ISO 50001 standard; non-energy benefits; economic impacts; free-ridership; and other information required for the impact evaluation. The team developed interview guides and outreach plans in close coordination with the IESO project manager. The appendices provide copies of the guides used.
Table 5: Overview of Process Interviews and Surveys

<table>
<thead>
<tr>
<th>Program</th>
<th>Population</th>
<th>Sample Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>IAP</td>
<td>Participant/Partial Participant</td>
<td>10 Participants</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11 Partial Participants*</td>
</tr>
<tr>
<td>IESO Staff</td>
<td></td>
<td>4 Business Development Managers (BDMs)**</td>
</tr>
<tr>
<td>PSUI</td>
<td>LDC Staff</td>
<td>9 LDC Program Managers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 Roving Energy Managers (REMs)</td>
</tr>
<tr>
<td></td>
<td>Participant/Partial Participant</td>
<td>32 EEMs (via online survey)</td>
</tr>
<tr>
<td>Cross-cutting</td>
<td>Trade Ally</td>
<td>6 Engineering Firms</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 Installation Contractor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 Equipment Supplier</td>
</tr>
<tr>
<td></td>
<td>Technical Reviewer</td>
<td>2 TR staff</td>
</tr>
</tbody>
</table>

* A full participant is a customer who submitted an application for one or more Capital Incentives (CI) projects and a partial participant is a customer who submitted an application for engineering study funding but not for a CI project. During this process evaluation, some partial participants were in the process of submitting an application for an engineering study or had just submitted one; hence, they were still categorized as partial participants as they had not had sufficient experience with the CI program to be surveyed as full participants.

** One interviewee is not technically a BDM, but leads the BDM staff.

IAP Customer Survey Sampling Details

Customers applying for Process and Systems project funding are required to submit a DES outlining the energy-saving opportunity and expected savings. The engineering study can be self-funded or funded through IAP. Table 6 summarizes the customer survey respondents’ participation in the various IAP initiatives. Only one full participant in the survey self-funded its engineering study.

Table 6: Customer Survey Respondents’ Participation in IAP Initiatives

<table>
<thead>
<tr>
<th>IAP Initiative</th>
<th>Participants</th>
<th>Partial Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering Study Only</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Process and Systems Incentive Only</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Engineering Study and Process and Systems Incentive</td>
<td>9</td>
<td>-</td>
</tr>
<tr>
<td>Retrofit or Small Capital Program</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

PSUI Customer Sampling Details

Since the LDCs manage customer relations for PSUI, a comprehensive list of PSUI participants or partial participants and their contact information was not available to the evaluation team. To obtain end-use customer feedback, the evaluation team surveyed the EEMs because their contact information was available and their level of awareness of the program meant they were more likely to

2 DES is optional for small capital projects.
respond to evaluation questions. Perhaps, the EEMs are not really representative of the larger pool of PSUI participants and partial participants. To develop a better understanding of the PSUI experience, the evaluation team has included feedback gathered from LDC staff.

2.3.6 Industrial Program Best Practices and Benchmarking Review

The evaluation team identified best practices through a literature review and in-depth interviews with six utilities or government agencies in Canada and the United States.

Literature Review

The following documents were reviewed:

› Natural Resources Canada. EcoENERGY Efficiency for Industry program.

In-depth Interviews

Following the literature review, the evaluation team developed interview guides to address two types of program delivery, namely direct and indirect, which respectively correspond to the IAP (direct) and the PSUI (indirect). Direct programs are delivered to end-use customers (either wholesale transmission customers or retail customers receiving power through a local distribution company). Indirect programs are offered by power generation entities to local distribution companies for delivery to end-use customers.
The team selected the six providers interviewed based on recommendations from IESO staff and on the programs’ similarity to the IAP and PSUI programs. These organizations included the following:

- Three vertically integrated generation, transmission, and distribution utilities;
- One transmission and distribution utility;
- One power marketing organization; and
- One public benefits corporation that delivers electric and gas efficiency programs, but neither generates nor distributes energy.
- One of the six companies supplying both electricity and gas.

2.3.7 Process Evaluation Analysis

The evaluation team synthesized the findings by research topic based on evidence from the following sources: interviews with program staff; reviews of data tracking systems and other program materials; a review of best practices from other jurisdictions; and feedback from trade allies, participants, and other key populations.

2.3.8 Preparation of Reports

The results of the impact evaluation, including the adjustments made to each reviewed project, the summary by LDC and the high-level findings, were provided to the IESO in a predetermined format prior to the submission of this report.

This report provides a detailed description of the context and the impact evaluation work conducted by Econoler, the adjustments made to the reported savings, the final verified energy and demand savings and the possible improvements the IESO could make to its programs. This report also provides findings and recommendations resulting from the process evaluation conducted by Cadmus.
3 IMPACT EVALUATION AND SAVINGS ATTRIBUTION

3.1 Objective and Approach of the Impact Evaluation

The purpose of the impact evaluation is to determine the verified gross savings resulting from IAP and PSUI as well as to estimate the level of program-driven attribution, with due consideration of both free-ridership and spillover, in order to determine the net savings of the IAP and the PSUI in 2014. Both energy and summer peak demand savings were considered in this evaluation.

For IAP, the impact evaluation assessed the Process and Systems and Retrofit Initiatives. For PSUI, the Capital Incentives and Enabling Initiatives (Energy Managers and Monitoring and Targeting (M&T)) were assessed.

The approach used by the evaluation team varied according to the initiative evaluated. For projects under IAP Process and Systems and PSUI Capital Incentives, the impact evaluation involved a review of technical documentation and an on-site visit for each project submitted in 2014. The review of technical documentation focused on project review reports, M&V plans and M&V reports. During the on-site visits, the evaluation team validated the calculation inputs used in the technical documentation, such as equipment specifications, operation schedules of existing and new equipment as well as optimization strategies. In addition, during on-site visits, visual inspection was conducted along with in-depth discussions with technical staff members.

For Energy Managers non-incentivized measures, IAP Retrofit projects and M&T projects, the savings revision methodology was adapted to take into account the lower level of complexity of the measures implemented and the smaller amount of documentation available. In the case of Energy Managers, the evaluation team selected a sample of measures to be reviewed, which accounted for approximately 10% of all the measures submitted in 2014. The evaluation team then reviewed the calculations provided for each evaluated measure, and where available, the TR’s annual review of the Energy Manager application. The majority of reviews also included an on-site visit to confirm, by visual inspection, the installation of the measures and discuss the calculation methodology with the Energy Manager. When an on-site visit was not possible, the evaluation team did a desk review, and if necessary, gave the Energy Manager a phone call to discuss the adjustments made. In the case of IAP Retrofit, all five projects were reviewed, and two of those measures were subjected to a site visit, while both M&T projects were reviewed and one was visited.

Following this analysis, the evaluation team revised the reported annual energy and demand savings established by the IESO for each project or measure. For IAP Process and Systems, IAP Retrofit and PSUI Capital Incentives, energy and demand savings realization rates were then calculated for each project. Since all the projects implemented within 2014 were reviewed, no extrapolation of the sampled projects’ impact results was required.
For Energy Managers, the energy savings and demand savings realization rates were calculated for the whole sample, using a weighted average based on the savings of each measure. This realization rate was then extrapolated to all measures submitted in 2014.

The realization rate was calculated in the same manner for all the initiatives, using the verified annual gross savings and the reported gross annual savings by the IESO for all the reviewed projects. The realization rate calculations were carried out using the equations listed below.

\[
\text{Realization Rate (Energy)} = \frac{\text{Verified annual gross energy savings (GWh)}}{\text{Reported annual gross energy savings (GWh)}} \times 100\%
\]

\[
\text{Realization Rate (Demand)} = \frac{\text{Verified annual gross summer peak demand savings (MW)}}{\text{Reported annual gross demand savings (MW)}} \times 100\%
\]

3.2 Desk Review and On-site Visit Results

This section summarizes the findings from the desk review and on-site visits for each of the program initiatives.

**IAP Process and Systems and PSUI Capital Incentives**

For IAP Process and Systems and PSUI Capital Incentives, the project documentation for the majority of these projects was very well done and provided ample information needed to validate energy savings.

Most of the M&V plans and reports were IPMVP-compliant, and for most part, had all the necessary information required to assess the annual gross energy savings. These documents are very comprehensive and lay a good foundation for achieving a high level of accuracy in determining the annual gross energy savings.

However, one of the three IAP Process and Systems projects and three of the ten PSUI Capital Incentives projects had poor project documentation, as described below:

› In one IAP project, some of the measurements planned in the M&V plan were not performed. Furthermore, explanations for the calculation of the peak demand savings were incomplete. Due to a lack of information, the evaluation team could not adjust the savings. The evaluation team recommends that the M&V plan be strictly followed in future reporting periods.

› In two of the PSUI projects, the M&V plan had too small measurement boundaries, which failed to account for some significant interactive effects. The evaluation team recommends that the M&V plan of these two projects be revised for future reporting periods because there is a discrepancy between what the TR calculates and the actual savings.

› The M&V report of a third PSUI project was unclear with respect to the daily hours of operation. The evaluation team had to contact the TR to confirm the number of daily operating hours.
Another element to be improved on is for M&V plans to include a summary of the baseline equations and calculations used to determine the energy baseline. Moreover, the M&V process should be expanded to include both pre-implementation demand calculations in the M&V plan and the post-implementation demand calculations in the M&V reports. Specifically, the IESO should consider adding summer demand savings to the M&V plan of future projects, with a focus on projects with non-uniform demand profiles (i.e., refrigeration projects vs. manufacturing). Doing so would make it possible to identify the data to be collected and measured in order to develop the hourly load profiles during the summer peak season.

Overall, the details regarding the implemented projects under IAP Process and Systems and PSUI Capital Incentives closely matched what the evaluation team found on site during most of the visits. This year’s evaluation, however, shows that there is still room for improvement in the design of the M&V plans.

**IAP Retrofit**

The Evaluation team reviewed four IAP Retrofit projects, either through desk reviews or on-site visits. The documentation of these projects includes application forms, emails and project worksheets in MS Excel format. The Excel worksheets contain automated savings calculations for prescriptive measures, which are based on deemed unitary savings. The evaluation team’s review has revealed that the savings reported were generally much lower than the verified values calculated. This seems to indicate that deemed savings could be too conservative, though it should be noted that the number of projects reviewed was rather small for such general conclusion. In particular, the hours of operation claimed by the participants during site visits were always higher than the value used in the deemed savings calculation. In one lighting project, the site visit revealed that more efficient lamps were installed than what was noted in the project score card. The Evaluator recommends that the accuracy of deemed savings be reviewed again in future evaluations, on a potentially larger pool of projects.

**Energy Managers**

For the EM measures, the quality of the documentation varied, depending on whether or not the measures had been previously revised by the TR. When the measures had been revised, the quality of their documentation was good. For the unrevised projects, the evaluation team found that in many cases, savings had been estimated using methods that were not sufficiently precise for the level of savings obtained or the type of measures implemented. In one case, the energy manager had already reached its target savings for the reporting period and thus reported extremely conservative savings for one specific measure.
**Metering and Targeting**

One year and two years after the installation of the M&T system, the TR issues a report on savings upon analysis of projects implemented by the participants. The evaluation team reviewed these reports and found them to be clear and well-documented. The format and the level of information of the first-year reports differed from that of the second-year report, because they had different requirements. The evaluation team recommends adding the following two requirements in order to facilitate the evaluation process: (1) reporting the peak kW savings per project in the second-year reports, and (2) indicating whether each project was incentivized or not in the first-year reports. Furthermore, it was found that the energy savings in both the first-year and second-year reports were indicated in Megawatt-hours (MWh). The evaluation team recommends reporting those savings in kilowatt-hours (kWh) for the sake of higher accuracy.

Another issue encountered is that the savings currently reported by the TR include both incentivized and non-incentivized measures. The tracking system does not provide sufficient information to establish clearly the non-incentivized savings (which should be the ones reported for M&T, in order to avoid double-counting projects in other PSUI initiatives). However, this information is available in the annual reports.

### 3.3 Gross Savings Results

After the M&V plan and procedure were validated, the annual gross energy savings were verified using the results from the M&V reports. For some sites whose reporting had been completed on a full year’s basis, the results from their first annual M&V reports were used directly. In other cases, if reporting had been completed for only one to three-quarters, the energy savings measured during the M&V periods were extrapolated over the full year based on the number of days in a full year divided by the number of days in the reporting period(s). For each project, seasonal variations were analyzed to ensure that the extrapolation remained valid. These annual gross energy savings were considered valid for 2014 and over subsequent years throughout the effective useful life of the project implemented. Where appropriate, adjustments were made to take into account elements that were not captured by the M&V.

The verified gross summer peak savings were calculated by following the “EM&V Protocols and Requirements”\(^3\), which includes a standard definition of peak for calculating demand savings, as summarized in the table below. For the 2014 evaluation, the IESO required that summer peak be applied.

---

Peak savings estimates are to be based on the average demand reduction across the total number of hours. For instance, if a plant installed efficient lighting and shut off all of its lights at 5 p.m. (both before and after the implementation of the measure), demand savings would occur for only a part of the peak time (between 1 p.m. and 5 p.m.; therefore, for 4 hours of the 6-hour peak time block). In that case, the peak demand savings should be calculated using the following weighted average:

\[
\text{Peak demand savings} = \Delta W \times \frac{4\text{hrs}}{6\text{hrs}} + 0 \times \frac{2\text{hrs}}{6\text{hrs}} = 0.667\Delta W
\]

Similarly, if an energy efficiency measure was applied on an industrial process that is shut down for 4 weeks in July and August every year, the power reduction should be multiplied by a ratio of 9 weeks/13 weeks, to account for that 4-week period during which no savings occur.

For weather-sensitive measures or facilities with variable load characteristics, an alternative method to calculate peak demand savings can be employed and is summarized in the following table.
Capacity savings are calculated on the basis of a weighted average of the maximum demand reduction in each of the three months that occurs within the blocks. Maximum demand reductions usually occur at design conditions. For summer peak savings, the weight of June, July and August are respectively 30%, 39% and 31%.

Weather-sensitive measures are very likely to produce their maximum impacts at the same hour as the actual top system peak hour. One example is the replacement of a chiller for air-conditioning with a more efficient chiller. The savings could vary according to the weather conditions; maximum savings would occur when it is the hottest outside, which will most likely coincide with the system peak hours. Therefore, weather-sensitive measures can be properly credited for their good performance during the periods of electricity system stress by using a much narrower definition of peak, which is 3 individual hours in this case.

For every project and measure verified as part of this evaluation, the most appropriate definition of peak was selected according to the nature of the measures implemented and was applied to its peak demand savings calculation.

The EM&V Protocols and Requirements also define the acceptable methods for collecting data to be used in peak demand savings calculations. Direct methods should be favoured; this means that hourly power data is to be collected before and after the measures’ installation, either at the participating site or at other sites where similar measures have been implemented. However, this was not possible since there was not enough M&V data or equipment data to support the direct methods of calculation. In all cases, the indirect method had to be used, which involved (1) assigning the energy savings to a certain period of time (usually the annual or summer hours of operation) and (2) obtaining the demand savings by dividing the energy use savings assigned to that period by the number of hours over that period.

3.3.1 IAP – Process and Systems

The following subsections outline the verification procedure followed by the evaluation team when evaluating the annual gross energy and summer peak demand savings for each of the three IAP Process and Systems projects. The validation process varied slightly depending on individual projects and was tailored to the specific measures being verified.

**VFD on Large Fan Project**

**Energy Savings**

The measurement boundary in the M&V plan for the variable frequency drive (VFD) on the Large Fan Project includes a 15-ton chiller. However, the on-site visit revealed that the chiller was not included in the measurement boundary; as a result, the energy consumption of the chiller was not measured during the baseline period or during any subsequent reporting period. Due to insufficient data about
the chiller’s operation, any additional savings associated with the VFD’s interactive effects on the chiller were not accounted for in the verified energy and demand savings.

The reported annual savings for the VFD on Large Fan Project were calculated based on the first three quarterly M&V reports.

At the time of evaluation, the annual M&V report was available; so, the verified annual energy savings were adjusted on the basis of this information. The resulting realization rate of the energy savings has been established at 98%.

**Demand Savings**

The TR established the reported peak demand savings by dividing the reported energy savings by the estimated number of operating hours during the year.

The evaluation team considered this method to be the most accurate to the extent possible, considering the amount of metering data available. The resulting realization rate of the peak demand savings has been established at 94%, following the adjustment applied on the energy savings.

**West Paint Shop Pumps VFD Project**

**Energy Savings**

The reported annual savings for the West Paint Shop Pumps VFD project were calculated by the TR based on the first-quarter M&V report and annualized using the ratio of annual days per year to the number of days in the M&V reporting period.

The evaluation team calculated the verified annual energy savings using the data from the first three quarters’ reporting periods, to which an annualization ratio was applied. Since the actual measured savings were considered properly calculated and representative of the project savings, no subsequent adjustments were made. The resulting realization rate of the energy savings has been established at 103%.

**Demand Savings**

The reported summer peak demand savings for this project were based on the reported energy savings for the first-quarter reporting period divided by the estimated operating hours.

Although the second-quarter and third-quarter M&V reports were available, the evaluation team calculated the verified annual demand savings using the data from the first–quarter reporting period (June 1 to August 31) since it covered summer peak months. The verified demand savings were calculated by dividing this period’s verified energy savings by the number of hours in the reporting period. The resulting realization rate of the peak demand savings has been established at 100%.
Coke and Iron VFD (Pumps/Fans) Project

Energy Savings

The first-quarter reporting period for this project ended on February 28, 2015. The data from this reporting period was reviewed by the TR. The savings verification was based on this first-quarter reporting period only.

The TR prepared the first-quarter M&V report, in which the baseline energy was adjusted to reflect some of the changes in the uptime and production output of two of the three production lines. Changes in the third production line’s production output were not accounted for. The energy savings in the first-quarter M&V report were established by the TR at 1,727 MWh for the 2,160-hour reporting period.

The evaluation team adjusted the baseline energy to account for the production changes of the third production line, and calculated the first-quarter verified energy savings based on the data documented in the M&V report. The verified annual energy savings were then determined by applying an annualization ratio to the first-quarter savings. The resulting realization rate of the energy savings has been established at 138%.

Demand Savings

To calculate the reported summer peak demand savings, assuming that the savings were evenly distributed throughout the year, the TR divided the reported annual energy savings by 8,760 hours.

During the on-site visit, the evaluation team found that the load profile of the process remains relatively stable over a normal operating year. Since no more precise data was available, the evaluation team used the indirect method and calculated the constant level of annual demand savings over 8,760 hours of operation per year. The resulting realization rate of the peak demand savings has been established at 138%, after the adjustment was made to the energy savings.

3.3.2 IAP – Retrofit

Five IAP Retrofit projects were completed in 2014 and they were located on two different sites, with two projects on one industrial site, and three projects on a university campus.

Four of the five IAP retrofit projects were reviewed. An on-site visit was conducted on the industrial site and the equipment of the two IAP Retrofit projects was inspected. Desk reviews were performed for two of the three projects at the university campus.

The following subsections describe the verification procedure followed by the evaluation team and the adjustments made on the savings on three of the four projects reviewed. Since no adjustment was considered necessary for the fourth project, its verification procedure is not described here.
It should be noted that the reported savings for IAP Retrofit savings are those indicated on the project worksheets. The savings calculations are provided by the participants.

**VFD on Supply Pumps**

**Energy Savings**

The evaluation team found errors in the calculation of the baseline and upgrade energy consumptions, based on which the reported savings were established. According to these calculations, the pumps would have been running 46% of the time, whereas the site visit revealed that the pumps run continuously. In addition, there were inconsistencies among the data used in the calculations, the justifying documents, and the data obtained during the on-site visit. For example, the motor capacity used in the calculations was higher than that indicated on the nameplates. So, the evaluation team re-evaluated the energy savings by using the data obtained during the site visit and the consistent data from the calculation spreadsheet provided by the participant.

The resulting realization rate applied to the reported annual energy savings has been established at 569%.

**Demand Savings**

The reported peak demand savings were also based on incorrect calculations. The evaluation team recalculated the demand savings based on the nameplate data and VFD set-point data obtained during the site visit and some data from the calculation spreadsheet. The resulting realization rate of the peak demand savings has been established at 233%.

**Prescriptive Lighting**

**Energy Savings**

The savings calculation was based on an incorrect number of fixtures and wattage per fixture. The initial calculation was based on the assumption of 303 fixtures in both the base case and the upgrade, whereas there were actually 370 fixtures in the base case and 303 fixtures in the upgrade. In addition, the wattage per fixture used for the base case and that of the upgrade both differed from the values collected by the evaluation team during the on-site visit. Also, the hours of operation used for the base case and the upgrade differed, while the on-site visit revealed the hours of operation remained unchanged after the upgrade. The evaluation team corrected these values and adjusted the savings accordingly. The verified annual energy savings calculated by the evaluation team are 83% of the reported annual energy savings.

**Demand Savings**

The same adjustments were made in the demand savings calculations. The verified peak demand savings calculated by the evaluation team are 53% of the reported peak demand savings.
LED Retrofit

Energy Savings

The project review showed that 22 fixtures were installed, compared to 12 fixtures used to evaluate the reported energy savings. The actual hours of operation were longer than the hours of operation used for the savings calculation. The energy savings were recalculated to take these discrepancies into account. The resulting realization rate has been established at 291% of the reported annual energy savings.

Demand Savings

The demand savings were also recalculated in order to reflect the discrepancies mentioned above. The resulting realization rate of the peak demand savings has been established at 136%.

3.3.3 PSUI – Capital Incentives

The following subsections outline the verification procedure applied by the evaluation team and the resulting adjustments made to the annual energy and summer peak demand savings for six of the ten PSUI Capital projects. The adjustments made to these six projects led to changes in the savings value of more than 5% per project. The savings calculations adjustments of other projects were considered minor (less than 5% per project) and are not described below.

Cooling System Process Upgrade

Energy Savings

The M&V plan for this project failed to account for the fact that three cooling tower fans were removed as part of the upgrade. The evaluation team took into account the energy savings associated with the decommissioning of these fans in the verified savings, but recommends that the savings calculation method be corrected in the M&V plan for the remaining reporting periods.

The IESO calculated the reported annual energy savings by summing up the differences between the reporting period energy and the baseline energy of the first three quarters and then applying an annualization ratio.

The evaluation team calculated the verified annual energy savings by adding the avoided energy use of the three decommissioned cooling tower fans to the annual energy savings calculated from the M&V reports. The resulting verified energy savings are 130% of the reported savings.

Demand Savings

The reported peak demand savings were calculated by dividing the reported annual energy savings by the estimated annual hours of operation.
The evaluation team evaluated the verified peak demand savings as follows: the average demand reduction was calculated for both Q1 and Q2 reporting periods, by dividing the verified energy savings by the total hours of the period. The weighted average demand reduction during the summer days of these two periods was then calculated. After accounting for the decommissioned cooling tower fans, the resulting verified peak demand savings have been established at 112% of the reported peak demand savings.

**Pumping Station VFD**

**Energy Savings**

The reported annual energy savings for this project were taken from the M&V plan, and they were based on the expected savings as calculated in the engineering study. The verified annual energy savings were calculated by applying an annualization ratio to the actual measured savings from the first-quarter M&V report. Since the measured savings were considered properly calculated and representative of the project savings, no subsequent adjustment was made. The resulting realization rate of the energy savings has been established at 94%.

**Demand Savings**

The TR reported peak demand savings of 108 kW. Since the demand savings calculations were not documented in the M&V report, the evaluation team was not able to determine exactly how these savings were calculated.

The evaluation team calculated the verified demand savings by dividing the energy savings by the total number of annual operation hours. This calculation method is justified by the fact that the operating conditions of the pumps during peak hours cannot be determined precisely. The resulting realization rate of the peak demand savings has been established at 49%.

**Cogeneration Project**

**Energy Savings**

The reported annual energy savings were calculated by applying an annualization ratio to the measured savings from the first-quarter M&V report. The verified annual energy savings were calculated by applying an annualization ratio to the measured savings from both the first-quarter and second-quarter M&V reports, which slightly reduced the savings. Additionally, an adjustment was made to account for an annual two-week shutdown period. The resulting realization rate of the energy savings is 90%.

**Demand Savings**

The reported demand savings were calculated by dividing the reported annual energy savings by the estimated annual hours of operation.
Since the first-quarter M&V period corresponds to the summer months (from June 1 to September 30), the evaluation team calculated the verified demand savings by dividing the measured energy savings from the first-quarter M&V report by the total hours of operation for that period. The resulting realization rate of the peak demand savings is 94%.

Sugar Pulverizer Energy Optimization

Energy Savings

The reported annual savings for this project were calculated using an annualization ratio of the measured savings from the first-quarter M&V report. The actual measured savings were considered adequate and representative of the project savings.

Demand Savings

The reported peak demand savings were calculated by dividing the reported annual energy savings by 4,064 annual hours of operation. The evaluation team revised the annual hours of operations to 3,810, based on the data from the M&V report. This value was validated with the TR. The evaluation team then made the calculation by dividing the verified energy savings by the total hours of operation, resulting in a realization rate of the peak demand savings of 83%.

PI-Back Pressure Steam Turbine Generator

Energy Savings

The reported annual energy savings for this project were calculated using an annualization ratio of the measured savings from the first-quarter M&V report. The actual measured savings were considered properly calculated and representative of the project savings.

Demand Savings

The reported peak demand savings were calculated by dividing the reported annual energy savings by the estimated annual hours of operation.

The evaluation team calculated the verified peak demand savings by dividing the energy savings by the total annual hours of operation. This calculation method was chosen for the following reasons: (1) the shutdown periods are not scheduled on the same dates from year to year, and, as a result, (2) the steam turbine generator’s peak-period operating conditions are unknown since these conditions also vary from year to year. This resulted in a realization rate on the peak demand savings of 113%.
Compressed-air System Upgrade

Energy Savings

The M&V plan for the compressed air system upgrade did not take into account the upgrade’s impact on the electricity consumption of the refrigerated air dryers. Since the old dryers’ consumption data was not measured during either the baseline or the reporting M&V period, changes in the energy consumption of the old dryers could not be calculated.

Following the unexpected failure of the original old 400-HP compressor, it was replaced by a 320-HP compressor. The TR calculated the baseline energy and the reported annual energy savings by assuming the load factor of the 320-HP compressor being the same as that of the 400-HP compressor, which is an incorrect assumption. Actually, the same quantity of air had to be produced with a smaller compressor capacity, which would result in a higher load factor, since the load factor is the ratio of produced compressed air to the rated capacity. Furthermore, the airflow was not measured individually on each compressor, which makes it difficult to understand how the compressor replacement affected the proportion of the compressed air produced by each compressor.

The evaluation team reviewed the baseline energy, assuming that the 320-HP compressor produced the same amount of compressed air as the 400-HP compressor, but more efficiently. The energy savings of the first-quarter M&V period were calculated by determining the energy-consumption difference between the first-quarter and the revised baseline. The verified annual savings were then calculated using an annualization ratio of the energy savings for the first-quarter M&V period. This has resulted in a realization rate of the energy savings of 110%.

Demand Savings

The reported peak demand savings were calculated by dividing the reported annual energy savings by 8,760 hours. The evaluation team used the same approach, but used the verified energy savings to establish the verified demand savings, which resulted in a value 10% higher than the reported peak demand savings.

3.3.4 PSUI – Energy Managers Non-incentivized Measures

To establish the energy and demand savings realization rates of the EM non-incentivized measures, the evaluation team used a weighted average of the realization rates established for the 40 reviewed measures. This has resulted in a realization rate of 96% for energy savings, and 91% for demand savings.

Although the realization rates are fairly high, the evaluation team found multiple mistakes and omissions in the savings calculations. For only 15 of the 40 reviewed measures, no adjustments were made to the energy savings calculations; as for demand savings, the calculated values are left unchanged for 13 measures only.
Many mistakes in the savings calculation methodology (such as omitting a load factor and failing to account for an important operation variable) were found, especially when the measure was not reviewed by the TR. In some cases, this could be explained by the fact that EMs had reached their savings target easily, and they chose to provide conservative preliminary calculations. However, the evaluation team noticed that in many cases, the savings calculations were not sufficiently detailed or rigorous. More training would be needed to better inform the EMs of the expected levels of detail and accuracy for the savings calculations that they submit. For some measures such as VFDs for which the calculations often depend on a series of assumptions, some guidelines on a standard calculation method and on default assumptions could also be provided.

When annualizing savings, one common mistake was the failure to take into account plant shutdowns. In many industrial businesses, this mistake had a large impact because shutdowns could occur for many weeks per year. Another recurring error occurred in the calculation of summer peak demand savings. For a very low number of measures, the definition of the summer peak demand was correctly applied in compliance with the IESO’s EM&V Protocols & Requirements. The TR even admitted to failing to apply this definition in its measure reviews, because it found “the market does not understand how to use IESO’s definition of peak demand savings”. During the evaluation team’s on-site visits, when EMs were asked if they were aware of this definition, all answered “No”. So, the evaluation team thinks it is highly advisable to teach EMs how to calculate peak demand savings according to the IESO definition as part of their training workshops.

In some of the measure reviews, the evaluation team did not have the key data required to make adjustments to the calculations. The evaluation team agrees that it is sometimes necessary to rely on assumptions and estimates in order to minimize the financial and operational burden of conducting M&V in small non-incentivized projects. Nevertheless, there should be a clear savings threshold, above which the EM is required to obtain approval of the savings substantiation methodology before moving forward with its project.

For instance, out of the 40 EM measures sampled in 2014, nine had reported energy savings of more than 500 MWh. In some of these cases, very simple measures (like shutting down a piece of equipment for a certain period each day) generate very high savings, and it would be the right thing to do to calculate savings without requiring precise M&V. In other cases, such as leak detection and repair program or process improvements, realized savings can vary according to various complex variables; in these cases, there should be clear requirements for conducting M&V. The evaluation team recommends that for all measures expected to generate more than 500 MWh, the Energy Manager be required to submit a savings substantiation plan to the TR prior to implementing the measure. This would allow the participant to make pre-implementation measurements if required, or move on with the project if the substantiation plan is robust and sound.

---

3.3.5 PSUI – Metering and Targeting

Only two sites with M&T systems had non-incentivized projects implemented in 2014, with one implemented at one of the sites, and four at the second site. The evaluation team conducted an on-site visit at the first site and found that the M&V system was installed largely as proposed (except for some minor technical issues usually expected with this type of installation). Further, it was found that the system is being used in the spirit advocated by the program since the detailed analysis of predicted and actual system energy performance is used to inform management’s and the line staff’s decision-making and actions. The verified energy savings were considered to be equal to those of non-incentivized measures presented in the Year 1’s metering report. A desk review was performed for the second project, and the savings calculated for the single non-incentivized measure were considered accurate. However, because this non-incentivized measure did not generate any demand savings while incented measures did, it lowered significantly the overall demand savings realization rate.

One issue that the Evaluator could not address is that there is some potential double counting between the M&T and EM initiatives. Indeed, some M&T systems were implemented in facilities where there was a Roving or Embedded Energy Manager. The TR informed the Evaluator that Energy Managers can choose to claim some of the M&T non-incentivized measures under the Energy Manager non-incentivized targets. When this happen, the TR removed the measures savings from their tracking system, however they were not able to provide the exact list of measures that had been claimed in EM for our review. Even if this occurrence is rare, it is important that moving forward, the TR clearly identify any savings moved from the M&T initiative to the Energy Manager initiative, as to ensure that no double counting occurs.

The realization rate of reported savings was found to be of 51% for energy savings and 36% for demand savings. The fact that incented measures were included in the reported savings, while they were removed to obtained the verified savings, is the only reason behind this low realisation rate.

3.3.6 Realization Rate

As mentioned previously, for IAP Process and Systems, IAP Retrofit, PSUI Capital Incentives and M&T energy and demand savings realization rates were calculated for each project. Since all the projects implemented within 2014 were reviewed, no extrapolation of the sampled projects’ impact results was needed.
For PSUI EM non-incentivized measures, the realization rate was established for a sample of 40 measures. To ensure that this rate can be applied to all the measures claimed in 2014, the margin of error at a confidence level of 90% was calculated, using the following formula:

\[
\text{\% error} = \frac{1.645 \sigma}{R \sqrt{n}}
\]

Where:

- \( \sigma \) is the standard deviation of the realization rate of individual measures included in the sample
- \( n \) is the number of measures for which a realization rate was calculated
- \( R \) is the weighted average realization rate established for the sample
- 1.645 is the z-score for a confidence level of 90%

For the energy savings realization rate, the margin of error was 9%, and it was 12% for the demand savings. The slightly higher margin of error for demand savings can be explained by the fact that the evaluation team observed inconsistent definitions and calculation methodologies of peak demand savings, which resulted in highly variable realization rates among the sampled projects and measures. The evaluation team tried to improve the margin of error by analyzing the presence of outliers, who could be excluded from the total realization rates of demand savings, but no obvious outliers were observed. In the end, though a 12% margin of error seemed high, the evaluation team decided that it would be more accurate to apply this realization rate for the entire sample to all the projects.

### 3.3.7 Overall Annual Savings

**Table 9: 2014 Annual Gross Energy Savings**

<table>
<thead>
<tr>
<th>Program Initiative</th>
<th>Reported Annual Gross Energy Savings (GWh)</th>
<th>Verified Annual Gross Energy Savings (GWh)</th>
<th>Overall Realization Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>IAP Process and Systems</td>
<td>11.839</td>
<td>13.773</td>
<td>116%</td>
</tr>
<tr>
<td>IAP Retrofit</td>
<td>0.428</td>
<td>0.899</td>
<td>210%</td>
</tr>
<tr>
<td><strong>Total IAP</strong></td>
<td><strong>12.267</strong></td>
<td><strong>14.672</strong></td>
<td><strong>120%</strong></td>
</tr>
<tr>
<td>PSUI Capital Incentives</td>
<td>93.966</td>
<td>90.464</td>
<td>96%</td>
</tr>
<tr>
<td>PSUI Energy Managers</td>
<td>46.801</td>
<td>44.929</td>
<td>96%</td>
</tr>
<tr>
<td>PSUI M&amp;T</td>
<td>1.404</td>
<td>0.503</td>
<td>36%</td>
</tr>
<tr>
<td><strong>Total PSUI</strong></td>
<td><strong>142.171</strong></td>
<td><strong>135.896</strong></td>
<td><strong>96%</strong></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>154.438</strong></td>
<td><strong>150.568</strong></td>
<td><strong>97%</strong></td>
</tr>
</tbody>
</table>
Table 10: 2014 Annual Gross Demand Savings

<table>
<thead>
<tr>
<th>Program Initiative</th>
<th>Reported Annual Gross Demand Savings (MW)</th>
<th>Verified Annual Gross Summer Peak Demand Savings (MW)</th>
<th>Overall Realization Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>IAP Process and Systems</td>
<td>1.363</td>
<td>1.556</td>
<td>114%</td>
</tr>
<tr>
<td>IAP Retrofit</td>
<td>0.090</td>
<td>0.107</td>
<td>119%</td>
</tr>
<tr>
<td><strong>Total IAP</strong></td>
<td><strong>1.453</strong></td>
<td><strong>1.663</strong></td>
<td><strong>114%</strong></td>
</tr>
<tr>
<td>PSUI Capital Incentives</td>
<td>12.819</td>
<td>12.287</td>
<td>96%</td>
</tr>
<tr>
<td>PSUI Energy Managers</td>
<td>6.338</td>
<td>5.768</td>
<td>91%</td>
</tr>
<tr>
<td>PSUI M&amp;T</td>
<td>0.172</td>
<td>0.102</td>
<td>59%</td>
</tr>
<tr>
<td><strong>Total PSUI</strong></td>
<td><strong>19.329</strong></td>
<td><strong>18.157</strong></td>
<td><strong>94%</strong></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>20.782</strong></td>
<td><strong>19.820</strong></td>
<td><strong>95%</strong></td>
</tr>
</tbody>
</table>

3.4 Net-to-gross Ratio

The NTGR evaluation was based on a self-report approach, which relied on a series of questions designed to measure the program’s influence on participants’ decision to whether or not implement energy efficiency projects.

This section describes the methodology used to convert the responses obtained into an appropriate NTGR. The NTGR calculation method includes the assessment of two key distortion effects: free-ridership and internal spillover. Once each effect is quantified, the NTGR is calculated using the following equation.

$$NTGR = (1 - \% \text{Free-ridership} + \% \text{Internal spillover})$$

The following two subsections outline how the two distortion effects mentioned above have been calculated for the following initiatives: IAP Process and Systems, IAP Retrofit and PSUI Capital Incentives. As for the Enabling Initiatives, the NTGR was not assessed. Both the EM and M&T initiatives of PSUI are intended to bring projects to the Capital Incentives initiative of PSUI; non-incentivized projects can be seen as a form of spillover. Therefore, the evaluation team did not assess their NTGR. As for EMs, the free-ridership level of 90% assumed by IESO has been left unchanged.

3.4.1 Free-ridership

Free-ridership occurs when participants declare that they would still have implemented the energy efficiency measures in the absence of the program. To evaluate this effect, the evaluation team conducted a questionnaire survey with each participant during on-site visits. In every case, it was verified that the respondent was well aware of the decision-making process within the company to ensure that the answers were accurate.
The questionnaire aimed to evaluate two free-ridership components: the participant’s intention and the program’s influence. The participant’s intention determines how likely the project could have evolved differently if the respondent had not received the program’s assistance. The program’s influence refers to the effect that various program elements could have had on the participant’s decision to whether or not implement the project in the way it was implemented. A new element was added to the influence component this year, based on what was observed during last year’s evaluation. Specifically, the evaluation team added the influence of the participant’s corporate energy-efficiency policy to the participant’s influence component surveyed. The goal was to identify partial free-riders among those participants who had set clear energy efficiency targets and would have implemented energy efficiency projects even if the incentive had been of a lower amount or had not existed.

Each surveyed participant’s responses to the questions about the participant intention and program influence components were converted into an average value for each project. The algorithm for this calculation is presented in Appendix III.

Two overall free-ridership level averages were calculated for each program: one for energy savings and the other for demand savings. These weighted averages were established based on the energy and demand savings values of each project.

Using this approach, the following free-ridership levels were determined.

<table>
<thead>
<tr>
<th>Free-ridership</th>
<th>For Energy Savings</th>
<th>For Demand Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>IAP Process and Systems</td>
<td>8%</td>
<td>8%</td>
</tr>
<tr>
<td>IAP Retrofit</td>
<td>12%</td>
<td>12%</td>
</tr>
<tr>
<td>PSUI Capital Incentive</td>
<td>20%</td>
<td>21%</td>
</tr>
<tr>
<td>PSUI Energy Managers</td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td>PSUI M&amp;T</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Although IAP Process and Systems and PSUI Capital Incentives are very similar, PSUI had a higher free-ridership level. The evaluation team believes that this was mostly due to annual variations among the participants. This year, some participants with the highest levels of savings under PSUI Capital Incentives also happened to have free-ridership levels between 13% and 38%.

### 3.4.2 Spillover

The internal spillover effects are defined as the additional energy and demand savings that may be generated due to program influence without any direct financial or technical support from the program (technical assistance, incentives, on-bill financing, etc.).
During on-site visits, participants were asked questions in order to determine whether they had implemented other energy efficiency projects, for which they had not submitted applications to an IESO program. If they had indeed implemented other projects without IESO’s assistance, the energy savings of these projects were estimated, their previous participation in the IAP or the PSUI was evaluated by an influence factor of 0 (meaning “no influence on their decision to go forward with another project) to 10 (meaning “extremely influential in their decision”).

The level of spillover was nil for all three program initiatives. While some PSUI participants indicated that they had implemented other energy efficiency measures without receiving further incentives, most of them said those savings were very small in comparison to the incentivized project, and were not able to provide information to quantify savings. One participant had a list of non-incentivized projects that added up to significant savings. However, further investigation showed that all the additional documented measures had already been claimed under Enabled Savings, which is an IESO initiative where non-incentivized savings are submitted by LDCs for their customers. Thus, the evaluation team did not account for those measures in the spillover calculation to avoid savings double-counting.

### 3.4.3 NTGR Calculation

Using the equation described in Section 3.4 and the free-ridership and spillover values just discussed, the NTGR has been calculated for both energy savings and demand savings of each program, as shown in the table below.

<table>
<thead>
<tr>
<th>Initiative</th>
<th>NTGR</th>
<th>For Energy Savings</th>
<th>For Demand Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>IAP Process and Systems</td>
<td>0.92</td>
<td>0.92</td>
<td></td>
</tr>
<tr>
<td>IAP Retrofit</td>
<td>0.88</td>
<td>0.88</td>
<td></td>
</tr>
<tr>
<td>PSUI Capital Incentive</td>
<td>0.80</td>
<td>0.79</td>
<td></td>
</tr>
<tr>
<td>PSUI Energy Managers</td>
<td>0.90</td>
<td>0.90</td>
<td></td>
</tr>
<tr>
<td>PSUI M&amp;T</td>
<td>1.00</td>
<td>1.00</td>
<td></td>
</tr>
</tbody>
</table>
3.5 Net Savings Results

This section reports on the net annual and lifetime savings.

3.5.1 Overall Net Annual Savings

The verified net annual savings for the program were estimated using the NTGR calculated in the previous section. The following equation was used to calculate the net savings.

\[
\text{Verified net savings} = \text{Verified gross savings} \times \text{NTGR}
\]

This equation was used to calculate both energy and demand savings and the results for each program are presented in the following tables.

**Table 13: 2014 Verified Annual Net Energy Savings**

<table>
<thead>
<tr>
<th>Program Initiative</th>
<th>Verified Annual Gross Energy Savings (GWh)</th>
<th>NTGR</th>
<th>Verified Annual Net Energy Savings (GWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IAP Process and Systems</td>
<td>13.773</td>
<td>0.92</td>
<td>12.671</td>
</tr>
<tr>
<td>IAP Retrofit</td>
<td>0.899</td>
<td>0.88</td>
<td>0.793</td>
</tr>
<tr>
<td><strong>Total IAP</strong></td>
<td><strong>14.672</strong></td>
<td><strong>0.92</strong></td>
<td><strong>13.464</strong></td>
</tr>
<tr>
<td>PSUI Capital Incentives</td>
<td>90.464</td>
<td>0.80</td>
<td>72.053</td>
</tr>
<tr>
<td>PSUI Energy Managers</td>
<td>44.929</td>
<td>0.90</td>
<td>40.436</td>
</tr>
<tr>
<td>PSUI M&amp;T</td>
<td>0.503</td>
<td>1.00</td>
<td>0.503</td>
</tr>
<tr>
<td><strong>Total PSUI</strong></td>
<td><strong>135.895</strong></td>
<td><strong>0.83</strong></td>
<td><strong>112.992</strong></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>150.567</strong></td>
<td><strong>0.84</strong></td>
<td><strong>126.457</strong></td>
</tr>
</tbody>
</table>

**Table 14: 2014 Verified Annual Net Summer Peak Demand Savings**

<table>
<thead>
<tr>
<th>Program Initiative</th>
<th>Verified Annual Gross Summer Peak Demand Savings (MW)</th>
<th>NTGR</th>
<th>Verified Annual Net Summer Peak Demand Savings (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IAP Process and Systems</td>
<td>1.556</td>
<td>0.92</td>
<td>1.432</td>
</tr>
<tr>
<td>IAP Retrofit</td>
<td>0.107</td>
<td>0.88</td>
<td>0.094</td>
</tr>
<tr>
<td><strong>Total IAP</strong></td>
<td><strong>1.663</strong></td>
<td><strong>0.92</strong></td>
<td><strong>1.526</strong></td>
</tr>
<tr>
<td>PSUI Capital Incentives</td>
<td>12.287</td>
<td>0.79</td>
<td>9.692</td>
</tr>
<tr>
<td>PSUI Energy Managers</td>
<td>5.768</td>
<td>0.90</td>
<td>5.191</td>
</tr>
<tr>
<td>PSUI M&amp;T</td>
<td>0.102</td>
<td>1.00</td>
<td>0.102</td>
</tr>
<tr>
<td><strong>Total PSUI</strong></td>
<td><strong>18.157</strong></td>
<td><strong>0.83</strong></td>
<td><strong>14.985</strong></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>19.820</strong></td>
<td><strong>0.83</strong></td>
<td><strong>16.511</strong></td>
</tr>
</tbody>
</table>
To put the 2014 results in perspective, the net annual energy savings values were compared to the savings claimed each year since 2010, by initiative.

While the industrial portfolio started generating significant savings in 2012, 2014 marked the year when some programs really took off. Most notably, PSUI Capital Incentives had more than 10 projects completed in 2014, which yielded very large savings and drove the Industrial portfolio to reach net annual energy savings in excess of 120 GWh.

3.5.2 Effective Useful Life of Measures

In order to establish the verified lifetime net energy savings, the measures’ effective useful life (EUL) was validated by the evaluation team. This value indicates the minimum life expectancy of all major pieces of equipment of a project.

For each project reviewed, the evaluation team either verified the EUL when it was reported, or assigned an EUL value when none was reported. The evaluation team conducted this verification using reference values from the IESO Assumptions and Measure Lists⁵ and the Wisconsin Measure Life Study⁶, as well as EUL values based on the evaluation team’s experience.

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For some measures, such as VFDs, different EUL values were used for commercial and industrial market segments. In the case of behavioural measures, which typically have a low persistence, the evaluation team set the EUL at one year.

To evaluate the possibility of a dual baseline (step-down) in annual energy savings, questions were asked about the age of existing equipment and its planned replacement. A step-down may occur if the old equipment is planned to be replaced at some point during the EUL by the new efficient equipment and the standard efficiency of new equipment at that time is higher than the current baseline. However, no occurrences of dual baseline were found this year. This was partially due to the difficulty with clearly identifying a replacement schedule for large industrial equipment. Additionally, many of the projects included the installation of VFDs, for which the baseline (the absence of VFD) does not change over time. Using a weighted average based on verified annual savings, the EUL for the IAP – Process and Systems and PSUI Capital Incentives projects was estimated at 10.0 years and 19.0 years, respectively.

Since the evaluation team reviewed only a sample of the IAP Retrofit and Enabling Initiatives projects, the team only reviewed the EUL of these projects and assigned EUL values to those projects for which no EUL value was provided. The EUL of the remaining projects was left unchanged. Using a weighted average based on verified annual savings, the EUL for IAP Retrofit, EM non-incentivized measures and M&T non-incentivized measures was estimated at 13.7 years, 10.2 years and 9.2 years, respectively.

### 3.5.3 Lifetime Energy Savings

To establish the verified lifetime net energy savings, the verified annual net energy savings of every year of the EUL were added up, for every IAP and PSUI project. Because no step-down in savings was identified for any project, the net lifetime energy savings have been established by multiplying the net annual savings by the EUL. The demand savings are also expected to remain constant over the entire EUL.

<table>
<thead>
<tr>
<th>Program Initiative</th>
<th>Verified Annual Net Energy Savings (GWh)</th>
<th>Average EUL (years)</th>
<th>Verified Lifetime Net Energy Savings (GWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IAP Process and Systems</td>
<td>12.671</td>
<td>10.0</td>
<td>126.712</td>
</tr>
<tr>
<td>IAP Retrofit</td>
<td>0.793</td>
<td>13.7</td>
<td>10.859</td>
</tr>
<tr>
<td><strong>Total IAP</strong></td>
<td><strong>13.464</strong></td>
<td><strong>10.2</strong></td>
<td><strong>137.570</strong></td>
</tr>
<tr>
<td>PSUI Capital Incentives</td>
<td>72.053</td>
<td>19.0</td>
<td>1,372.310</td>
</tr>
<tr>
<td>PSUI Energy Managers</td>
<td>40.436</td>
<td>10.2</td>
<td>412.507</td>
</tr>
<tr>
<td>PSUI M&amp;T</td>
<td>0.503</td>
<td>9.2</td>
<td>4.640</td>
</tr>
<tr>
<td><strong>Total PSUI</strong></td>
<td><strong>112.992</strong></td>
<td><strong>15.8</strong></td>
<td><strong>1,789.457</strong></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>126.457</strong></td>
<td><strong>15.2</strong></td>
<td><strong>1,927.028</strong></td>
</tr>
</tbody>
</table>
4 PROCESS EVALUATION

4.1 Objective and Approach of the Process Evaluation

The process evaluation’s objectives are to assess the IAP and PSUI programs’ overall effectiveness and identify opportunities for process improvements. The evaluation team completed the following evaluation activities:

› Conducting interviews with program participants, trade allies, LDCs, and other key stakeholders;
› Analyzing program tracking data;
› Making a review of industrial program best practices, gathered from other leading industrial programs and a literature review;
› Developing program performance metrics to enable IESO to track the programs’ progress over time.

4.2 Industrial Accelerator Program

The following subsections describes the process evaluation of the IAP, which provides financial support through two initiatives: Process and Systems and Retrofit. IAP Retrofit is still a small scale program, with only 6 projects completed in 2014; it was therefore not the focus of this evaluation.

4.2.1 IAP Process and Systems Participation

Figure 3 shows the application status for all 60 IAP eligible. Non-participants that did not submit an application for an engineering study or a Process and Systems project make up the largest group of customers (32%); 30% of the customers submitted applications for both; 27% applied for engineering study funding only, and 11% applied for only Process and Systems project funding.
Figure 3: Classification of IAP Eligible Customers by Application Status

Figure 4 shows the number of projects in IAP through 2014, based on an analysis of SharePoint data.

Since IAP was launched, 26 PESs and 52 DESs have been completed. Out of the 26 PESs, 14 (54%) were converted to DESs. Out of the 52 DESs, 24 (46%) were converted to Process and Systems incentive applications.
Business managers and the TR claimed that although participation numbers were lower than they had expected, the projects met or exceeded electric savings goals.

4.2.2 Program Design

Engineering Studies

IAP program participants and partial participants all claimed that they used engineering study results to assess the feasibility of potential projects, identify energy-saving opportunities, and determine return on investment, thus establishing a business case for pursuing a capital project.

In the IAP program’s first two years, IESO’s business development managers (BDMs) noted that customers often sought funding for both a PES and a DES. More recently, customers have tended to submit a self-funded DES as part of the Process and System application instead of first applying for a funded DES. Customers explained that they chose not to enter into a contract for engineering studies due to the slow approval process. Furthermore, customers who plan to submit a Process and Systems application have little incentive to apply for PES or DES funding because the IAP rules indicate that the PES or DES funding is removed from the final Process and Systems project’s incentive amount. Since the incentives for Process and Systems projects are generous and attractive, customers want to speed up the process as much as possible from their end.

Process and Systems

Participants undertaking a Process and Systems project cited the following motivations for pursuing Process and Systems projects through IAP, as summarized in Table 16: resource conservation, decreased operation and maintenance costs, meeting corporate sustainability goals, and return on investment.

<table>
<thead>
<tr>
<th>Motivation for Pursuing Process and Systems Project</th>
<th>Number of Participant Responses (n=10) *</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resource conservation</td>
<td>5</td>
</tr>
<tr>
<td>Decrease operation and maintenance costs</td>
<td>4</td>
</tr>
<tr>
<td>Meet corporate sustainability goals</td>
<td>3</td>
</tr>
<tr>
<td>Other: [Project saved their business]</td>
<td>1</td>
</tr>
<tr>
<td>Return on investment/payback</td>
<td>1</td>
</tr>
</tbody>
</table>

*Multiple answers allowed; no limit on responses.

One respondent said that if his facility had not participated in the Process and Systems initiative, the “plant would have shut down”; the project saved the business. Two participants said that their main motivation for pursuing a Process and Systems project was to meet corporate sustainability goals, since they had joined the Northern Industrial Electricity Rate program and their participation in IAP
fulfilled the requirement related to their corporate sustainability goals. When the NIER rebate is applied this was subtracted from the overall incentive obtained through IAP.

**Participation Barriers**

Given the potentially large incentives available, the program contract contains stringent requirements to minimize IESO’s risk of customer project non-performance (in addition to several rounds of approval required within the IESO), such as incentive claw-back provisions. Customers must provide letters of credit from a bank with their applications, as well as updated letters of credit for every milestone payment throughout their participation in the Process and Systems initiative.

In addition to these contractual barriers to participation, the IESO Business Development Managers (BDMs) mentioned several others. BDMs believed that additional reasons for low customer participation in the IAP are: lack of internal resources to pursue the project; challenges due to the capital planning cycle; high cost; lack of interest; extensive contract commitment; and internal management and budget limitations. Table 17 summarizes the barriers described by the BDMs at each stage of the IAP.

**Table 17: Barriers to Participation in the IAP**

<table>
<thead>
<tr>
<th>Stage in the IAP</th>
<th>Barrier Cited by the BDMs</th>
</tr>
</thead>
</table>
| PES/DES                                        | › It takes too long (up to six months) to have applications approved, which causes delay in starting the PES or DES. Customers often avoid the engineering study due to approval wait times.  
› Customers consider the PES a waste of time as the process takes too long. |
| Contract requirements (language, ten-year time frame, and incentives) | › The 10-year commitment is too lengthy and will not work with many business models. Some are not sure if companies will be viable in 10 years, and the requirement for repaying incentives is too risky for some businesses. |
| Installation/implementation of energy-saving improvements | › No barriers.                                                                          |
| Monitoring and verification (M&V) of the energy-saving improvements | › None discussed.                                                                       |

In 2015, IESO introduced the small capital incentive option to address some of these barriers. This option limits the incentive payment to $200,000, but no engineering study is required. This option seeks to increase participation in IAP by reducing the M&V commitment period. For instance, some mining company customers cannot commit to 10 years as they cannot predict the state of their company for that time frame. The IESO perceives the small capital option as more attractive to customers, given its one-year contract commitment. Feedback from partial participants indicated they also considered the new small capital project offerings attractive.
The evaluation team asked partial participants about the reasons why they did not implement a Process and Systems project. As shown in Table 18, answers generally were evenly distributed, including: committing to 10 years proved a barrier; a too-complicated application process; and internal issues. Other answers included desired projects being not eligible for the Process and Systems initiative and respondents waiting for results from a DES. In one case, a customer’s BDM left the IESO and the application was not followed up. As a result this customer waited for over one year until the situation was rectified and the application went through.

Table 18: Partial Participants’ Various Reasons for Dismissing a Capital Incentive Project

<table>
<thead>
<tr>
<th>Why partial participants decided not to move forward with a CI project after engineering study</th>
<th>Partial Participants (n=11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did submit application*</td>
<td>3</td>
</tr>
<tr>
<td>Committing to 10 years was main barrier</td>
<td>2</td>
</tr>
<tr>
<td>Internal issues</td>
<td>2</td>
</tr>
<tr>
<td>Process too complicated</td>
<td>1</td>
</tr>
<tr>
<td>Project we needed was not covered in CI</td>
<td>1</td>
</tr>
<tr>
<td>Contact at IESO left and our paperwork did not get signed off for a full year</td>
<td>1</td>
</tr>
<tr>
<td>Still conducting engineering study, waiting for results</td>
<td>1</td>
</tr>
</tbody>
</table>

* Customer recently submitted a CI application

The evaluation team explored whether offering financing would help remove the barriers to participation. BDMs did not consider lack of financing as a barrier for customers. Rather, they saw the lack of timeliness in approving applications as a barrier, since projects should be in lockstep with customers’ budget-planning cycles. The evaluation team asked customers how much of a help they found attractive financing could be. As shown in Table 19, seven participants and four partial participants said attractive financing would make no difference to them, while partial participants said it would make internal approval easier (n=2) or would make both internal approval and project implementation easier and faster (n=4).

Table 19: Would Attractive Financing Help IAP Participants?

<table>
<thead>
<tr>
<th>If the program offered attractive financing, how would it affect customers?</th>
<th>Participants (n=10)</th>
<th>Partial Participants (n=11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Easier to get approval</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Easier and faster to get approval and implement projects</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>No difference</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>Don’t know</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
We also investigated whether a different incentive structure might affect participants’ decision to complete a project. Three participants mentioned that having the incentive upfront, instead of at the end of the project, would be helpful. One customer indicated that it would be extremely helpful if the IESO provided 10%–25% of the Process and Systems project upfront instead of paying incentive payments upon project completion. Particularly in the case of this customer’s lighting project, IAP’s delay in paying the incentive until the project was complete constituted a barrier, because this project cost approximately $8 million.

4.2.3 Marketing

BDMs said they are the primary party promoting IAP, and they do so through making face-to-face interactions with customers and follow-up by phone and email. They also actively participate in the activities of trade associations. Each BDM manages between four and 30 customers. According to BDMs, they strive to reach out to all of their customers, though some customers are not responsive. All eligible customers have been contacted at least once in marketing the program. If a customer declines interest, BDMs follow up to understand their reasons. BDMs follow up with customers regularly, making sure they are aware of program changes, such as the introduction of the small capital option in January 2015. BDMs believe there are opportunities for trade allies to play a greater role in promoting the program.

The evaluation team asked customers how their organizations first learned about the IAP. As shown in Table 20, the majority of customers (nine participants and seven partial participants) said that they had learned about IAP through a BDM. Customers also learned about IAP through the TR, a contractor or an engineering firm. Two customers surveyed were unable to recall.

<table>
<thead>
<tr>
<th>How customers first heard about the IAP program</th>
<th>Participants (n=10)</th>
<th>Partial Participants (n=11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IESO Business Development Managers</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>Technical Reviewer</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>A contractor or engineering firm</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Don't know</td>
<td>0</td>
<td>2</td>
</tr>
</tbody>
</table>

Customers also confirmed that BDMs had followed up with them regularly. As shown in Table 21, seven participants and partial participants said their BDMs had followed up to encourage them to move forward with the Process and Systems project upon completion of their DESs.
Table 21: Did IESO Staff Follow up with Customers to Encourage Moving Forward with the Capital Incentive?

<table>
<thead>
<tr>
<th>Was there follow-up from IESO to encourage moving forward with the Process and Systems project?</th>
<th>Participants (n=10)</th>
<th>Partial Participants (n=11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>No</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Can't remember</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

We asked partial participants whether they planned to pursue energy projects in the future. Table 22 shows six partial participants were planning to pursue future energy projects through an IESO program. Three partial participants were not sure about plans to complete future energy efficiency projects through IAP or another efficiency program; one of these customers explained that their mill currently was not in operation and another said they were not aware of IAP or IESO program offerings that would help their company maximize energy efficiency. Finally, one customer expressed frustration with complicated, time-consuming paperwork and would not implement projects with the IESO because financial return might not prove worthwhile.

Table 22: Will Customers Pursue Other Energy Projects with IAP or through IESO?

<table>
<thead>
<tr>
<th>Will customers pursue other future energy Projects with IAP or through IESO?</th>
<th>Partial Participants (n=11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>6</td>
</tr>
<tr>
<td>No</td>
<td>1</td>
</tr>
<tr>
<td>Not Sure</td>
<td>3</td>
</tr>
</tbody>
</table>

4.2.4 Application Process

Customers expressed dissatisfaction with the lengthy, complicated application approval process. Survey respondents found the paperwork, timeframe, and bureaucratic process too time-consuming and difficult to work with. The BDMs agreed that the application process is complicated and they could provide additional resources to assist with the application.

As shown in Table 23, two participants had to wait for over one year for their applications for Process and Systems projects to be reviewed, though it took some participants less than six months (n=5). The TR staff said that they often receive noncompliant applications. They make a list of missing information and send it to the BDMs, who forward the requests for information to customers. Usually, such request for information occurs once, but it can occur twice and even three times in some rare cases. Most communication between the TR and customers regarding the technical review of engineering and project applications is done through the IESO BDMs.
Table 23: How Long Did it Take to Get Approval for the Process and Systems Project?

<table>
<thead>
<tr>
<th>How long did it take to get approval for the Process and Systems project?</th>
<th>Participants (n=10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-6 months</td>
<td>5</td>
</tr>
<tr>
<td>6 months to 1 year</td>
<td>2</td>
</tr>
<tr>
<td>Over 1 year</td>
<td>2</td>
</tr>
<tr>
<td>Can’t remember</td>
<td>1</td>
</tr>
</tbody>
</table>

Four partial participants said the application process should be streamlined to shorten the time required for approval and to reduce time required on their end.

4.2.5 Satisfaction

The evaluation team asked participants and partial participants about their satisfaction with IAP overall, the engineering studies, IESO program staff support, and the work done by the TR. Participants were also asked about satisfaction with the Process and Systems initiative. Figure 5 highlights the results regarding all these aspects. Program staff support and Process and Systems initiative received the lowest satisfaction scores given by participants.

* Participant n=10; Partial participant n=11; “don’t know” and “Refused” responses not included.

**Figure 5: Satisfaction with Various Aspects**

The evaluation team asked customers to explain their reasons for dissatisfaction.
Table 24: Customer Reasons for Dissatisfaction

<table>
<thead>
<tr>
<th>Program Element</th>
<th>Customer Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>IAP Overall</td>
<td>Application process too complicated. Although the process was frustrating, they participated because the incentives were so attractive. Taxpayers should not have to pay for programs like IAP.</td>
</tr>
<tr>
<td>Engineering Study</td>
<td>Takes too long for IESO to approve DES applications; ended up self-funding the DES.</td>
</tr>
<tr>
<td>Technical Review</td>
<td>The TR account manager left, resulting in project delay. Did not like quality of work.</td>
</tr>
<tr>
<td>IESO Staff Support</td>
<td>Difficult to contact BDM. BDMs slow to respond. BDM turnover caused their applications to be lost, delaying their projects.</td>
</tr>
<tr>
<td>Process and Systems initiative</td>
<td>Application process was frustrating.</td>
</tr>
</tbody>
</table>

4.3 PSUI

The following subsections present the process evaluation of PSUI’s program, which included the following measures that LDCs offer to their industrial and institutional customers.

› Capital Incentives (CI)
› Engineering studies (PES and DES)
› Opportunity Accelerator (OA)
› Energy Managers: embedded energy managers (EEMs) and roving energy managers (REM)
› Monitoring and Targeting (M&T)

4.3.1 Program Participation

Based on the i-Con data, 56 out of 76 LDCs are participating in PSUI as of 2015, as shown in Table 25. Out of 32 LDCs associated with CI applications, 13 are associated with completed projects.

Table 25: LDC Participation in PSUI Program Initiatives*

<table>
<thead>
<tr>
<th></th>
<th>Capital Incentive</th>
<th>Engineering Study</th>
<th>Energy Manager</th>
<th>Monitoring &amp; Targeting**</th>
<th>No Participation***</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of LDCs</td>
<td>32</td>
<td>55</td>
<td>27</td>
<td>18</td>
<td>20</td>
</tr>
</tbody>
</table>

* No i-Con data for Opportunity Accelerator available
** Some LDCs do not have M&T eligible customers
*** Some LDCs do not have CI eligible customers
Table 26 summarizes PSUI program activity from its inception through January 2015.

**Table 26: PSUI Projects/Applications as of January 2015***

<table>
<thead>
<tr>
<th>Milestone</th>
<th>Number of Projects**</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Completed Projects</strong></td>
<td></td>
</tr>
<tr>
<td>Completed Capital Incentives</td>
<td>19</td>
</tr>
<tr>
<td>Completed Engineering Studies</td>
<td>97</td>
</tr>
<tr>
<td><strong>Applications Submitted to i-Con</strong></td>
<td></td>
</tr>
<tr>
<td>Capital Incentives Applications Total</td>
<td>111</td>
</tr>
<tr>
<td>Project Incentive</td>
<td>56</td>
</tr>
<tr>
<td>Small Capital / Micro Project</td>
<td>55</td>
</tr>
<tr>
<td>Engineering Study Applications Total</td>
<td>673</td>
</tr>
<tr>
<td>Preliminary Engineering Study</td>
<td>273</td>
</tr>
<tr>
<td>Detailed Engineering Study</td>
<td>400</td>
</tr>
<tr>
<td>EEM Applications</td>
<td>53</td>
</tr>
<tr>
<td>REM Applications</td>
<td>24</td>
</tr>
<tr>
<td>M&amp;T Applications</td>
<td>33</td>
</tr>
</tbody>
</table>

* Source: Analysis of i-Con and SharePoint data
** Unique projects not deactivated; some customers may have multiple applications/projects.

While most EEM survey respondents were aware of the M&T, CI, and engineering study initiatives, as shown in Figure 6, their awareness did not necessarily translate into participation. Only 26% of EEMs worked for an industrial customer that participated in M&T. The Opportunity Accelerator (OA) had a similar participation level. Seventy-eight percent of EEMs said their organizations participated in an engineering study; CIs had the second highest participation levels, with 67% of EEMs reporting participation.
Figure 6: EEM Awareness and Participation in Programs

The LDC interviews (with program managers and REMs) indicated similar results; fewer LDCs had experience with Monitoring & Targeting and Opportunity Accelerator projects, compared to engineering studies or CI. Four of the 10 utilities did not have any experience with M&T and only one LDC had experience with OA. The audit was underway with the TR during the data-gathering period. IESO staff mentioned that they had received as many as 15 applications (at the time of the interview), with six or seven audits completed.

Three LDCs said that they had never participated in the CI initiative. Those who had participated found incentives levels high enough for most customers to justify the time needed to overcome participation barriers.

4.3.2 Program Design

Administration

LDCs are responsible for administering the PSUI program. They market the program among their customers, collect supporting documentation, provide information needed to complete applications, help submit applications through i-Con, and, for REMs, track progress towards mandated targets.

The TR provides education support for LDCs, receives and reviews applications, double-checks estimated savings and project approaches, and makes funding recommendations. The TR also performs M&V for completed projects. In contrast to IAP, whose relations with customers are managed by the BDMs, the TR staff can reach out to LDC staff and customers to provide feedback and gather information.
The IESO funds PSUI, reimbursing all LDC administration costs and paying for incentive costs as invoiced for approved PSUI projects. These funds flow through the LDC to the final customer. IESO also takes responsibility for final decisions on issues or challenges that arise. IESO staff reported that while staffing levels have been sufficient, the program has a less than optimal staffing structure. The program has not clearly defined roles and responsibilities, and IESO staff believes that streamlined administration could greatly improve their effectiveness in managing the program.

The evaluation team attempted to determine whether having LDCs (as opposed to IESO) market and administer the PSUI program worked well. All LDC program managers and REMs reported this arrangement was effective. Table 27 shows responses from interviewed LDC staff members expressing their views. Three interviewees said the LDCs and their customers shared a sense of community, unlike the IESO, which could come across as an outsider without showing an understanding of customer needs. This implies LDC staff feels they have built a level of trust that their large industrial customers do not share with the IESO.

**Table 27: Why Having the LDCs Administer the Program Works Well**

<table>
<thead>
<tr>
<th>Verbatim Responses from LDC Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>“We have a more intimate relationship with their customers than a larger provincial authority.”</td>
</tr>
<tr>
<td>“I think so, because we are who the customers know. They don’t know the IESO.”</td>
</tr>
<tr>
<td>“It makes a lot of sense. It is a niche program, and, because we know our customers well and have worked in those facilities, it makes sense.”</td>
</tr>
<tr>
<td>“Absolutely. This is the only way that makes sense, because of the square peg, round hole issue. This program requires a more personal touch. I realize there is no perfect scenario and understand what the applicant is thinking. We care about that stuff more than an outside organization.”</td>
</tr>
<tr>
<td>“The clients like working with someone who knows them.”</td>
</tr>
</tbody>
</table>

**Energy Managers**

REMs and EEMs, whose salaries are paid by the PSUI program, identify energy efficiency opportunities, develop energy management plans, and complete saveONenergy incentive applications for industrial customers. REMs and EEMs must meet the following savings targets to remain in the program:

- Minimum 300 kW of peak demand savings
- 30% of demand and energy savings must be non-incentivized

LDCs are expected to manage the REMs and EEMs, but the TR staff said that the level of oversight varies from LDC to LDC. Additionally, the LDCs are limited in their ability to report REM and EEM performance through i-Con. According to the IESO and TR staff, the REM/EEM portion of the i-Con system is particularly poor because IT staff overlooked it during the last upgrade and did not include a solution for reporting energy manager performance. Without a means for LDCs to report energy
manager performance, it was difficult for IESO to obtain timely and accurate information regarding the EEM and REM initiatives. To address this issue, the IESO created the Energy Manager Hub (the Hub), a site where energy managers can search for potential projects and network with peers. The Hub also made it possible to provide timely, accurate reporting on the energy manager programs’ performance.

REMs are employees at the LDCs and work with multiple customers. Industrial customers who do not have their own in-house energy managers can request their local LDC to assign them an REM if the LDC is participating in the REM initiative. The LDC provides this service at no charge to their customers.

Large industrial facilities hire EEMs through PSUI. Like REMs, EEMs have minimum energy savings targets mandated as part of their contracts; but, unlike REMs, an industrial business employs them full-time (rather than working part-time at multiple facilities). An industrial facility seeking to hire an EEM can receive compensation for 80% of their annual salaries, up to $100,000; 80% of the EEM's annual expenses also can be reimbursed, up to $8,000.

The initiative design allows companies to transition an existing employee into the energy manager role or to hire someone into the role. As shown in Figure 7, 62% of the EEMs have been brought in as new employees to fill energy manager roles, suggesting most industrial customers either did not have the EEM skillset in-house or a staff member with sufficient time to dedicate to energy efficiency improvements prior to participating in the EEM initiative.

![Figure 7: How EEM Role was Filled (n=32)](image)

As part of the EEM survey, the evaluation team asked how difficult it was for EEMs to achieve the 30% non-incentivized savings target. As shown in Figure 8, 84% of the EEMs found this target somewhat or very difficult to achieve.
Figure 8: EEM Experience with Achieving Non-incentivized Savings Targets (n=32)

When asked to suggest an alternative target level, respondents most commonly (44%) recommended changing the non-incentivized savings target to between 5% and 10%, as shown in Figure 9.

Figure 9: EEM Recommendations for Non-incentivized Savings Targets (n=27)

Nineteen percent of the respondents suggested a different method of setting non-incentivized targets, such as one set higher for the first year’s and then decreasing over time, or one based on kWh. They mentioned that, in the first one to two years, they achieved “low-hanging fruit” projects; once those had been implemented, it became harder to hit targets. During industrial site visits, Econoler heard the same comments: “The company has been doing energy efficiency for a while and there are no more low-hanging fruits in terms of energy efficiency.” Respondents currently have to file projects as non-incentivized that could have been incentivized just to meet the requirement. They also cited challenges in convincing management to approve non-incentivized projects. Table 28 shows some of their verbatim answers.
Table 28: Reasons Why 30% Target is Not that Easy to Achieve (Examples)

<table>
<thead>
<tr>
<th>Example Verbatim Responses from EEM Staff</th>
<th>Increasing Difficulty over Time</th>
<th>Gaining Approval for Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>“First year there was a lot of low-hanging fruit and the 30% savings goal was exceeded. Second year, the projects become harder to identify and quantify.”</td>
<td>“Achieving these targets for first year is easy, but with progressive years it is difficult.”</td>
<td>“Because in year one of the EEM it was relatively easy, however the lower hanging fruit have disappeared and it is much more work to achieve.”</td>
</tr>
<tr>
<td>“Not many low hanging fruit left.”</td>
<td>“Difficult to approve funding without incentive.”</td>
<td>“Difficult to justify upfront cost to get go-ahead with the project.”</td>
</tr>
<tr>
<td>“It is easier to pitch projects as a package with incentives to assist in lowering financial barriers.”</td>
<td>“Convincing a store owner to implement a regular retrofit project without any incentive is challenging.”</td>
<td></td>
</tr>
</tbody>
</table>

All six REMs reported that the Energy Manager initiative worked well. So was the opinion of LDC program managers whose utilities had an EEM or REM within their service territory. Respondents suggested that REMs can apply lessons learned from one project site to their future sites, and they can provide a new level of customer service. Regarding EEM success, respondents attributed program success to the EEMs’ ability to spend time evaluating and implementing energy-saving projects, which many LDC staff does not have time for. EEMs could do the “heavy lifting” and, in some cases, came up with creative projects that had not occurred to customers. Two LDC staff members said that in some cases, EEMs were so successful that companies hired them as permanent employees, regardless of PSUI funding.

Engineering Studies

PSUI offers 100% funding for engineering studies (up to $10,000 for a PES and $50,000 for a DES). PSUI includes these studies to support identification and analysis of energy-efficiency opportunities. LDCs indicated they preferred to push customers towards the DES, since a customer completing a PES and choosing to go forward with a project would still have to conduct a DES, duplicating many efforts. Several LDC program managers questioned why the PES was included in the PSUI offerings, since, in their opinion, the engineering studies were best used to move incentivized projects forward.

LDC staff noted that many customers considered this program to be a way to a free study, and that there were customers who agreed to participate in the studies, but did not have serious intentions to commit to energy-saving projects. However, one REM noted that the study was a way to present information to upper management in a meaningful way. Two of the LDC program managers agreed, saying that having a review of possible projects was a good way to create awareness in industrial facilities, where managers were interested in making changes, but did not have a clear understanding of what their options were. The study was able to create momentum to move customers forward from interest into action.
One issue with the engineering studies was that the findings were not always pertinent to the needs (or ability) of the customer; one REM noted that there were study findings presented with 20-year paybacks, which were unrealistic for the customer. As with other initiatives, feedback from the LDCs also suggested that the application process was overly complex and that simplification of the process could improve this initiative.

### Monitoring and Targeting

PSUI’s M&T element was designed to assist industrial facilities with an energy manager in understanding their current energy consumption and exploring operational changes that could reduce a facility’s energy consumption. The program uses historical energy consumption data to set targets and identify opportunities to reduce energy consumption. IESO anticipates that M&T can improve overall energy efficiency at an eligible industrial facility by 5% to 10%.

LDCs provide funding for up to 80% of the eligible costs (e.g., purchase, installation, and operation of the M&T system), and up to $75,000 per site. Customers must meet the following requirements to participate:

- Customers must have a resident energy manager to manage the M&T system.
- The facility must demonstrate (by the end of the second year of operation) 0.2 MW in peak demand savings and 0.2 MW * Facility load factor * 8,760 hours in energy savings.
- Customers must commit to implementing all identified projects with a payback of less than one year.
- Customers must agree to provide annual reports on implemented opportunities for five years.

As discussed previously, while EEM survey respondents exhibited high awareness levels regarding PSUI’s M&T offering, the program has only seen a few successful projects so far. Four of the 10 LDCs interviewed did not have any experience with M&T. An additional four noted some of their M&T projects made it to the application phase, but customers had not moved forward with their projects. Several LDCs who had seen customers back out commented that it only provided value for the region’s largest customers.

For those LDC staff who had seen activity in M&T, they noted that once customers got past the approval stage, customers were able find a number of opportunities for savings, and that the incentive was appealing to customers.

### Opportunity Accelerator

The Opportunity Accelerator (OA) service offers a free walk-through energy audit to eligible industrial facilities, targeting customers who otherwise had been hard to reach. Through this service, the TR identifies top opportunities at facilities, engages customers through the application process, and helps them move forward in implementing the projects. The OA initiative was designed to target customers who had previously been hard to reach, and provide guidance on top opportunities for energy
efficiency improvements, and identify low-hanging fruit. The TR staff noted that OA was helping customers identify potential savings, and was particularly useful because it allowed the TR to meet customers face-to-face; this helped customers feel that the TR understood their needs.

Only two of the 15 LDC staff members interviewed had any experience with OA. Since the audits were done by the TR, they had no feedback to provide regarding any issues or concerns.

**Capital Incentives**

PSUI pays up to 70% of project costs through the CI initiative. There are two main categories of CI projects: small capital (formerly called Micro Projects - less than $1 million) and project capital projects ($1 million or greater). For both, incentives must be the lesser of:

- 70% of project costs; or
- $200 per MWh of annual energy savings.

Small capital projects require M&V terms of one year, compared to 10 years for project capital projects. Feedback from industrial customers, unable to commit to a 10-year obligation, prompted IESO to offer shorter M&V periods through the small capital option (the small capital project offering was launched in 2012). This addition of the small capital project was positively received. One REM noted that they were particularly pleased about the inclusion of the small capital component, saying “the process to get the incentive is much more streamlined for micro [small capital] projects. More customers can apply.”

While many LDC staff felt that the incentive level offered a sufficient value to offset the burdensome contract process, there were many complaints regarding the length of contracts. One LDC program manager noted that the contract might make sense for very large industrial customers, but was excessive for most potential customers in his region. Another suggested that having one standardized and simplified document template with guidance on how to move through the program would be helpful in overcoming the complexity of the application process.

**Participation Barriers**

The evaluation team asked LDC staff to describe barriers they saw preventing customers from participating in PSUI initiatives. The primary barrier, across all programs, was the application process’ onerous nature in terms of contract documents’ length, the amount of “legalese” customers had to navigate, and the rigor of the TR’s analysis and data gathering. Table 29 shows some verbatim responses from LDC staff. Other barriers included wait time needed to receive reimbursement, M&V requirements, and decision-makers’ lack of technical expertise. LDC feedback indicates IESO approval and PSUI processes move too slowly and are too complex.

“A lot of paperwork is required and it tends to counterbalance the benefits of the program.”
-EEM

“The contract is terrible. It was intended only for very large customers and projects.”
-LDC
**Table 29: Barriers Preventing Customers from Participating**

<table>
<thead>
<tr>
<th>Verbatim Responses from LDC Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>“The timeline and engineering analysis. The rigor involved in participation. One detailed engineering study has taken one year for the customer to complete. And contractual details also.”</td>
</tr>
<tr>
<td>“The main barrier is legal. The complexity of the program for actual PSUI, after the study is done, and the actual study itself is complicated. It gets tied up in lawyers and doesn’t go anywhere after the study is done. Also, the opportunities pursued somewhere else, like with retrofit.”</td>
</tr>
<tr>
<td>“Doing detailed engineering studies and technical reviews from [the TR] are blocks. Next biggest thing is the delay in incentive payments, only receive half of incentive payments upon completion of the projects and have to wait half a year to get other half of it, sometimes does not come in capital year.”</td>
</tr>
<tr>
<td>“Not enough large customers or large enough savings. A big hurdle is also people not knowing about it, and time and money. There is not enough time for customers [to participate].”</td>
</tr>
<tr>
<td>“First that would be the requirements… The preliminary engineering study, for example. It's so complicated people go to retrofit. The reason why is the perception that the amount of verification is stringent for a longer period of time. PSUI is perceived to be more complicated and more stringent.”</td>
</tr>
<tr>
<td>“The confusion with the timeline and incentive paybacks.”</td>
</tr>
<tr>
<td>“It depends on the program. For the energy managers, putting in 20% presents a challenge for some. The contract has lost them a few customers on the incentive side. OPA won’t budge on the terms of the contract and so they had to do it through retrofit.”</td>
</tr>
<tr>
<td>“The contract. A fair amount of projects or even engineering studies get stalled or delayed because of the complexity of the contracts. The language is complicated, IESO wants to keep 100% of the environmental attributes…. If the funding only covers 50% of the costs, why does IESO get all the environmental attributes? Also, the time it takes for participants to get their incentive payment. Sometimes they need it sooner and to not have to wait so long.”</td>
</tr>
<tr>
<td>“There is a lot of stuff at the front end. It can be a 30 page or a 100 page contract that has to get through lawyers and everyone else that is involved. The size of the contract is a barrier.”</td>
</tr>
<tr>
<td>“Head offices think it is too complicated, based on the way it is presented so far. For the contract, if you say to the customer, you must go through with x, y or z, and ask them to sign that on a contract, good luck. Like for monitoring and targeting, you have to sign a contract saying anything less than a one-year payback; you have to do it, but try getting someone in a prison or military base to sign that.”</td>
</tr>
<tr>
<td>“If the program were simpler, the take-up would be much higher. Just the agreement is enough to scare customers away. The original 10-year agreement was way too much. I am amazed anyone signed it.”</td>
</tr>
<tr>
<td>“The legalese paperwork and onerous amount of documents.”</td>
</tr>
<tr>
<td>“The application process, the contractual process, and some of the folks they deal with do not have technical expertise.”</td>
</tr>
<tr>
<td>“Just seeing the value in it for them.”</td>
</tr>
<tr>
<td>“Sometimes it is just manpower or resources. Otherwise, it could be lack of technical expertise.”</td>
</tr>
</tbody>
</table>

IESO staff indicated they were aware of these issues. One staff member said that expected activity had not materialized and program processes had delayed implementation. He also said he heard LDCs reiterate that the program was too complicated for most customers to participate.
For the M&T initiative, one barrier discussed was that success in the EEM program deterred participation in M&T. If the on-site energy manager (a requirement of M&T) was an EEM, they would need to achieve a requirement of 500 kW of demand savings per year, in addition to the 300 kW per year already required. Other LDCs said they simply did not have large enough customers in their areas to drive interest in the initiative.

LDC staff also identified specific barriers for the CI projects. Program managers said that the IESO allowed them to submit a request for customers to receive advance payment at certain intervals. Advance payment, however, required a prohibitive amount of paperwork, basically requiring them to perform a credit rating each time to receive a solvency certificate. This requirement not only constituted a deterrent, but held up projects for those continuing to participate in the program. Respondents also noted that PSUI could “claw back” money if the customer did not meet expected savings, which is a huge deterrent for customers counting on a certain incentive amount to make their project viable. This uncertainty was noted to be very off-putting for customers.

Despite these barriers, LDCs who had experience with the CI initiative felt interest in the program would continue due to its generous incentives.

When the evaluation team asked EEMs who had not implemented a CI project why they chose not to move forward with an application, over one-half (55%) reported their facility had been deterred by the approval process/contract or the approval time, as shown in Figure 10.

Figure 10: What Prevented Customer from Moving Forward With CI Project (n=11)

The evaluation team also asked whether EEMs considered M&V requirements reasonable. As shown in Figure 11, almost two-thirds (64%) of EEMs considered the requirement reasonable and thought it did not pose a barrier to achieving their goals or persuading their facilities to participate in projects.
EEMs who thought the M&V requirement unreasonable cited the following factors: the time-consuming and complicated nature of the process; resource costs associated with the lengthy process; and the far-too-long 10-year requirement for M&V.

The evaluation team also asked EEMs to identify challenges they faced in moving energy-saving projects forward within facilities where they work. As shown in Figure 12, they most commonly identified funding availability (just over one-third of the respondents).

Despite the variety of barriers mentioned, over one-half (62%) of EEMs said they were very likely to go through PSUI for future energy efficiency or behind-the-meter generation projects, as shown in Figure 13.
Financing

Respondents offered mixed opinions regarding whether financing, offered through the PSUI program, would help industrial customers participate in PSUI program offerings. As shown in Figure 14, the majority of LDC staff (PMs and REMs) did not think financing would help customers participate. They noted most large industrial customers had existing relationships with lending institutions, and they had not experienced a project being held back due to a customer’s inability to obtain funding.
More than one-half of EEMs, on the other hand, felt offering financing would help customers move forward with projects. Figure 15 shows many EEMs (50%) said direct financing from IESO would improve industrial customers’ willingness and ability to participate in projects, while 27% of EEMs thought reduced rates would be most beneficial for industrial customers. Other responses included “not sure” or “type is not important.”

![Figure 15: What Type of Financing Would Be Most Helpful (n=22)](image)

4.3.3 Marketing

Since PSUI is delivered through LDCs, marketing tactics and efforts vary. LDC staff reported marketing approaches ranging from direct mail and cold calling to lunch-and-learns and face-to-face meetings. LDCs with smaller numbers of eligible customers conduct in-person meetings, while LDCs with larger industrial customer bases utilize tactics, such as events and direct mail. Most EEMs reported their organizations learned about PSUI from their LDCs, as shown in Figure 16.

![Figure 16: How EEMs’ Organizations Became Aware of PSUI (n=29)](image)
When asked what marketing tactics worked the best, LDC staff cited more personalized tactics, such as breakfast meetings and direct calling. Staff felt they knew their large industrial customers well and could target those that would benefit from working with the program. LDC staff did note, however, that they wanted more marketing support from the IESO, with one commenting that “more detailed marketing info with timelines and more trainings would be helpful.”

4.3.4 Application Process

Feedback regarding the application process has mostly been negative. As discussed earlier, the lengthy contract, rigidity of contractual requirements, and complexity of contract language are barriers to participation. In fact, several LDC staff members noted that the application process was so intimidating to some customers that it drove them over to the Retrofit program. One REM noted that IESO delayed one of their applications for over 200 days without giving any explanation.

One IESO staffer working with PSUI agreed with the LDCs that the application process required too much review. This person said the application review process was too burdensome and time-consuming, and that they only had uncovered a small number of actual issues through the current review process. One REM suggested that having an online application process might be a helpful way to make the process easier to complete. His suggestion was that having an online portal for applications would make the process more transparent and save time. This suggests the application review is overly rigid without providing much value in return.

4.3.5 Satisfaction

The evaluation team measured satisfaction with the PSUI program through the EEM survey and REM and LDC program manager interviews. Overall, LDCs and energy managers found the PSUI program beneficial and, despite there being room for improvements, expressed overall satisfaction with the program. As shown in Figure 17, 91% of EEM respondents were either somewhat (50%) or very (41%) satisfied with the program.

![Figure 17: EEM Overall Program Satisfaction (n=32)]
LDC staff said that PSUI is valuable primarily because it allows them to provide more options to their customers. Figure 18 summarizes their other reasons.

![Figure 18: What Is the Value of PSUI for LDC (n=15)](chart)

**Program Elements**

When asked to rate their satisfaction with various PSUI program offerings in which they had participated, all EEMs reported being either somewhat or very satisfied with the Opportunity Accelerator, CI, and M&T program aspects, as shown in Figure 19. Ninety percent of respondents were satisfied with the engineering study measure.

![Figure 19: EEM Satisfaction with PSUI Measures and Program](chart)
When prompted, less-than-satisfied respondents found the approval process too cumbersome and the requirements too “boiler plate” for some customers.

**EEM Program Support/Hub**

The evaluation team asked EEMs to rate their satisfaction with various aspects of the EEM offerings. As shown in Figure 20, 81% of the respondents were (at least somewhat) satisfied with the SharePoint Hub; 93% were satisfied with training they attended, and 96% were satisfied with program support they received.

![Figure 20: EEM Satisfaction with EEM Offerings](image)

When asked to explain why they were less than satisfied, respondents said they wanted the Hub to be more useful for seasoned energy managers. One respondent suggested making the Hub independent and free from technical reviewer oversight. They suggested including information such as viewable quarterly reports on their progress, calculations from other projects, and recommendations for ways to achieve deeper savings. In regard to training, respondents suggested that, while training had been done well, content did not change and did not address some key EEM issues, such as tracking non-incentivized savings; they felt IESO’s expectations for tracking these non-incentivized savings were not clearly defined.

Most EEMs indicated that they used the Hub, though 31% of the respondents had never used the resource, as shown in Figure 21.
When asked about their use of the Hub, 80% of the respondents most often used the discussion boards. Only 7% of the respondents used the Hub for checking progress towards their goals.

When asked which resources they would like the Hub to provide (beyond those currently provided), EEMs said tools to help sell the program (e.g., business case reports, statistics, and case studies), information on the latest technologies, and improvements to networking capabilities.
i-Con System

LDCs’ feedback regarding i-Con suggested that, while many learned to work with this tool over time, they felt it required too much duplication of data entry, suffered from very slow loading, and took too many clicks to reach an intended destination. Despite frustration with i-Con, most LDC program managers preferred that the IESO oversee improvements to i-Con rather than having to learn another system. Although i-Con is not ideal, they now know how to use it and, while it took substantial time to enter data, these data were entered and tracked in a central location. REMs were much more critical, saying that they refused to use it, making LDC staff do all necessary data entry, or they used it but thought it was, in the words of one REM, “horrible.”

LDC staff who did not find i-Con sufficient for their needs noted the following areas for improvement:

› Make the system compatible with more browsers, because currently it only works with Internet Explorer 8.
› Reduce the number of clicks needed to find customer and project information.
› Make displays more simple and intuitive.
› Improve its ability to extract information.

Communication

The TR program staff said they maintained good, open communication with the LDCs, Key Account Managers (KAMs), and other program staff. REMs and LDC program managers agreed, saying the TR responded promptly to inquiries and kept communication going. Several LDCs noted they received weekly email or phone communications from the TR. One noted CLEAResult provided timelines to LDCs so that customers knew when to expect their applications to move to next steps. The IESO agreed communication from the TR had been satisfactory.

When discussing communication with OPA/IESO, several LDC program managers said they had difficulty getting responses from the IESO, particularly with communications related to non-approval. LDC staff discussed the behind-the-meter generation project change when, after receiving several applications, the IESO held all applications while reviewing the program’s future without issuing notice to LDCs. The IESO eventually came back, offering a lower incentive level (which decreased from 70% of the costs to 40%). LDCs reported frustration due to their inability to
receive clear answers from IESO program staff regarding why applications were on hold. They were also frustrated when, months later after the IESO’s decision, they had to return to customers who already had filled out applications, and had to ask these customers to complete the applications again with expectations of a lower incentive. Communication issues also arose for a project where the LDC could not obtain clarification for the application status of a project that ultimately proved ineligible. Several LDC staff members cited the inability to get timely feedback from OPA/IESO.

Internally, IESO staff noted, due to the complexity of contracts involved, delays often resulted from the difficulty with deciding on and approving changes. There is a working group that discusses these issues; once they decide on a change, IESO lawyers must become involved. The back-and-forth between differing internal groups results in a lengthy process.

4.4 Data-tracking

The IESO provided the evaluation team with login information for three data-tracking systems used for program administration: (1) SharePoint, (2) i-Con and (3) an Excel database maintained by the TR.

4.4.1 SharePoint

The program implementer maintains a dedicated SharePoint site for housing IAP application documents and various tracking files. It tracks the project status and metrics. SharePoint also contains documents summarizing PSUI activity. These are imported from the i-Con system (discussed next); the implementer cleans these to reflect application processing outcomes.

The site’s homepage displays a list of IAP case folders, which can be filtered by case ID, participant organization name, IESO business manager, date of last activity, and application status. Each case folder contains the following subfolders: application, application review, contract, draft study, and final study. Some documents in the subfolders are unique to specific projects/customers, such as engineering study reports, while others are standardized program application forms, engineering review reports, and contracts.

The SharePoint site also contains menus leading to other types of program documentation, such as templates, monthly activity reports, and program promotional materials. IESO staff directed the evaluation team to the “Willis Reports” menu for files summarizing program activity.
Not all files in this folder are updated regularly; IESO also provided the evaluation team with the following list of Excel files kept current:

- Completed Projects for IAP Process and Systems and PSUI Capital Incentives
- Completed Engineering Studies for IAP and PSUI
- IAP Detailed Study and Project Tracking
- Completed IAP Retrofit Projects
- PSUI M&T Project Applications

The evaluation team reviewed these files to inform analysis of program participation. In doing so, the team also developed the following observations about the data-tracking system:

- The SharePoint system cannot generate summary reports automatically; each IAP summary file must be manually updated by the implementer.
- Determining the status (e.g., participant, partial participant, or non-participant) of each eligible company listed on the program website must be done manually and requires multiple searches and cross-references.
- The complexity of each project, the wealth of information available, and the numerous types of support documentation supports the use of case folders. However, extracting information across multiple folders proves time-consuming due to the volume of information available and the system giving no summary of these materials. For example, customer contact information (needed for process evaluations) is contained solely in the application form, often a scanned image in the PDF format.
- In addition to difficulty with summarizing data across projects, it is not always clear which kind or piece of information proves most relevant where multiple choices exist (e.g., multiple contact persons or document versions). The evaluation team relied on IESO staff to provide a list of IAP customer contacts for the process evaluation. Many contacts provided by the IESO came from BDMs and were not listed as primary contacts in the application forms contained on SharePoint.
- Program summary files sometimes contained incomplete information (e.g., the “number of measures” field was sometimes left at zero).

### 4.4.2 i-Con

i-Con is an online portal (Microsoft Dynamics CRM), through which LDC staff submit applications and supporting documents to IESO. Figure 23 is a screenshot showing the menus (PES, DES, EEM, M&T, REM, and project incentive applications) on the left-hand side and a list of the applications on the right-hand side. As shown in the figure, information, such as the project file number, application name, status, LDC staff phone number, is available. Each row represents a different project application file. Clicking on the row opens another window with additional details and files.
IESO staff said that the data in i-Con was not always accurate. So, where possible, we should refer to SharePoint summaries maintained by the implementer. Although the system was upgraded over the past few years, the upgrade failed to make necessary improvements to the industrial program portion of the database. As a result, it is time-consuming to extract certain types of information from i-Con. For example, the contact information for the customer is contained in the application form. However, the application form is a scanned image in PDF, which requires downloading the application file and then extracting the data manually. There is no way to obtain a list of customer contact information from the system, other than repeating this process for all the applications.

As with the SharePoint system, there is a wealth of information available through i-Con. However, the data is not necessarily up-to-date and it is difficult to summarize information across all applications. Furthermore, the LDC staff submitting the application may vary in their titles; in some cases, the REM submits the applications, and in other cases, the LDC program manager or account manager submits the application.

The aforementioned issues have made the application process complicated and frustrating to participants, as discussed in Sections 4.2 and 4.3.

4.4.3 Technical Reviewer’s Energy Manager Database

Measures implemented by Energy Managers are documented in a database maintained by the TR. This document is a living document, which means that any project or measure included in it can be modified at any time. To perform the evaluation, the evaluation team obtained an extract of this database on a selected date. Additionally, for the measures sampled by the evaluation team, the TR provided the technical documentation (such as savings calculations, invoices and correspondence with the Energy Manager).

The Energy Managers database contains a large quantity of information, including but not limited to: the participant’s LDC, the type of Energy Manager (Roving or Embedded), the participant’s name, the facility’s address, the project description, the reported peak demand and energy savings, the completion date and the estimated effective useful life (EUL).
The information entered is generally complete. For instance, all measures had a “Project Title” entry and an EUL value, and only 5 entries did not have any value in the “Electricity Savings” field (some of them were probably demand-savings-only measures). One field that could be filled out more systematically is the “Project Cost”; in fact, 96 of the 375 measures submitted in 2014 showed no value at all in this field. While it is possible that many of those measures had a nil cost value, it should be indicated clearly if this is the case (with a “0”), and measures for which the cost figure was not available should be recorded as such (with “N/A” for instance).

One very important piece of information that is missing is a unique identifier number, which would enable easy location of a measure between different versions of the same database. Indeed, because the database is a living document, all the fields can be modified at any time. Furthermore, the lack of measure traceability has led to the duplication of certain measures in the database. To keep track of changes, the IESO sometimes prepares a “true-up report”, which involves identifying the changes made to each individual entry between two dates. Such a task is very complex and time-consuming, and tends to cause errors.

Another potential improvement is to indicate which measures have undergone a revision by the TR. At the moment, it is not possible to distinguish the measures awaiting verification from those already reviewed, or those not selected for verification.

Finally, the evaluation team thinks that as a living document, the EM database poses major obstacles to accurately evaluating the impact of the program. Projects can be constantly added or removed, sometimes even many years after the reporting period expires. These issues can have substantial negative impacts on the annual program results. This implies that every year, comparing the line-by-line differences between the previous report and the updated one is the only way to detect any changes that have occurred since the last result-filing.

The evaluation team performed such a comparison between the last report (updated in the fall of 2014) and the database dated from April 2015, and found that no fewer than 41 measures had been removed and 137 measures had been added. It should also be noted that when the evaluation team selected the project sample in February 2015, the database was still being modified on a daily basis for the 2011-2013 period.

The evaluation team recommends that the operation of this program be carefully reviewed to ensure that: (1) projects submitted after a given deadline cannot be considered for the present reporting period; (2) revisions by the technical reviewer cannot be made after a given deadline, which should be prior to the starting date of the evaluation process; (3) the reporting period be closed following the acceptance of the evaluation results.
4.5  Trade Ally Feedback

The evaluation team collected feedback from eight trade allies that provided services through the industrial programs, regarding such aspects as program awareness, program delivery, recruitment and training, and marketing. The following subsections discuss their responses regarding each of these aspects.

4.5.1  Program Awareness

The evaluation team asked trade allies about their awareness of IAP and PSUI. As shown in Figure 24, half of the interviewed trade allies were familiar with both programs, three were familiar with at least one program, and one trade ally (an equipment supplier) was not explicitly aware of either program, noting only a general familiarity with his customers receiving IESO incentives for their projects.

![Figure 24: Trade Ally Program Awareness (n=8)](image)

The evaluation team asked trade allies about their interactions with IESO, LDC, and the TR staff. Some trade allies provided multiple responses. As shown in Figure 25, the majority of trade allies interacted with the TR staff, one-half interacted with staff from their customers’ LDCs, three interacted with staff from the IESO, and two did not interact with anyone other than their clients’ staff.
4.5.2 Recruitment and Training

During the interviews, trade allies told the evaluation team how they first learned about the IAP and PSUI programs. Three trade allies learned about the programs from their clients; and two trade allies from contacts at one or more LDCs. Other trade allies learned about the programs from the IESO, the TR, or colleagues. Figure 26 summarizes these findings.
Two trade allies indicated they or their colleagues received training related to the industrial programs. One of these trade allies could not provide concrete feedback about their experience because another staff member attended the training. The other trade ally remembered two presentations, one by the IESO and another by a client’s LDC; these presentations provided overviews of the various IESO programs, including descriptions of program offerings and customer eligibility requirements. The trade ally felt the presentations helped his company and clients better understand the program offerings.

The evaluation team asked trade allies about receiving program materials designed to explain the IAP and PSUI programs. Three trade allies found program-related information on the IESO website; all three considered information they found helpful but poorly organized. Three trade allies did not recall receiving materials designed to explain the programs. Two trade allies received program brochures from their clients’ LDCs. One of these respondents said the program brochures gave helpful support to interactions with clients, as a sign of credibility. The other said the information provided in the brochures was not particularly helpful for determining customer or project eligibility. Figure 27 illustrates program materials that the interviewed trade allies received or collected.

![Figure 27: IAP and PSUI Program Materials Received or Collected by Trade Allies (n=8)](image)

4.5.3 Program Marketing

Trade allies indicated their customers had some awareness of the IAP and PSUI programs, as shown in Figure 28. Four trade allies observed high levels of program awareness among their client base; three said their industrial clients generally were aware of the programs’ existence, but were unaware of program details, such as eligibility requirements; one trade ally noted low program awareness. The latter trade ally said his industrial clients knew about the IESO, but, based on his experience in marketing the programs, did not have knowledge about the programs offered.
The evaluation team asked trade allies whether they actively marketed IESO industrial programs to their clients. One trade ally said his firm did not market the programs, but focused on the technical aspects of each project and left investigation of funding options to the client. The seven other trade allies actively marketed IESO industrial programs to their customers. Six of these respondents marketed programs primarily through conversations with clients. One shared LDC program brochures during conversations with clients. One trade ally marketed the programs to interested clients via presentations, and another did so through its company magazine. Figure 29 summarizes these interview findings.

**Figure 28: IAP and PSUI Program Awareness among Trade Allies’ Industrial Clients (n=8)**

**Figure 29: Trade Ally Industrial Program Marketing Methods (n=8, multiple responses)**
The team then asked trade allies whether they would be interested in taking on a more active role in lead generation and customer recruitment for the IESO industrial programs. Four trade allies said they or someone else at their organization would be interested in taking on a more active role. One of these trade allies stated his firm’s interest depended on a contractual agreement, as his company would provide intellectual property in the form of a client base. Two trade allies said their previous attempts at taking on bigger roles met with resistance from the IESO due to concerns about the potential for perceived favouritism. Three trade allies could not answer on behalf of their organizations, and one was not interested in taking on a bigger role in the future.

The evaluation team probed how the IESO or LDCs could help promote program participation and energy efficiency in general. Two trade allies could not provide a response. One trade ally said contractor-driven program marketing already worked well and so, additional or new promotion strategies were unnecessary.

The other five trade allies offered several ideas. One suggested a lunch-and-learn, where interested trade allies could informally meet with staff from the IESO and LDCs to learn more about the programs, thus becoming more effective program marketers. Three trade allies suggested mass marketing by the IESO and LDCs so that in-person conversations with clients might benefit from a strong starting point in terms of customers’ program awareness. One trade ally said training LDC staff members would be a necessary first step, and another said partnerships between the IESO and LDCs first would need to be strengthened. Finally, one trade ally felt customer-driven program-marketing could be streamlined if participating LDCs provided contractors with information about customers’ energy usage intensity.

4.5.4 Program Delivery

The evaluation team asked trade allies about IAP and PSUI program delivery. The mixed responses appeared to depend on varying factors, including the programs in which the trade allies participated, LDCs involved, and how closely the trade allies interacted with IESO, LDC, or the TR staff.

The team first identified the program aspects that worked particularly well. Two trade allies noted overall project and incentive payment timeframes met or exceeded their expectations. One trade ally pointed out that timeframes for the TR’s review processes worked well, largely because the TR staff met deadlines and provided helpful technical feedback. Additionally, two trade allies noted that in cases where staff from the client’s LDC was knowledgeable, collaboration between stakeholders worked particularly well in ensuring effective program delivery. Finally, one trade ally noted the IAP and PSUI programs effectively raised customers’ overall awareness of the benefits associated with energy-saving programs and the incentivized projects.

The evaluation team also identified those program aspects that could be improved from the trade allies’ perspectives. For example, a more uniform body of program knowledge among customer LDCs could improve the PSUI program delivery. Contrary to the feedback provided by others, two trade
allies said staff from their clients’ LDCs lacked a detailed understanding of the programs, causing their clients to hesitate and delay project implementation.

Also contrary to the feedback provided by others, four trade allies said project timeframes caused problems. These trade allies particularly noted the extended time required for their clients to finalize contract terms with the IESO. These same trade allies said that contract terms required by the IESO proved onerous for end-use customers; furthermore, they said, contract terms constituted a potential deterrent to program participation. At the very least, they said, the level of detail required could cause projects to stall while customers were seeking assistance from legal experts.

The team asked trade allies if and how often a lack of internal funding constituted a barrier to completing a capital investment project for clients. Seven out of eight interviewed trade allies said a lack of funding at some point posed a barrier for their clients. All seven reported at least one-half (if not more) of their clients ran into this barrier due to project delays or cancellations.

Larger customers, particularly those with more than one site, often compared multiple capital investment project options and pursued those that made the most sense in terms of anticipated return on investment and project paybacks, both of which benefitted from available financial assistance. One trade ally recommended that the IESO restructure program design and pay contractors directly so that participants do not have to wait for reimbursements, thereby making it easier to make upfront decisions about project funding.

4.6 ISO 50001 Program Alignment

There are various levels of energy management systems (EMS), as illustrated in Figure 30. The main categories are:

› EMIS – Energy Management Information System;
› EMS – Energy Management Systems, supported by SEM (Strategic Energy Management) programs;
› ISO 50001 Systems.

An EMIS is the simplest of the three to implement, while an ISO 50001 system is the most elaborate because of the controls, results reporting and audits required to conform to the standard.
IESO mandated the evaluation team to assess the industry members’ level of knowledge about energy management systems, including the three elements presented above.

As part of the surveys, PSUI EEMs, trade allies, LDC representatives and IAP participants were asked about their levels of familiarity with the ISO 50001 energy-management standard and about the motivations or barriers to its implementation in Ontario.

Natural Resources Canada (NRCan) and program managers from a number of Canadian and American utilities and organizations were also contacted to identify the current best practices in terms of ISO 50001 program alignment. They were also surveyed regarding ISO 50001 market readiness and their perception of the obstructive and motivating factors in EMS implementation in the industrial sector.

4.6.1 PSUI EEM Survey Results

PSUI EEMs were asked if they had heard about the ISO 50001 energy-management standard. Overall, the majority (96%) of respondents had heard about this standard.
Figure 31: ISO 50001 Standard Awareness among EEM (n=44)

Among EEMs that heard about the ISO 50001 standard, just over a third (36%) is very familiar with the standard. On average, respondents rated their level of familiarity with this standard at 6, on a scale from 1 to 10.

*On a scale from 1 to 10 where “1” means “Not at all familiar” and “10” means “Extremely familiar”

Figure 32: Familiarity with the ISO 50001 Standard (n=42)*

Most companies or organizations (86%) which employed the surveyed EEMs are not ISO 50001 certified, however 44% of them consider aligning with the ISO 50001 standard within the next two years. Energy conservation is the main reason cited by these companies or organizations for aligning with the ISO 50001 standard.
The most common reasons cited for not aligning with the ISO 50001 standard are the lack of perceived benefits, resources and time.

EEMs were asked whether the company or organization that they work for use performance indicators to track their energy use. Respondents indicated that they are using such indicators (11 out of 12 respondents) or are in the process of implementing the use of such indicators (1 respondent). The typical indicator for industrial businesses is the energy use per unit production, either at plant or production line level; in other facility types, it is the energy use per unit floor area.
Finally, over 66% of the companies or organizations where the EEMs work either have an energy-efficiency policy, are in the process of developing such a policy, or have energy reduction targets already included in their strategic plans.

![Classification of Organizations by Energy-efficiency Policy Status](image)

**Figure 36: Classification of Organizations by Energy-efficiency Policy Status**

### 4.6.2 Trade Allies, LDC and Participants Survey Results

Trade allies, LDCs and participants were asked if they had heard about the ISO 50001 energy-management standard. Overall, 31 of the 43 respondents (72%) had heard about this standard.

![ISO 50001 Standard Awareness among Trade Allies, LDC and Participants](image)

**Figure 37: ISO 50001 Standard Awareness among Trade Allies, LDC and Participants**

Trade allies, LDCs and participants that heard of the ISO 50001 standard are however not very familiar with the standard. On average, respondents rated their level of familiarity with this standard at between 3 and 5, on a scale from 1 to 10.
Table 30: Familiarity with the ISO 50001 Energy-management Standard

<table>
<thead>
<tr>
<th>Familiarity with the ISO 50001 Standard</th>
<th>Average Scale from 1 to 10, where “1” means “Not at all familiar” and “10” means “Extremely familiar”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trade Allies</td>
<td>3</td>
</tr>
<tr>
<td>LDC</td>
<td>5</td>
</tr>
<tr>
<td>Participants</td>
<td>4</td>
</tr>
</tbody>
</table>

Very few companies with which the respondents work in Ontario are ISO 50001 certified. Only 5 respondents, out of 30, work with ISO 500001 certified companies.

Few of the companies or organizations with which the respondents work in Ontario ask them for information on ISO 50001 and its implementation.

![Bar Chart](image)

Figure 38: Organizations that Inquired about ISO 50001 Standard and Its Implementation (n=30)

In the respondents’ opinion, the most common reasons for companies or organizations to align with the ISO 50001 standard are energy and cost savings, followed by marketing and client requirement or customer pressure (see Figure 39).
Participants were asked about their use of energy performance indicators. Ninety percent of the participants surveyed said they use energy performance indicators to better manage their energy consumption, while 10% monitor their overall energy consumption.

Trade allies and LDCs were asked about the proportion of companies or organizations they work with that use performance indicators to track energy use. The respondents said that the proportion varies according to the building or company size and market segment (see Table 31). Three respondents estimated this proportion at between more than 20% and 50%.

The indicator most commonly used among industrial businesses is the energy use per unit production, at either the plant or the production line level. In other types of facilities, it is the energy use per unit floor area.

According to three respondents, the use of performance indicators is on the rise.
Table 31: Use of Performance Indicators by Ontario Companies and Organizations, according to LDCs and Trade Allies

<table>
<thead>
<tr>
<th>Types of Facility Using Performance Indicators</th>
<th>Types of Facility Not Using Performance Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>› Large industrial facilities</td>
<td>› Small industrial facilities</td>
</tr>
<tr>
<td>› Large commercial buildings</td>
<td>› Small commercial buildings</td>
</tr>
<tr>
<td>› Companies with multiple locations</td>
<td>› Stand-alone businesses</td>
</tr>
<tr>
<td>› Mining</td>
<td>› Pharmaceutical industry</td>
</tr>
<tr>
<td>› Forestry</td>
<td></td>
</tr>
<tr>
<td>› Municipal buildings</td>
<td></td>
</tr>
<tr>
<td>› Hospital</td>
<td></td>
</tr>
<tr>
<td>› Schools</td>
<td></td>
</tr>
<tr>
<td>› Small industrial facilities</td>
<td></td>
</tr>
<tr>
<td>› Small commercial buildings</td>
<td></td>
</tr>
<tr>
<td>› Stand-alone businesses</td>
<td></td>
</tr>
</tbody>
</table>

4.6.3 Best Practices

As mentioned earlier, Natural Resources Canada (NRCan) and program managers from a number of Canadian and American utilities and organizations were contacted to identify the current best practices in terms of ISO 50001 program alignment.

Incentive Programs

NRCan and a number of Canadian and American utilities and organizations have set up incentive programs to help industrial businesses implement various components or levels of an energy management system (EMS). The Canadian programs are summarized in Appendix XII.

EMIS Programs

Efficiency Nova Scotia’s On-Site Energy Management Program, Enbridge Gas Distribution’s RunItRight Program, NRCan’s ecoENERGY Efficiency for Industry Program and SaskPower’s Industrial Energy Optimization Program all support the implementation of an EMIS.⁷

According to NRCan, implementing an EMIS takes three steps:

› Developing a preliminary business plan;
› Developing an implementation plan;
› Implementing the measures identified.

At each of these steps, management can decide whether to go ahead with the next one, based on information gathered during the previous step. In contrast to an EMIS, ISO 50001 implementation requires obtaining overall approval for the entire process prior to implementing the process. Consequently, plant energy managers find it easier to get management’s approval to implement an EMIS than ISO 50001.

According to NRCan, an EMIS may lead to less sustainable results than ISO 50001, because it is not mandatory for an EMIS to undergo regular audits, which quite often prompt and encourage constant energy efficiency improvements. However, the implementation of an EMIS can eventually lead to the implementation ISO 50001, because once an EMIS is implemented, it becomes easier to implement ISO 50001.

**SEM Programs**

BC Hydro and a number of American utilities have Strategic Energy Management (SEM)\(^8\) programs. Aligned with ISO 50001, an SEM is designed to support the clients through various stages in implementing an EMS.

It is estimated that the mandatory requirements of BC Hydro’s SEM program are 50% aligned with ISO 50001. With the optional actions encouraged by the SEM program, the SEM program is nearly 70% aligned with ISO 50001.\(^9\)

A SEM can eventually lead to the implementation of ISO 50001. However, according to BC Hydro and Bonneville Power Authority, the gain in benefits between the two is perceived as having the least value, while involving resources in the form of time, money and human resources. The extra step from SEM to ISO 50001 will be typically taken only for the benefit of the ISO 50001 certification itself.

**ISO 50001 Programs**

NRCan's ecoENERGY Efficiency for Industry Program and SaskPower’s Industrial Energy Optimization Program are both aimed at the implementation of an ISO 50001 system, including certification. These two programs also support the implementation of an EMIS.

Manitoba Hydro does not have an ISO 50001 program, but plans to include ISO 50001 training in the next energy manager program.

The other utilities contacted have no plan yet for an ISO 50001 program.

**ISO 50001 Market Readiness**

Up to now, only a very limited number of Canadian companies have implemented an ISO 50001 system. According to NRCan, only 26 to 28 Canadian companies had obtained the certification between June 2011 and January 2015.

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\(^8\) Program developed for a group of utilities by the Consortium for Energy Efficiency (CEE)

\(^9\) This program was analyzed against ISO 50001.
The EMS is more popular than ISO 50001. For example, in British Columbia alone, there are currently 35 participants in BC Hydro’s SEM program, which is more than the total number of Canadian companies that already have the ISO 50001 certification or that are currently undergoing ISO 50001 implementation.

### 4.7 Industrial Program Best Practices Review

The IESO asked the evaluation team to compare the IAP and PSUI programs’ design and key elements with those of other leading industrial programs to determine their alignment with best practices.

#### 4.7.1 Description of Programs Reviewed

All the programs reviewed have been in place between six and 22 years. In contrast, the IESO programs are relatively new (e.g., four years for PSUI and five years for IAP). In addition to IESO in Ontario, providers interviewed for the study served three other Canadian provinces: British Columbia, Manitoba, and Quebec. The remaining three providers operated in the northeastern and northwestern United States. When providers offered discrete industrial programs, the evaluation team evaluated those designed to serve the largest industrial customers. Two programs, however, did not limit eligibility based on energy usage, instead offering their programs to all customers on an industrial rate.

Table 32 shows providers interviewed and their industrial programs reviewed for best practices.

#### Table 32: Overview of Evaluated Programs

<table>
<thead>
<tr>
<th>Utility/Authority</th>
<th>State/Province</th>
<th>Program(s) Reviewed</th>
<th>Program Year</th>
<th>Target Audience</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Delivered through a Distribution Utility</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IESO (Electric System Operator)</td>
<td>Ontario, Canada</td>
<td>saveONenergy Process &amp; System-Upgrades-Institutional &amp; Industrial (PSUI)</td>
<td>4</td>
<td>Distribution customers; eligibility varies by program*</td>
</tr>
<tr>
<td>Bonneville Power Administration (BPA) (Power marketing and Transmission)</td>
<td>Washington, Oregon, Idaho, Montana, Wyoming, Nevada, Utah, California</td>
<td>Energy Smart Industrial Program</td>
<td>6</td>
<td>All customers on an industrial rate</td>
</tr>
<tr>
<td><strong>Delivered Directly to End-users</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IESO (System Operator)</td>
<td>Ontario, Canada</td>
<td>saveONenergy Industrial Accelerator Program (IAP)</td>
<td>5</td>
<td>Transmission customers peak demand ≥1MW</td>
</tr>
<tr>
<td>Utility/Authority</td>
<td>State/Province</td>
<td>Program(s) Reviewed</td>
<td>Program Year</td>
<td>Target Audience</td>
</tr>
<tr>
<td>-----------------------------------------------------------</td>
<td>------------------------------</td>
<td>-----------------------------------------------------------------------</td>
<td>--------------</td>
<td>--------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>BC Hydro</strong> (Generation, Transmission and Distribution) (Electricity)</td>
<td>British Columbia, Canada</td>
<td><strong>Power Smart</strong> Project Incentives (PI Industrial) Strategic Energy Management (SEM Industrial)</td>
<td>12 (PI) 9 (SEM)</td>
<td><strong>PI</strong>: Distribution or transmission rate/using &gt; one gigawatt-hour per year/projected savings of ≥50 MWh annually (transmission customers projected savings of ≥300 MWh annually) <strong>SEM</strong>: Annual electricity usage of ≥20 gigawatt-hours</td>
</tr>
<tr>
<td><strong>Hydro Quebec</strong> (Generation, Transmission and Distribution) (Electricity)</td>
<td>Quebec, Canada</td>
<td><strong>Industrial Systems</strong></td>
<td>12</td>
<td>All customers on an industrial rate</td>
</tr>
<tr>
<td><strong>Manitoba Hydro</strong> (Generation, Transmission and Distribution) (Electricity and Gas)</td>
<td>Manitoba, Canada</td>
<td><strong>Power Smart-Industrial</strong> (Performance Optimization Program), Energy Efficiency Screening Studies, Engineering Studies</td>
<td>Started 1993. Enhanced in 2006 and 2014</td>
<td><strong>POP</strong>: Annual savings of 25,000 kWh or 10 kW, equipment meets CSA standards and has expected operating life of 10 years.</td>
</tr>
<tr>
<td><strong>Commonwealth Edison</strong> (ComEd) (Transmission and Distribution) (Electricity)</td>
<td>Northern Illinois</td>
<td><strong>Smart Ideas: Industrial Systems Optimization</strong> (For compressed air, process cooling and industrial refrigeration systems)</td>
<td>7</td>
<td>Compressed Air: Minimum 250 HP (combined) of compressors Process Cooling: Minimum 500 tons in operation Industrial Refrigeration: Minimum 500 HP (combined) of compressors</td>
</tr>
<tr>
<td><strong>New York State Energy Research and Development Authority</strong> (NYSERDA) (Public benefits corporation offers information, programs, technical expertise, and funding to increase energy efficiency)</td>
<td>New York</td>
<td>Industrial and Process Efficiency (IPE), FlexTech</td>
<td>-</td>
<td>All customers paying system benefits charges. <strong>IPE</strong>: Focus on manufacturing facilities and data centers <strong>FT</strong>: ≥100 kW demand</td>
</tr>
</tbody>
</table>


*PSUI: (Capital Incentives) Proposed project in service before December 31, 2015, and annualized electricity savings > 350 MWh, (100 MWh for Small Capital Incentives); (Energy Managers) single facility connected to LDC and potential to deliver annual savings of ≥ 0.3 MW peak demand savings and 0.3 MW x Facility Load Factor x 8760 hours in energy savings; (Preliminary Engineering Study) single facility connected to LDC and deliver ≥ 100 MWh of annualized electricity savings; (Opportunity Accelerator) single facility connected to LDC, have a peak electric demand of ≥1 MW, have not performed an Opportunity Accelerator assessment at the facility.
4.7.2 Best Practices

The evaluation team reviewed information collected from in-depth interviews and the literature review to identify best practices for the following eight components shared by all programs:

› Program Theory and Design
› Program Management
› Marketing and Outreach
› Reporting and Tracking
› M&V and Quality Control
› Program Participation Process
› Incentive Approaches
› Program Evaluation

Several practices were common to multiple providers. For example, providers’ programs utilized a holistic approach, providing a comprehensive portfolio of services to industrial customers. Several providers considered program flexibility key to a program’s success, building the program to support and respond to individual customer’s needs rather than promoting specific or limited measures. Providers quickly moved tested measures with predictable savings and stable prices into prescriptive programs so that their staff could focus on more complex custom projects that customers were unlikely to complete on their own.

Providers also commonly used SEM programs or, in the absence of a formal SEM program, facility assessments and feasibility studies to identify opportunities and to drive participants to custom incentive-based programs. One utility regarded its SEM program as overhead, with all savings achieved attributed to capital programs (e.g., compressed air and process cooling). Another said they could not reach their savings goals using custom projects alone, reporting SEM accounts provided one-third of their targets.

Two providers advised utilities to balance risk against the reward for both data-tracking and M&V. Program delivery can become unnecessarily delayed in tracking and measuring more data than that warranted by the potential risk, often resulting in long delays regarding application approval, savings verifications, and incentive payments. Such delays can give rise to customer and contractor dissatisfaction and can affect participation.

The evaluation team asked providers about their strategies to guard against free-ridership. While most acknowledged free-ridership as a concern, agreement did not emerge on how common free-riders were in these programs. For example, one provider said they did not have any. Many providers, however, said they relied on ongoing close relationships with their customers to first identify potential free-riders. Some also include free-ridership “declarations” in their contract agreements or may ask customers to provide financial information to prove they are not free-riders. Most also establish
efficiency baselines to boost efficiency and help determine the amount of energy savings above what a customer would have already installed.

The evaluation team asked providers about their customer contracting requirements. Four providers said they required customers to sign contracts. The contract terms varied between three and ten years. In all cases, providers said rebates may be clawed back if savings do not persist. All four providers said, however, they would first evaluate savings achieved to date, and they rarely pursued such extreme options.

Overall, while many best practices can be found in the literature for each of the eight components discussed above, those included below synthesize the research findings.

1. Program Theory and Design
   - Target customer segments underserved by past programs. Examples include: industrial processes, agriculture, high-tech industries (such as data centres), and the food service industry.
   - Provide comprehensive programs, offering a full menu of services, including: incentives, marketing, technical assistance, and training and education for a full menu of customer end-use applications. Target all decision points: equipment purchase/replacement, retrofit, and new construction.
   - Evaluate program offerings annually and move all possible measures into prescriptive programs.
   - Keep abreast of technology; incentivize only the highest-performance products in each measure.

2. Program Management
   - Develop and maintain clear lines of responsibility and communication to facilitate program staff accountability.
   - Establish, communicate, track, and report clear goals. Set realistic key performance indicators (KPIs), and attach bonuses and penalties to these.
   - Utilize well-qualified engineering staff and recognized industry experts.
   - Maintain consistent personnel over time.
   - Establish a secure SharePoint site to allow program stakeholders to access customer identifiable information.
   - Foster collaboration among program stakeholders to maintain common and consistent program services and messaging.

“Be careful putting kWh goals into the implementer’s contract. This has a tendency to focus them on that number and how they get there does not matter [to them].” Provider
3. Marketing and Outreach

› Utilize personal marketing to customers through KAMs and program representatives to identify and address customer-specific barriers, build trust and confidence, and sustain relationships.
› Market program offerings at the earliest decision-making stages during equipment or facility replacements or retrofits.
› Develop and provide case studies addressing key technologies and segment applications to support facility managers in selling projects to upper management.
› Discuss energy efficiency in the context of non-energy benefits, such as increased production, lower operation costs, and better process control. For example, quantify each customer’s annual energy cost savings and greenhouse gas reductions, achieved for each percentage of energy usage reduction through energy efficiency.
› Educate customers about major energy efficiency opportunities in industrial processing (e.g., the water-energy connection).
› Maintain ongoing, up-to-date training for account managers, marketing staff, and trade allies to keep them informed about the entire portfolio of programs and the latest efficiency technologies and practices.

“Find out what is important to the customer, what drives them. For example, if it’s profitability, relate energy to what that could mean to their profit margin.” Provider

4. Reporting and Tracking

› Integrate all program data, including measure-level data, into a single database. Integrate or link this with other appropriate systems, such as cross-program databases, customer information systems, and marketing or customer relationship management (CRM) systems.
› Track program prospects early to intervene at key decision points for major equipment-related events.
› Balance tracking levels against resource availability and risk.

5. M&V and Quality Control

› Scale M&V efforts to match the risk represented by each project’s uncertainty of estimated savings and its contribution to overall estimated program savings.
› Require post-inspections and commissioning for all large projects and projects with highly uncertain savings.\(^\text{10}\)
› Require pre-inspections for large projects with highly uncertain baseline conditions that significantly affect project savings.\(^\text{11}\)

Utilize corrective action reports, and review these with the program implementer or trade ally to determine mistakes made and action needed to correct these.

6. Program Participation Process

- Provide customers with a single portal or program contact to assist in accessing and navigating the full range of program services.
- Provide technical assistance to help applicants through the process.
- Adjust incentive levels based on market demand.
- Limit or exclude incentive payments to known free-riders. Do not accept projects already underway.

“If you have zero free-ridership, you are not casting your net wide enough. If you can guarantee [you have only] one free-ridership, you are focusing too much on that and losing money.” Provider

7. Incentive Approaches

- Set an efficiency baseline and use incremental costs to benchmark and limit payments.
- Stop incentivizing measures once they become common in the market.

8. Program Evaluation

- Develop an evaluation plan in parallel with program design to: (1) determine information that must be collected during implementation; (2) assess program evaluability and potential evaluation approaches; (3) ensure the evaluation will cover all important research topics.
- Stagger the timing of process and ex-post impact tasks so that process evaluations can be conducted and results communicated on a relatively real-time basis.
- Conduct a customer satisfaction survey after each project, and annually review the results with each trade ally or study provider.
- Develop realization rates by end use or measure type, and utilize these to improve savings estimates over time.
4.7.3 Benchmarking

In addition to identifying best practices, the evaluation team benchmarked the reviewed programs per the following criteria:

- Use of a third-party implementer
- Use of KAMs in program marketing and delivery
- Full-time in-house staff dedicated to the program (FTEs)
- Metrics tracked to measure program success
- Program incentives
- Financing offered by the utility or government agency interviewed

In reviewing these industrial programs, the evaluation team found program delivery varies by provider. Three providers utilize a third-party implementer and three deliver their programs using in-house staff. One provider that utilizes in-house staff also contracts with outside consultants to support their M&V and marketing efforts.

Marketing to large industrial customers requires one-on-one communication and individualized account management. Therefore, KAMs prove central to the marketing and relationship management strategies of all providers interviewed. One provider has completely abandoned mass marketing to industrial customers. While all utility programs rely on one-on-one relationships between customers and KAMs, each manages KAM goals differently. A single best practice for incentivizing KAMs did not emerge from the interviews. The depth of a KAM’s involvement appears to remain largely at the discretion of each KAM.

When asked which metrics program providers tracked to determine program success, respondents most commonly cited savings achieved and cost-effectiveness, though customer participation and satisfaction also emerged as important indicators.

Although large industrial programs are designed to drive custom projects, several providers offer prescriptive incentives as part of their suite of programs for industrial customers. As one provider said, prescriptive programs ensure that everyone has access to incentives and allow the utility to focus staff resources on complex custom projects that can achieve large savings. The evaluation team focused the benchmarking review on custom incentives of these programs. These incentives are based on a flat $/kWh saved or are calculated to pay the lesser of $/kWh for first-year annual savings or a percentage of eligible project capital costs. Percentages range from 50% to 70%. Table 33 shows the benchmarked items.
Table 33: Benchmarking Programs

<table>
<thead>
<tr>
<th>Utility</th>
<th>Third-party Implementer</th>
<th>Utilize Account Managers/Goals</th>
<th>In-house Staff (FTE)</th>
<th>Metrics Used to Measure Success</th>
<th>Incentives</th>
<th>Financing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Delivered Indirectly through Distribution Utility</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IESO</td>
<td>LDCs</td>
<td>LDC’s KAMs/ Program kW savings.</td>
<td>PSUI: 5</td>
<td>Participation Energy savings Project and Program Cost Effectiveness</td>
<td>Varies by program*</td>
<td>No</td>
</tr>
<tr>
<td>BPA</td>
<td>LDCs</td>
<td>No/customer support provided by implementation contractor/goals set for kWh savings, response times, communication protocols, and quality control</td>
<td>3-1/2 to 4</td>
<td>Energy savings, program cost/average MW, customer satisfaction</td>
<td>Paid by utilities (TBD)</td>
<td>Provided by LDC if offered</td>
</tr>
<tr>
<td><strong>Delivered Directly to the End-user</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IESO</td>
<td>Implement in-house</td>
<td>Business Development Managers/ Program kW savings.</td>
<td>IAP: 2</td>
<td>Participation Energy savings Project and Program Cost Effectiveness</td>
<td>Varies by program**</td>
<td>No</td>
</tr>
<tr>
<td>BC Hydro</td>
<td>Implement in-house</td>
<td>KAMs/goal for annual kWh savings</td>
<td>40 for the transmission program, 30 for the distribution program</td>
<td>Energy savings, cost-effectiveness</td>
<td>Transmission: $45/MWh Distribution: Averages $35/MWh</td>
<td>No</td>
</tr>
<tr>
<td>Hydro-Quebec</td>
<td>Implement in-house</td>
<td>KAMs/no goals required at this time</td>
<td>25</td>
<td>Cost-effectiveness, energy savings</td>
<td>Up to $0.15/kWh or 50% of cost $300,000 cap</td>
<td>No</td>
</tr>
<tr>
<td>Manitoba Hydro</td>
<td>Implement in-house</td>
<td>KAMs/no goals at this time</td>
<td>6 (growing to 10)</td>
<td>Energy savings</td>
<td>$0.10/kWh savings plus $200/KW (winter demand reduction), plus $200/KW (summer demand reduction) up to 50% of incremental project cost. $200,000/project cap. Will not incentivize below a 1-year</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Utility | Third-party Implementer | Utilize Account Managers/Goals | In-house Staff (FTE) | Metrics Used to Measure Success | Incentives | Financing
---|---|---|---|---|---|---
ComEd | Subcontractor | KAMs/goal for number of opportunities submitted | 1 | Participation, energy savings, cost-effectiveness | Refrigeration and process cooling: $0.07/kWh, compressed air: implementation is paid for by utility; therefore, no additional rebates. | No
NYSERDA | Implement in-house (with external technical support for M&V and outreach and customer advocacy) | KAMs/goals not stated | 6 | Participation, energy savings | IPE: (Electric) $0.05/kWh- $0.16/kWh up to 50% of project cost, no incentive cap; (Natural Gas) $6/MMBtu- $20/MMBtu up to 50% of project cost, $1 million/Facility/Year cap | No

*PSUI: (Capital Incentives) $200/MWh or 70% of eligible project cost for retrofit projects, up to 50% of custom project cost or fixed incentives for prescriptive projects; (Energy Managers) 80% of annual salary up to $100,000 + up to $8,000/year for expenses; (Engineering Studies) preliminary studies: 100% of cost up to $10,000. Detailed studies: 100% up to %50,000; (Opportunity Accelerator) no cost to customer to identify opportunities; incentives available through the other programs.

**IAP: (Process Systems) $230/MWh or 70% of eligible project cost or one-year simple payback (project incentive capped at $10 million); (Retrofit) Up to 50% of eligible project cost.

**Program Offerings**

The evaluation team benchmarked services offered by the different utilities. All programs offer feasibility studies to identify process and equipment improvement opportunities. Three providers pay 100% of the study cost; one of these providers requires customers to commit to spending up to $15,000 on study findings with a payback of 18 months or shorter. This same provider requires customers with compressed-air systems to agree to install any of the five defined measures if they are identified in the study. Two providers pay 50% of study costs, and one provider pays 50% up to a maximum of $15,000.
Figure 40 shows the number of providers that offer the nine benchmarked program services and services offered by the IESO through the IAP or PSUI programs. IESO noted that their training and support, workshops and webinars are not offered specifically under the two programs but are separate offerings which are available to energy managers, trade allies, and any other interested party.

![Program Offerings](chart)

### 4.7.4 Community Impact

The evaluation team spoke to providers about the impact of their programs on job creation in their communities. Few providers drew a direct line between the programs and direct community impacts. Three providers, however, cited hiring of project managers to work with customers, increased competition, and aggressive program marketing among trade allies seeking compressed-air projects, and technical assistance and incentives as playing a role in keeping manufacturers from relocating facilities to other provinces or states.

### 4.7.5 Common Barriers to Data-tracking and Administration

Providers in Canada and the United States confront similar challenges when delivering large, complex programs that require significant data collection and tracking and ongoing interactions with customers during project installations. Two primary challenges emerged.
First, difficulties arise in managing customer and program data systems that do not share a standard data exchange protocol. When using different systems for CRM, project tracking, M&V, and payments, providers may be required to enter project data multiple times. Matching kWh savings in the project tracking database with those in the reimbursement system can create problems, as can running reports requiring data from different systems.

To address these problems, all providers recommended purchasing the most robust affordable system for storing and managing all data in one place. Four providers said they did this or had systems that easily interfaced. They specifically cited Seibel as a system for all functions, Frontier for project tracking, and Energy Orbit for CRM. Energy Orbit is a cloud-based application, operating on a Salesforce platform, which allows users with compatible systems to easily share data.

Second, providers cited project flow and processing times. Two providers said their average projects took 18 months to complete, with most of the time consumed by customer implementation and waiting for responses. When considering ways to streamline the phases which utilities control, one provider raised this question for himself and others: “Do you need a screening review of every project, or can you trust your study providers?” He went on to say: “We’re not English majors here [looking for perfect applications and forms], we just look for the key elements [required to evaluate the project] and turn around the applications, studies and M&V reports.”

In many cases, provider technical staff or KAMs guide customers through the entire process and, if necessary, complete applications and reports. One provider said: “For every action the customer takes, we have a person to follow up and position them for the next stage.”

One provider utilizes program KPIs and holds weekly project management meetings to track the status of all projects. Projects falling outside the KPIs targets receive additional attention.

### 4.7.6 Alignment with Best Practices

All program providers interviewed are utilizing best practices in some areas; none are utilizing them across all areas of their programs. Most providers are increasing their focus on comprehensive SEM practices to achieve on-going energy and demand savings. To varying degrees, they are providing customers with the technical expertise and staff support to identify, implement and maintain these practices.

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12 SEM is a holistic approach to energy management in order to continuously improve energy performance by achieving persistent energy and cost savings over the long term. It focuses on business practice changes from senior management to shop-floor staff, affecting organizational culture to reduce energy waste and improve energy intensity. SEM emphasizes enabling plant management and staff to impact energy consumption through behavioural and operational changes. Although SEM does not emphasize a technical or project-centric approach, SEM principles and objectives may support capital project implementation. See: [http://library.cee1.org/sites/default/files/library/11283/SEM_Minimum_Elements.pdf](http://library.cee1.org/sites/default/files/library/11283/SEM_Minimum_Elements.pdf).
Additionally, providers are finding that customer participation is improved when providers reduce the paperwork burden of lengthy applications, contracts and M&V document requirements. Programs and customers also benefit when providers take a common-sense approach to imposing non-performance penalties, balancing energy savings achieved against any remaining financial risk to the program or damage to the customer relationship that could result in the customer moving their facilities outside of the territory or state.

Like the providers interviewed, IESO’s programs are aligned with some best practices, such as offering a comprehensive menu of services targeting both large and small industrial customers, and utilizing the engineering studies to drive participation in their other programs. The evaluation team identified areas where IESO may want to consider implementing or increasing best practices to enhance program performance and customer and trade ally satisfaction.

IESO is aligned with best practices in the following areas:

**Marketing and Outreach:** IESO aligns with marketing and outreach best practices. Both the IAP and PSUI programs are marketed directly to the customer through business development managers and KAMs. Case studies featuring common energy efficiency measures (e.g., HVAC, lighting, compressors) and energy management are available on the saveONenergy website. Additionally, IESO provides program brochures and organizes training webinars and presentations.

IESO is somewhat aligned with best practices in the following areas:

**Program Theory and Design:** IESO’s programs align somewhat with best practices, offering a range of services that target large and small industrial customers. An additional opportunity for IESO may be to consider an SEM-type program similar to BPA’s High Performance Energy Management program, which seeks to integrate energy management within the customer organization as a core business practice, thereby fostering continuous improvement and sustained energy savings.

**Reporting and tracking:** All stakeholders use IESO’s i-Con system for tracking and reporting on the PSUI program. The program, however, reportedly has a steep learning curve and is difficult to use. For the EM initiative, the database is built and maintained by the TR. The fact that this database is a living document poses serious problem in terms of savings accounting. IESO uses no formal tracking system for the IAP program. The TR tracks program applications and project progress and provides quarterly reports to IESO.

**M&V:** Both programs require that engineering studies be conducted to establish a baseline of energy use, and that completed projects undergo a post-implementation site inspection by either the TR or an LDC representative. As for the EM initiative, no M&V is required, because of the smaller scale of the projects submitted. However, the evaluation team is of the opinion that it could be beneficial to add some M&V requirements for projects exceeding a given threshold of savings.
IESO is not aligned with best practices in the following areas:

**Program Management:** IESO has had high turnover among its IAP program management staff. They do not appear to have a single program contact or a secure site to exchange sensitive data between stakeholders.

Collaboration among stakeholders is not apparent. Incentives were changed without issuing proper notice to program staff or participants, resulting in some customers receiving lower incentives after making decisions to proceed.

**Program Participation Process:** The PSUI program has no single point of contact designated for customers. Customer support depends on the individual LDC.

**Incentives:** Capital incentives are based on actual project costs or energy savings achieved against a custom energy performance baseline, instead of a minimum performance baseline as recommended by best practices.

### 4.8 Program Performance Metrics

Program performance metrics (PPM) are most effective when they are:

› Drawn from readily available data;
› Quick and simple to compile; and
› Provide meaningful insight into a program’s performance.

Bearing these in mind, the evaluation team identified two performance metrics that apply to both IAP and PSUI, and specific PPMs for each program. Each identified performance metric is given a brief description, including the kinds of information required, the benefits that can be gained by tracking the metric and the recommended review frequency. Each PPM is intended for the IESO and the TR unless otherwise noted. PPM 7 only applies to the LDCs.

The evaluation team noted that the program implementer tracks certain metrics in monthly reports and in the dashboard, such as energy and demand savings. The PPMs discussed below are meant to provide information on how the programs are performing in other dimensions.
IAP and PSUI PPMs

› PPM 1: Track the number of applications in each initiative of IAP and PSUI. Track this PPM by NAISC codes if these are available in the customer’s database.

Data required: The number of unique applications submitted to each initiative by calendar year. Customer NAISC code for each application.

Benefits: Tracking applications by initiative and NAISC code will allow program managers to identify the initiatives that are utilized most often by the customers. This will also identify those initiatives with less participation, which may warrant further investigation. If the programs are able to track applications by customer NAISC codes, program staff will also be able to identify specific industries which are participating most actively in the initiatives, and those that are not. Program managers may be able to identify industry-specific barriers to participation and develop solutions to overcome them.

Frequency: Quarterly.

› PPM 2: Track the conversion rates of program-funded engineering studies to project applications. Track conversion of project applications to signed contracts.

Data required: A list of all program-funded engineering studies and their status as of the review date.

Benefits: This PPM identifies the percentage of studies that are converted to project applications, and also the percentage of project applications that are converted to signed contracts. This data can be benchmarked against previous and future years to identify trends. The evaluation team noted that the TR is already tracking this metric in the IAP monthly report.

Frequency: Bi-annually (twice a year).

IAP PPMs

› PPM 3: Track the number of times the technical review of Process and Systems applications must go back to a customer requesting additional project information. Record the types of information requested. Segment by program-funded and self-funded engineering studies.

Data required: Engineering funding source, dates additional information was requested, and details about the exact information requested.

Benefits: This PPM identifies: (1) the differences in the level of the completeness of information received and (2) the efforts required by staff to gather the data needed for each type of application. This may also highlight any patterns regarding the types of information that customers consistently fail to provide, and encourage discussions on how to modify data requirements or improve compliance by customers.

Frequency: Annually.
PPM 4: Track the process flow time between receipt of the complete application and notification to the customer on application status.

**Data required:** (1) the date when the complete application is received (after any additional requested information has been submitted by the customer); (2) the date when the customer is notified of project status. The number of days between these two dates is calculated.

**Benefits:** This PPM identifies the time it takes to review and respond to a customer’s application. This information can be compared across programs and benchmarked against best practices.

**Frequency:** Bi-annually (twice a year).

**PSUI PPMs**

PPM 5: Track the percentage of EEMs and REMs who meet their savings targets.

**Data required:** Individual EEMs and REMs achieved savings against targets.

**Benefits:** This PPM identifies the EEMs and REMs who have achieved their savings goals. It also identifies the contributions made by EEMs to the combined total savings, in comparison to those made by REMs. This PPM also identifies the barriers to achieving the targets. It identifies solutions to overcome the barriers and increase program savings.

**Frequency:** A quarterly review of savings target achievement performance with each individual EEM and REM. The overall savings achievement should be reviewed semi-annually to allow for making adjustments in time to ensure calendar year savings.

PPM 6: Track the number of days it takes to respond to questions from the LDCs.

**Data required:** Date when the LDC submitted a question about PSUI and the date when program staff provided a response.

**Benefits:** IESO is relying on the LDCs to ensure the good delivery of the PSUI program. LDCs need timely guidance and support in order to submit high-quality project applications and maintain a good level of satisfaction with the program.

**Frequency:** Question-response turnaround times and technical review times should be reviewed semi-annually.

PPM 7: Track the customer drop-out rate, the phase in which the drop-out occurred and the reason for the drop-out. (For LDCs)

**Data required:** Processing status of every application, the phase in which it was ended, by whom it was ended and a standard system for noting the reasons for dismissing applications and ending the application process.

**Benefits:** This PPM identifies the bottlenecks where applications or projects tend to drop out, and the common barriers customer encounter with the program or staff (such as delays, lack of responses, failure to respond, lack of technical expertise, etc.)

**Frequency:** Bi-annually (twice a year).
5 CONCLUSION AND RECOMMENDATIONS

5.1 Cross Cutting

Conclusion No. 1: Customers find IAP and PSUI financial incentives attractive and are willing to do some work upfront to participate. More customers would participate, however, if the program presented fewer barriers. Such barriers include the following: complicated terms and conditions in the contract (e.g., long-term commitment and incentive clawback provisions); customers’ lack of internal staff resources (i.e., to pursue internal and external approval and processing or respond to paperwork); mismatches between application-processing and business decision-making timelines; uncertainty regarding final incentive amounts; and a lack of transparency around the steps and their duration in the application process.

› Recommendation No. 1: Make the application process easier for customers. The least to be done is to revisit the contract, decreasing its length and working to speed up the review process. Targets should be set for application review and processing turnaround times. A process flow diagram (with target processing time for each milestone) should be created and made available to explain the application process to customers and other stakeholders.

› Recommendation No. 2: Create a self-service web portal allowing participants to check their applications’ status and to submit missing information. LDC staff and trade allies should also be given access to this portal so that they can assist customers in advancing their applications. This portal should offer customers a means to identify reasons why their applications have stalled and to escalate issues.

Conclusion No. 2: Trade allies are willing to play a bigger role in promoting the program. Currently, trade allies are not actively encouraged to work with the program. BDMs were open to the idea of formally working with trade allies and some LDCs are already working with trade allies on program projects.

› Recommendation No. 3: IAP and PSUI should involve trade allies more formally. Research on other similar programs indicates that trade allies prove highly influential in customers’ efficiency project decision-making processes. Since trade allies have financial interests tied in with project completion, they can advocate for a project. So, a formal trade ally network or program liaison should be established to educate trade allies about IAP and PSUI, inform them about program changes, and support trade allies by providing marketing materials, such as program brochures explaining incentive options, eligibility requirements and the value of these investments.
Conclusion No. 3: Existing data-tracking systems are cumbersome and not quite effective, and are a source of mistakes or delays in the application process. LDC staff noted that once an application or even an inquiry made its way to the IESO through i-Con, they received little information about its status. Additionally, LDCs and the evaluation team observed that i-Con does not provide useful reports and that extracting useful information was so challenging that many LDCs kept their own parallel set of data for reporting purposes. The TR has adopted the same practice for maintaining updated information regarding PSUI. The IAP SharePoint site also presents a number of issues, such as its inability to generate summary reports automatically or allow for determining a participant’s status easily.

› Recommendation No. 4: Consider updating or completely changing the data-tracking systems. A new round of i-Con-updating can be planned on and carried out to improve the reporting functionalities and reduce the need to duplicate data entry. If i-Con cannot provide these key functions, consider implementing a more flexible and user-friendly tracking system. As for SharePoint, if the missing functions cannot be added and activated, another system should be considered. No matter what solution is selected, a user-centred design approach must be followed to properly identify user needs and operational requirements to meet the program’s tracking needs.

Conclusion No. 4: The TR tracks some metrics through its monthly program reports and dashboards, but these provide only a limited view of program performance. Currently, the following indicators are covered by the tracking efforts: (1) the energy and demand savings, (2) the amount of contracted incentive, (3) cost-effectiveness, and (4) the projected conversion rates from studies to projects. Expanding the scope of tracking to include other initiative-level process-performance indicators would help IESO identify issues that warrant more immediate attention.

› Recommendation No. 5: Consider expanding the scope of tracking to additional program-performance metrics to support more frequent program adjustments. The additional PPMs could provide program staff with a means to diagnose how the program is performing between two evaluations. The evaluation team has suggested 7 key program-performance metrics to be included in the scope of tracking, including the number of unique applications submitted to each initiative by calendar year and the conversion rates of program-funded engineering studies to project applications.

Conclusion No. 5: Customers expressed satisfaction with communication with the TR (which has contractual response-time targets to meet). Communication with IESO staff and LDCs, however, can be slow. The TR must forward and relay customer information requests through IESO and LDC staff, whose slow-coming responses delay the application review process.

› Recommendation No. 6: Shorten response times in communication with customers. Consider dedicating one or two staff members at IESO and at each LDC to serve as key contact points for IAP and PSUI and making this contact information available on the program’s website.
Conclusion No. 6: Customers found the DES useful, but found the PES of limited value. In addition, some customers considered that the DES process was too slow and completing a DES reduced the financial incentive available for CI projects.

› Recommendation No. 7: Replace the PES offering with OA. Do not charge customers for an OA.

› Recommendation No. 8: Turn reimbursement for DES into an incentive for signing a contract. Consider fully reimbursing the engineering study cost (up to a cap) to reward customers who have signed a CI contract. Do not deduct this amount from the capital project incentive. Pay the study cost soon after CI contract-signing.

Conclusion No. 7: Some customers would welcome the addition of a financing initiative. Given that securing funding is a major challenge in moving projects forward, financing provided by the program could speed up a customer’s internal project approval process.

› Recommendation No. 9: Develop and implement a financing-incentive pilot. Consider partnering with multiple lending institutions to offer attractive financing for approved projects. Gather early customer feedback on financing needs and products.

5.2 IAP-specific Conclusions and Recommendations

Conclusion No. 8: The IESO may be able to improve the program’s current organizational structure. Interviews with program staff and customers suggested that more clearly defined roles and responsibilities would result in a more streamlined, customer-focused process. Lack of clarity poses a particular challenge when staff turnover occurs. In one particularly dissatisfying incident, an applicant’s BDM left the IESO without passing along the customer’s application. This delayed the customer’s project for over a year before it was remedied.

› Recommendation No. 10: Clearly define program organizational structures, roles, and responsibilities. In particular, some staff members should be assigned to respond to inquiries from customers and LDCs. This information should be included in the process flow diagrams previously discussed. It should be ensured that application-processing duties are properly handed over when staff turnover occurs.

5.3 PSUI-specific Conclusions and Recommendations

Conclusion No. 9: LDCs are confident about their ability to offer PSUI to their customers. LDCs can provide a level of personalized support to customers that the IESO and the TR cannot. However, since LDC staff possess varied levels of knowledge and have different administrative practices, their services can result in inconsistent experiences for customers and trade allies.
Recommendation No. 11: Provide LDCs with training to enable them to provide a consistent, high-quality program experience. Trade allies especially enjoyed working with knowledgeable LDC staff, who were capable of providing useful customer data during engineering studies, engaging in more active communication with the IESO and the TR, and playing a more helpful role in marketing the program to customers. Regular workshops (in-person or online) should be run to communicate expectations regarding administration, discuss program changes and updates, and allow LDC staff to network and share lessons learned. Marketing support should be provided to help LDCs sell the program to customers.

Conclusion No. 10: Although as a PSUI component, Energy Managers is effective, the process efficiency should be improved. Designated energy managers who are knowledgeable about various incentives and application processes can help overcome barriers resulting from lack of time or staff resources and confusion regarding the process. Most EEMs surveyed were satisfied with support from PSUI, including the SharePoint Hub, whose discussion board was the most popular feature among EEMs. They used it to share information, such as business cases and case studies, and to access resources to help them find new energy-saving opportunities and sell those ideas to decision-makers at industrial facilities. Nevertheless, the impact evaluation revealed that not all energy managers have a good knowledge of energy and demand savings estimation. The reporting process was also found to be cumbersome and unreliable, because reporting periods are never closed and filed savings can be changed at any time.

Recommendation No. 12: Develop or refine training and technical resources to help energy managers operate more effectively and improve their technical knowledge. Training should cover diverse topics, including: M&V procedures and savings substantiation methods, tips for tracking and achieving non-incentivized savings targets, new technologies and information-sharing on successful projects. One specific subject that seemed to require more focus in the training session was the peak demand savings definition; most interviewed EMs admitted they did not know how IESO expected them to calculate this value. Once EMs master the application of the peak demand savings definition, it should be ensured that the technical reviewer consistently validate that it they use it correctly – this was not the case this year.

IESO should also consider using existing certification on energy management and M&V already available in the market. The SharePoint hub should also be updated with tools to help energy managers gain project approval, such as business case studies or information about the latest energy-saving technologies. Energy managers stated that they appreciated the networking opportunities offered by IESO, and the Evaluator believes that IESO should continue encouraging this practice.
Recommendation No. 13: Adjust the design of the initiatives to encourage energy managers to maximize savings. The program’s M&T component increases energy managers’ savings targets, deterring them from taking advantage of this initiative. Further, the EEM/REM initiative’s static non-incentivized savings targets can be difficult to achieve after the first or second year, when low or no-cost projects have been implemented. Convincing upper management to complete non-incentivized projects to fulfill their targets can be difficult and may lead to reduced savings (provided that management would have been willing to implement the project with an incentive). An EEM noted that he perceived his job as helping their organization find the best ways to pursue savings, including making efforts to ensure the shortest project payback periods. Several others also mentioned that it was difficult to find support for projects when asking a company to give up a large incentive due to a contractual technical requirement. Either non-incentivized savings targets should be adjusted to align with achievable levels or more training should be provided to help energy managers implement short-payback projects that, though ineligible for incentives, would achieve valuable savings.

Recommendation No. 14: Determine a savings threshold above which the TR’s savings substantiation plan must be pre-approved to evaluate the necessity of conducting on-site metering before implementing the project. The Evaluator identified many projects that had very high savings, but their savings substantiation was not adequate. For many projects (e.g., lighting projects), relying on assumptions and engineering calculations can be adequate appropriate; in such cases, the TR can approve the project quickly. However, when the process parameters cannot be estimated with a sufficient level of certainty, it is necessary to make some measurements and such a requirement has to be set and met early in the project design in order to get pre-implementation measurements. The Evaluator thinks that 500 MWh would be a reasonable threshold, above which pre-approval of the substantiation plan should be required.

Recommendation No. 15: Require the reporting of the Energy Managers initiative to be done on an annual basis and ensure that measures can be identified with a unique identification number. Each year, the list of measures implemented should be compiled and filed in their final version after technical review. This implies that a clear deadline for submitting projects for the past year must be determined, and that technical review must be conducted within a given timeframe. Also, it is critical that during the year, each measure be tracked using a unique identification number so that revisions to the savings are clear and that duplication of entries is avoided.

Recommendation No. 16: Systematically enter “measure costs” information for all non-incentivized EM measures. As many as 96 of the 375 measures submitted in 2014 showed no value at all in this field. While it was possible that many of those measures had a nil cost value, it should have been entered clearly if this was the case (with a “0”), and those measures whose cost information was not available should be indicated as such (with “N/A” for instance). Doing so will help accurately assess cost-effectiveness. As mentioned previously, there should also be a field that indicates the incremental costs, which might not be the same value as the measure cost.
Conclusion No. 11: No spillover was established for PSUI participants this year. This was because all potential spillover (associated with non-incentivized projects that could have been attributed to the participants’ experience with the program) had already been accounted for by the Enabled Savings Initiative.

› Recommendation No. 17: Evaluate spillover under PSUI rather than under Enabled Savings. Currently, 100% of the savings claimed as spillover are attributed to Enabled Savings. By assessing spillover as part of the impact evaluation, savings attribution (the portion of savings resulting from the program) can be properly carried out. As explained previously, doing so would also allow more accurately determining the full benefits brought by the program and better assessing its cost-effectiveness.
Appendix I

DESK REVIEW PROTOCOL

General Information

Desk review date: ____________________________
Project ID: ____________________________
Project category: ____________________________
Project type: ____________________________
Company name: ____________________________
Facility address: ____________________________

Reviewer name: ____________________________
Phone: ____________________________
Email: ____________________________

List of people contacted for the review and contact information:

Was M&V conducted as part of this project? (y/n)
Is a site visit planned for this project? (y/n)

A) Provide a brief description of the project (baseline equipment and measures)

B) Indicate the main results of the project review (ex. indicate if you had to revise the savings, and why)

C) What was the cost estimate of the project in the engineering studies?

D) Does the facility consider that the costing included in the engineering studies were accurate compared to the real amount paid for

For REM and EEM Programs with multiple projects, repeat Sections a to d for each project
Savings Summary

Fill up the savings summary below.

<table>
<thead>
<tr>
<th>Project ID</th>
<th>Project Name/Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

REM and EEM: Project name or identifier

<table>
<thead>
<tr>
<th>Summer Peak Demand (kW)</th>
<th>Energy (kWh)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>

Savings from Tracking Sheets (IESO's reported values, most likely from the latest M&V Report)

Verified Savings (Verified by Econoler)

Savings to Anticipated Savings Ratio (row 11/row 10)

For REM and EEM Programs with multiple projects, repeat lines 8 to 13 below for each project

Technical Calculation Review

Use this worksheet and additional ones, if necessary, for the verification of the verified savings. Include notes to document the approach.

If EEM or REM Program with multiple projects, clearly identify the project associated with each set of calculations

The following items have to be verified:

EEM and REM Projects

Direct energy and demand savings attributable to non-incentive initiatives and projects.

Reviewer's Calculation and Notes Below

Question for the Site Visit

Note to the reviewer: the level of effort to be spend on each project in the sample has to be balanced according to the quantity of expected savings and to the project complexity.

If a site visit is planned for this project, enter the list of questions for the site visit below:
For EEM and REM Programs with multiple projects, clearly identify the project for each set questions
Items that may need to be verified: operating schedule, number of hours per year, interactive effects, …
## Questions to Energy Managers about ISO 50001 - EEM only

<table>
<thead>
<tr>
<th>Question</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Q1.</strong> Have you or your company ever heard of the ISO50001 standard on energy management?</td>
<td></td>
</tr>
<tr>
<td><strong>Q2.</strong> [ASK IF YES IN Q1] On a scale from 1 to 10 where “1” means “Not at all familiar” and “10” means “Extremely familiar”, how familiar are you with the ISO50001 standard on energy</td>
<td></td>
</tr>
<tr>
<td><strong>Q3.</strong> [ASK IF YES IN Q1] Is your company or organization ISO50001 certified?</td>
<td></td>
</tr>
<tr>
<td><strong>Q4.</strong> [ASK IF NO IN Q3] Would your company or organization consider aligning with the ISO50001 standard? Any others?</td>
<td></td>
</tr>
<tr>
<td><strong>Q5.</strong> [ASK IF YES IN Q4] What are the reasons your company or organization would choose to align with the ISO50001 standard? Any others?</td>
<td></td>
</tr>
<tr>
<td><strong>Q6.</strong> [ASK IF YES IN Q4] In your opinion, what concerns, if any, would your company or organization have about aligning with the ISO50001 standard? Any others?</td>
<td></td>
</tr>
<tr>
<td><strong>Q7.</strong> Has your company or organization ever experienced implementing the ISO standard for quality management (ISO 9000) or environmental management (ISO 14001)? If so, which one(s)?</td>
<td></td>
</tr>
<tr>
<td><strong>Q8.</strong> Does your company or organization have a policy for energy efficiency, either at the company or corporate level? If so, could you please describe this policy?</td>
<td></td>
</tr>
<tr>
<td><strong>Q9.</strong> Does your company use energy performance indicators to better manage its energy consumption (kWh per unit produced for example)? If so, which one(s)?</td>
<td></td>
</tr>
</tbody>
</table>
## Appendix II
### ON-SITE VISIT PROTOCOL

#### 1. General Information

<table>
<thead>
<tr>
<th>Site Visit Date:</th>
<th>Project ID:</th>
<th>Contact Name:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project type:</td>
<td>Contact Phone:</td>
<td></td>
</tr>
<tr>
<td>Company name:</td>
<td>Email:</td>
<td></td>
</tr>
<tr>
<td>Address:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>List of people met during the visit:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial/institutional</td>
</tr>
<tr>
<td>Municipal</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of building:</th>
<th>Specify:</th>
</tr>
</thead>
</table>

#### 2. Key Project Variables

**Variable Descriptions:** Pull key project variables and listed key performance indicators (KPIs) from M&V Plan

NOTE: PC Users “Alt+Enter” for new line in cell. MAC Users “CMD+Option+Enter”.

#### 3. Facility Operation Schedules

**Facility Description:** Outline a quick description of the facility and its primary operation/purpose.

NOTE: PC Users “Alt+Enter” for new line in cell. MAC Users “CMD+Option+Enter”.

**Facility annual schedule:** Fill the table below for each occupancy schedule reported by the site contact as occupancy could vary for each section of the facility. Use additional sheets if necessary.

<table>
<thead>
<tr>
<th>Weekdays</th>
<th>Weekends</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>1 - Normal Schedule</th>
<th>2 - Specify:</th>
<th>3 - Specify:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weekdays</td>
<td>Weekends</td>
<td>Weekdays</td>
<td>Weekends</td>
</tr>
<tr>
<td>Number of days with regular schedule per year</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of days with regular holidays schedule per year</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of days with no occupancy per year (For example: seasonal closure)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total number of days per year</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Total = 261 Total = 104
Facility daily schedule: Fill the table below for each occupancy schedule reported by the site contact as occupancy could vary for each section of the facility. Use additional sheets if necessary.

<table>
<thead>
<tr>
<th>Schedules</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
<th>Sunday</th>
<th>Holidays</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schedule 1: Normal</td>
<td>Time of use (e.g. 8:00 am to 5:00 pm)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hours per day</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schedule 2 (specified above)</td>
<td>Time of use</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hours per day</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schedule 3 (specified above)</td>
<td>Time of use</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hours per day</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If YES fill the table below for each heating system or process system at the site.

Briefly describe interactive effects for the project.

### 5. Building Heating/Cooling System Description

#### Heating Systems

<table>
<thead>
<tr>
<th>Description</th>
<th>Heating system 1</th>
<th>Heating system 2</th>
<th>Heating system 3</th>
<th>Heating system 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy source (electricity, natural gas, oil, etc.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heating system type (electric resistance, furnace, heat pump...)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nominal capacity (indicate the unit – kW, Mbtu...)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heating system efficiency or COP</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>If any, changes in building set points (occ./unocc. temp., % hum)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Cooling Systems

Fill the table below for each cooling system at the site

<table>
<thead>
<tr>
<th>Description</th>
<th>Cooling system 1</th>
<th>Cooling system 2</th>
<th>Cooling system 3</th>
<th>Cooling system 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy source (electricity, natural gas, oil, etc.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooling system type (compressor, absorption...)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nominal capacity (indicate the unit – kW, tons, etc.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooling system SEER or COP</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>If any, changes in building set points (occ./ unocc. temp., % hum)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 6. Pre-Visit Assessment of the Project

*Indicate the key observations from the feasibility study and M&V report analysis. These notes will serve on site to guide the visit and identify the main information to collect and/or verify.*
7. On-Site Observations and Findings

Report the on-site visit and indicate the key observations and findings made on site.

---

8. M&V Post Implementation Results

Report the on-site visit and indicate the key observations and findings made on site.

<table>
<thead>
<tr>
<th>Year # 1</th>
<th>Year # 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Results (MWh)</td>
<td>Results (MWh)</td>
</tr>
<tr>
<td>Percent of Expected (%)</td>
<td>Percent of Expected (%)</td>
</tr>
<tr>
<td>Period Start Date</td>
<td>Period Finish Date</td>
</tr>
<tr>
<td>Days in Period</td>
<td>Days in Period</td>
</tr>
</tbody>
</table>

Seasonal Load Profile? (Y/N)  Summer Load Variations? (Y/N)

Notes: Insert Comments from M&V Reports
## 9. Free-ridership and Spillover Assessment

<table>
<thead>
<tr>
<th>Questionnaire Completed?</th>
<th>(Y/N)</th>
<th>Questionnaire Completed?</th>
<th>(Y/N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Free Ridership</td>
<td></td>
<td>Spillover</td>
<td></td>
</tr>
<tr>
<td>(PSUI Program only)</td>
<td></td>
<td>(IAP and PSUI Programs)</td>
<td></td>
</tr>
</tbody>
</table>

## 10. Energy and Demand Savings Adjustments

<table>
<thead>
<tr>
<th></th>
<th>Energy Savings from Tracking Sheet</th>
<th>MWh/yr</th>
<th>% of Project Completed in 2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demand Savings</td>
<td></td>
<td>kW</td>
<td>% of Project Completed in 2013</td>
</tr>
<tr>
<td>from Tracking</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sheet</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Energy Savings</td>
<td></td>
<td>MWh/yr</td>
<td></td>
</tr>
<tr>
<td>from M&amp;V</td>
<td></td>
<td>kW</td>
<td></td>
</tr>
<tr>
<td>Demand Savings</td>
<td></td>
<td>kW</td>
<td></td>
</tr>
<tr>
<td>from M&amp;V</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Adjustment by the Evaluator

<table>
<thead>
<tr>
<th></th>
<th>Adjustment - M&amp;V Energy Savings</th>
<th>MWh/yr</th>
<th>Evaluated Energy Savings</th>
<th>MWh/yr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demand Savings</td>
<td>Adjustment - M&amp;V Demand Savings</td>
<td>kW</td>
<td>Evaluated Demand Savings</td>
<td>kW</td>
</tr>
<tr>
<td>from M&amp;V</td>
<td>Diversity Factor Used by Econoler</td>
<td>%</td>
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<td></td>
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</tbody>
</table>

### Final Project Impacts at the Meter

<table>
<thead>
<tr>
<th></th>
<th>Evaluated Energy Savings</th>
<th>MWh/yr</th>
<th>Evaluated Demand Savings</th>
<th>kW</th>
</tr>
</thead>
</table>

**Diversity Factor for peak period as defined by IESO**

## 11. Additional Notes (if required)

NOTE: PC Users "Alt+Enter" for new line in cell. MAC Users "CMD+Option+Enter".

**Total Project Savings:**

| Energy Savings (kWh) | = | Demand Savings (kW) | = |
### 12. Questions to Energy Managers about ISO 50001

**Q1.** Have you or your company ever heard of the ISO50001 standard on energy management?

**Q2.** [ASK IF YES IN Q1] On a scale from 1 to 10 where “1” means “Not at all familiar” and “10” means “Extremely familiar”, how familiar are you with the ISO50001 standard on energy?

**Q3.** [ASK IF YES IN Q1] Is your company or organization ISO50001 certified?

**Q4.** [ASK IF NO IN Q3] Would your company or organization consider aligning with the ISO50001 standard?

**Q5.** [ASK IF YES IN Q4] What are the reasons your company or organization would choose to align with the ISO50001 standard? Any others?

**Q6.** [ASK IF YES IN Q4] In your opinion, what concerns, if any, would your company or organization have about aligning with the ISO50001 standard? Any others?

**Q7.** Has your company or organization ever experienced implementing the ISO standard for quality management (ISO 9000) or environmental management (ISO 14001)? If so, which one(s)?

**Q8.** Does your company or organization have a policy for energy efficiency, either at the company or corporate level? If so, could you please describe this policy?

**Q9.** Does your company use energy performance indicators to better manage its energy consumption (kWh per unit produced for example)? If so, which one(s)?

<table>
<thead>
<tr>
<th>Response</th>
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</table>
Appendix III
FREE-RIDERSHIP ALGORITHM

The free-ridership level was measured through in-depth interviews with participants. Free-ridership was assessed using a series of questions divided in two sections, intention and influence.

Intention is used to determine how the project likely would have differed if the respondent had not received the program assistance. The maximum number of points in the Intention section is 50.

Influence is assessed by asking about how much influence – from 1 (no influence) to 5 (extreme influence) – various program elements had on the decision to do the project the way it was done. The items selected for rating are specific components of the program being evaluated. The maximum number of points in the Influence section is 50.

The total free-ridership score is the sum of the intention and influence components, resulting in a score ranging from 0 to 100. This score is multiplied by .01 to convert it into a proportion for application to gross savings values.

The figure below presents the algorithm for calculating the free-ridership level.

---

FR1. Prior to participating in the program, was the purchase and installation costs of the project included in your company’s capital budget?
1. Yes 2. No 99. Don’t know/Refused

FR2. Which of the following is most likely what would have happened if you had not received the rebate from the IESO?
1. Canceled or postponed the project at least one year
2. Reduced the size, scope, or efficiency of the project
3. Done the exact same project (no change)
99. Don’t know/Refused

FR3. By how much would you have reduced the size, scope, or efficiency? Would you say a…
1. Small amount
2. Moderate amount
3. Large amount
99. Don’t know/Refused

FR4. Please describe what your company would have changed about the size, scope, or efficiency of the project

FR5. Now I want to focus on what it would have cost your company to implement the project without the rebate from the IESO. How likely is it that your company would have paid the full cost to complete the same project at the same time? Would you say…
1. Very likely
2. Somewhat likely
3. Not too likely
4. Not at all likely
99. Don’t know/Refused

FR6. I’m going to read a list of items about the program. Please rate each item on how much influence it had on the decision to complete the project the way it was done. Please use a scale from 1, meaning no influence, to 5, meaning the item was extremely influential in your decisions.
FR6a. The IESO staff such as your Key Account Manager or CleaResult
FR6b. The program funded engineering study and recommendations
FR6c. The financial incentives for the project
FR6d. The program sponsored energy manager (if applicable)
FR6e. The program funded energy monitoring system (if applicable)

Intention Score (MAX 50%)

FR2 OR FR3 OR FR5

---
<table>
<thead>
<tr>
<th>Question</th>
<th>Formula/Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR7. Was there anything else that was highly influential in your decision to complete the project in the way that you did? If so, record answer and enter SCORE of 4 or 5, based on description of topic.</td>
<td>IF FR7 ≤ 4 OR 5 → 50% - [MAX(FR6a : FR6e ; FR7) x 10%] OTHERWISE → 50% - [MAX(FR6a : FR6e) x 10%]</td>
</tr>
<tr>
<td>FR8. Was your company considering any other energy efficiency projects that could have been implemented instead of the project that received funding from IESO?</td>
<td>IF FR8 = 1 → ASK FR9 OTHERWISE skip to FR11.</td>
</tr>
<tr>
<td>FR9. How did the assistance from IESO influence which project was implemented?</td>
<td>Record answer and ask FR10 if it is relevant.</td>
</tr>
<tr>
<td>FR10. Using the same scale of 1 to 5, please rate how much influence the assistance from OPA had on WHICH project was implemented.</td>
<td>Used for process evaluation and consistency validation.</td>
</tr>
<tr>
<td>FR11. Does your company have corporate policies about energy efficiency that are considered when purchasing new equipment or making improvements?</td>
<td>IF FR11 = 1 → ASK FR12 AND FR13 OTHERWISE END QUESTIONNAIRE.</td>
</tr>
<tr>
<td>1. Yes 2. No 99. Don’t know/Refused</td>
<td></td>
</tr>
<tr>
<td>FR13. How would you rate the influence of your company’s corporate policies on decisions to make energy efficiency upgrades? Please use a scale of 1 to 5, where 1 means no influence and 5 means the policies were extremely influential.</td>
<td>IF FR13 = 5 → 25% IF FR13 = 4 → 12.5% OTHERWISE → 0%</td>
</tr>
</tbody>
</table>

Influence Score (MAX 50%)

Final Free-Ridership Level

Intention Score + Influence Score
Appendix IV
SPILLOVER ALGORITHM

Spillover was measured through interviews conducted during on-site visits. Participants were asked whether, they implemented any additional energy efficiency measures following their participation in the program, without benefitting from any incentives offered by IESO or their energy distributor. If a participant declared having implemented additional measures, they were asked a set of questions designed to identify the additional energy efficiency measures implemented and to quantify their associated savings (type of measure, quantity, efficiency level, etc.). Subsequently, another question was asked to quantify the level of influence the program had on the participant’s decision to whether implement these additional measures. The value established regarding this level of influence was used to determine the portion of the additional savings attributable to the program.

Then, the level of spillover was established by dividing the total quantity of the additional savings attributable to the program by the total quantity of savings achieved by the program for all the survey respondents.

The figure below illustrates the methodology used to calculate the spillover level.

SO1. After participating in the Industrial program, have you implemented other energy efficiency measures than those you implemented through the project either elsewhere in your facility or in another of your facilities without participating in any IESO’s energy efficiency program?

IF 1. Yes: CONTINUE
IF 2. No OR 99 : END

SO2. Ask for each of the additional EE measures identified in SO1:
Did you obtain any incentive from IESO or your energy distributor, or do you intend to submit a funding request in the future?

IF 2. No: CONTINUE
IF 1. Yes OR 99 : END

SO3. Which measures have you implemented on your own after participating in IESO’s Industrial Program?

SO2 = SUM of kWh associated with each upgrade

Additional Upgrade Savings:
SO2

SO4. How influential was your experience with IESO’s Industrial Program on your decision to implement the measures that you installed on your own after participating in the program? (Scale 0 to 10)

SO4 = Answer x 10%

Attribution Level:
SO4

Spillover Savings:
SO2 x SO4

Final Spillover Level = \[
\frac{\text{SUM of (SO2 x SO4) for All Respondents}}{\text{SUM of Program Savings for All Respondents}}
\]
## Appendix V
### TRUE-UP RESULTS FOR ENERGY MANAGERS 2011-2013\(^1\)

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>2011</td>
<td>REM</td>
<td>0</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2012</td>
<td>EEM</td>
<td>86</td>
<td>975</td>
<td>8,130,590</td>
<td>85,391,635</td>
<td>980</td>
<td>7,511,590</td>
<td>76,852,471</td>
<td>854</td>
<td>22,783,032</td>
</tr>
<tr>
<td>2012</td>
<td>REM</td>
<td>4</td>
<td>20</td>
<td>38,267</td>
<td>371,586</td>
<td>19</td>
<td>36,015</td>
<td>334,427</td>
<td>18</td>
<td>104,895</td>
</tr>
<tr>
<td>2013</td>
<td>EEM</td>
<td>84</td>
<td>2,669</td>
<td>26,182,682</td>
<td>450,739,787</td>
<td>2,300</td>
<td>23,370,354</td>
<td>405,665,808</td>
<td>3,335</td>
<td>53,855,201</td>
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<tr>
<td>2013</td>
<td>REM</td>
<td>17</td>
<td>18</td>
<td>2,710,913</td>
<td>17,842,670</td>
<td>15</td>
<td>2,438,247</td>
<td>16,058,403</td>
<td>111</td>
<td>3,425,066</td>
</tr>
</tbody>
</table>

\(^1\) All values presented in this table are differential, meaning that they are the difference between the total 2011-2013 savings results and the last evaluation results of the Energy Managers Initiative (dated August 2014). For all projects in this period, a realization rate of 96% and 91% was applied respectively to the energy and demand savings. The NTGR was 0.90 for both energy and demand savings.
Appendix VI
TRUE-UP RESULTS FOR PSUI CAPITAL INCENTIVES 2013\textsuperscript{14}

<table>
<thead>
<tr>
<th></th>
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<tbody>
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<td>2\textsuperscript{15}</td>
<td>426</td>
<td>1,232,785</td>
<td>10,773,350</td>
<td>324</td>
<td>916,641</td>
<td>8,380,811</td>
<td>324</td>
<td>1,937,318</td>
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</table>

\textsuperscript{14} All values presented in this table are differential, meaning that they are the difference between the total-2013 savings results and the last evaluation results of the Energy Managers Initiative (dated August 2014). For the three projects added in this true-up, an average realization rate of 102% and 116% was applied respectively to the energy and demand savings. The NTGR was of 0.84 for energy savings and of 0.79 for demand savings.

\textsuperscript{15} 1 project was removed, and 3 were added, for a total of 2.
Appendix VII
IAP FULL AND PARTIAL PARTICIPANT GUIDE

IESO INDUSTRIAL PROGRAM EVALUATION
Industrial Accelerator Program (IAP)

IAP Industrial Customer Survey (Participant/Partial Participant)

Red text: Skip patterns
Green text: instructions

<table>
<thead>
<tr>
<th>Sections</th>
<th>Question Numbers</th>
<th>Participant</th>
<th>Partial Participant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awareness and Participation</td>
<td>1-10</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Freeridership</td>
<td>FR1-FR13</td>
<td>✓</td>
<td></td>
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<tr>
<td>Satisfaction</td>
<td>11-15</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>International Standards</td>
<td>16-22</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

Introduction

OPA (now part of the IESO) has hired Cadmus to evaluate the Industrial Accelerator Program, which I’ll refer to as IAP. As a part of this evaluation, we are collecting feedback from organizations that have received funding for an engineering study or a capital incentive project. The results will be reported anonymously; feel free to speak candidly.

Do you have any questions before we begin? [If needed: this call should take about 40 minutes for Participants and 20 minutes for partial-participants.]

Awareness and Participation

[Ask participants and partial-participants]

1. How did your organization first learn about the Industrial Accelerator Program (IAP)?
   a. IESO Business Development Managers
   b. Technical Reviewer
   c. Word of mouth
   d. A contractor or engineering firm
   e. Equipment supplier
   f. Other: [Specify]
   g. Don’t know
2. Our records indicate your organization participated in the [engineering study only, the capital incentive, or both], is this correct?
   a. Engineering Study
   b. Capital Incentive
   c. Both
   d. Don’t know

3. [Ask if participant completed an engineering study funded by IAP] How did you use the results of the engineering study?
   a. [Record response]

4. [Ask if participant completed an engineering study funded by IAP] Did anyone follow up with you after the engineering study to encourage you to move forward with a Capital Incentive project?
   a. [Record response]

5. [Ask Partial Participants/Engineering Study Only Participants] Why did your company decide not to move forward with a Capital Incentive Project after the engineering study? What barriers did you face?
   a. [Record response]

6. [Ask Partial Participants Only] Is anything IAP/IESO could do or offer that would help organizations like yourself to move forward with a capital incentive project?
   a. [Record response]

7. [Ask Participants Only] How long did it take to get your company or organization’s approval to do a capital incentive project?
   a. [Record response box]

8. [Ask Participants Only] What was the motivation for pursuing a capital incentive project? [check all that apply]
   a. Return on investment/payback
   b. Resource conservation
   c. Meet corporate sustainability goals
   d. Replace failed equipment/building maintenance
   e. Improve productivity
   f. Improve workplace comfort
   g. Increase workplace safety
   h. Decrease operation and maintenance costs
   i. Other: [Specify]
   j. Don’t know
9. If the program offered attractive financing for capital projects, would it be easier or faster for your company to complete energy projects?
   a. Easier to get approval
   b. Faster to implement projects
   c. Easier and faster to get approval and implement projects
   d. No difference
   e. Don’t know

10. [IF 9=a, b, or c] What sort of financing offering would be most helpful? (e.g. direct financing through IESO or referrals to regional lenders)
   a. [Record response]

Freeridership Questions

[Ask participants]

Now I’m going to ask you a few questions about what you might have done differently if IESO had not offered the Industrial Accelerator Program.

FR1. When you first learned about the [PROGRAM NAME], was the entire cost of purchase and installation of the [MEASURE CODE] already included in your company’s capital budget?
   1. (YES)
   2. (NO)
   98. (DON’T KNOW)
   99. (REFUSED)

FR2. Which of the following best describes what would have happened if your company had never learned about the [PROGRAM NAME]? Would you have…
   1. Canceled or postponed the project at least one year
   2. Reduced the size, scope, or efficiency of the project
   3. Done the exact same project (no change) on the same schedule
   98. (DON’T KNOW)
   99. (REFUSED)
[ASK IF FR2= 2]
FR3. By how much would you have reduced the size, scope, or efficiency? Would you say a...[READ LIST]
   1. Small amount (10-20%)
   2. Moderate amount (20-50%)
   3. Large amount (over 50%)
  98. (DON’T KNOW)
  99. (REFUSED)

[ASK IF FR3=1, 2, 3]
FR4. PLEASE DESCRIBE WHAT YOUR COMPANY WOULD HAVE CHANGED ABOUT THE SIZE, SCOPE, OR EFFICIENCY OF THE PROJECT.

   1. [RECORD ANSWER]
  98. (DON’T KNOW)
  99. (REFUSED)

[ASK IF FR2=3 (done the same project at the same time)]
FR5. Now I want you to think about what it would have cost your business to implement this project without the funding from [PROGRAM NAME]. How likely is it that your business would have paid the full cost to complete the same project at the same time? Would you say... [READ LIST]

   1. Very likely
   2. Somewhat likely
   3. Not too likely
   4. Not at all likely
  98. (DON’T KNOW)
  99. (REFUSED)

FR6. I’m going to read a list of items provided by the program. Please rate each item’s influence on the decision to implement your business’ energy project. Please use a scale from 1, meaning not at all influential, to 5, meaning the item was extremely influential in your decisions.
<table>
<thead>
<tr>
<th>Item</th>
<th>Not at all</th>
<th>Extremely</th>
<th>Don’t know</th>
<th>Not applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Influence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>a</td>
<td>Assistance provided by the IESO Key Account Manager or the TR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b</td>
<td>The [PROGRAM NAME] funded engineering study</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c</td>
<td>[PROGRAM NAME] financial incentives for energy projects</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

FR7. Was there anything else that was highly influential in your decision to complete the project in the way that you did?

1. ([RECORD:_______________________])

98. (DON’T KNOW / DON’T RECALL)

99. (REFUSED)

FR8. Was your company considering any other energy efficiency projects that could have been implemented instead of the project that received funding from [IAP]?

1. (Yes)

1. (No) [SKIP TO SECTION B]

98. (DON’T KNOW)

99. (REFUSED)

[ASK IF FR8= YES]

FR9. How did the assistance from [IAP] influence which project was implemented?

1. [RECORD ANSWER]

2. (DON’T KNOW)

98. (REFUSED)
FR10. Using the same scale of 1 to 5, please rate how much influence the assistance from [IAP] that you just described had on which project was implemented.

1. ([RECORD ANSWER])
   98. (DON’T KNOW / DON’T RECALL)
   99. (Refused)

FR11. Does your company have corporate policies about energy efficiency that are considered when purchasing new equipment or making improvements?

1. (Yes)
2. (No) [SKIP TO NEXT SECTION]
   98. (DON’T KNOW) [SKIP TO NEXT SECTION]
   99. (REFUSED) [SKIP TO NEXT SECTION]

[ASK IF FR11= 1]

FR12. Which of the following best describes this policy? [READ LIST]

1. Your company purchases energy efficient equipment regardless of cost
2. Your company purchases energy efficient equipment if it meets payback or return on investment criteria [SPECIFY]
3. Something else [SPECIFY]
   98. (DON’T KNOW)
   99. (REFUSED)

[ASK IF FR11=1]

FR13. How would you rate the influence of your company’s corporate policies on decisions to implement your business’ energy project in the way that you did? Please use a scale of 1 to 5, where 1 means no influence and 5 means the policies were extremely influential.

1. [RECORD RESPONSE]
   98. (Don’t know)
   99. (Refused)
Satisfaction

[Ask participants and partial-participants]

11. Please rate your satisfaction with each aspect of the IAP program: [options: very satisfied, somewhat satisfied, not too satisfied or not at all satisfied, or don’t know/not applicable]
   a. Engineering study
   b. Capital incentive
   c. IESO Program staff support
   d. Technical review

12. How satisfied are you with the IAP program overall?
   a. Very satisfied
   b. Somewhat satisfied
   c. Not too satisfied
   d. Not at all satisfied

13. [If Q11 or Q12 Not too satisfied, or Not at all satisfied] Please explain why you reported Not too satisfied or Not at all satisfied.
   a. [Record response]

14. [Ask Partial Participants] Is your organization planning to complete any energy efficiency project in the near future? Any through IAP or another IESO efficiency program?
   a. Yes [SPECIFY]
   b. No

15. Please provide suggestions for improving the IAP program.
   a. [Record response]
International Standards

[Ask participants and partial-participants]

In conclusion, we just have a few more questions for you about awareness of energy management standards.

16. Have you ever heard of the ISO50001 standard on energy management?
   a. Yes
   b. No

17. [ASK IF YES IN Q16] On a scale from 1 to 10 where “1” means “Not at all familiar” and “10” means “Extremely familiar”, how familiar are you with the ISO50001 standard on energy management?

18. [ASK IF YES IN Q16] Do the companies or organizations you work with in Ontario ask you about the ISO50001 standard and its implementation?

19. [ASK IF YES IN Q16] Among the companies or organizations you work with in Ontario, what proportion are ISO50001 certified?

20. [ASK IF YES IN Q16] In your opinion, what motivates companies or organizations to align with the ISO50001 standard?

21. [ASK IF YES IN Q16] Conversely, what do you think impedes companies or organizations to align with the ISO50001 standard?

22. Do the companies or organizations you work with in Ontario use energy performance indicators to better manage their energy consumption (kWh per unit produced for example)? If so, which one(s)?

Thank you for your time and the valuable feedback you have provided.
IESO hired Econoler and Cadmus to evaluate the Industrial Accelerator Program, which I’ll refer to as IAP. We are interested in learning more about barriers that would prevent IESO’s transmission-connected customers from participating in the feasibility study or capital incentive offerings. This interview will focus primarily on your experience with customers that either have not engaged with the program or that have dropped out before completing a capital incentive project. Our goal is to better understand why these customers are not moving forward with retrofit projects, and what might encourage them to do so.

**Introduction**

1. My understanding is that as the business development manager, you are responsible for promoting the Industrial Accelerator Program to transmission-connected customers. How many customers do you represent? Do you work only with IAP-eligible customers?
2. How many customers have you contacted regarding the program?
Outreach and Communication

3. How do IAP-eligible customers learn about the program? Are there other channels for promoting IAP besides the BDMs?
4. Do you think trade allies could play a greater role in promoting the program? Why or why not?
5. My understanding is that all eligible customers have been contacted at least once. Is that correct? How many times does the program reach out to a customer if they do not indicate interest?

Process

6. What reasons do customers give for not engaging with the program?
7. What barriers, if any, exist at each stage of the program? [Address each stage individually.]
   a. Preliminary/Detailed engineering studies
   b. Contract requirements (language, two-year time frame, incentives)
   c. Installation/implementation of energy-saving improvements
   d. M&V of the energy-saving improvements
8. Is lack of financing a barrier for organizations that might otherwise move forward? [If yes] What type of support could the program provide, in your opinion? Do companies want referrals to financing, or do they want the program to provide financing?

Data

9. How do you keep track of customer contacts? What type of software or system do you use?
10. Do you have a report on each customer’s status with regard to the IAP program? Do you know at which stage each customer is at any given time?
11. Is there anything about the program data tracking system that could be improved?

Program Design

12. Do customers frequently use the preliminary study, or do they tend to skip straight to the detailed study?
13. A detailed study is not needed for small capital projects. Does this impact how customers structure their project proposals?
14. Are there any changes to the program process that you think might result in greater participation?

Those are all the questions I have for you today. Thank you for taking the time to speak with me.
Appendix IX
PSUI LDC GUIDE

IESO INDUSTRIAL PROGRAM EVALUATION
Process and Systems Upgrade Initiative (PSUI)

Guide for Interviews with LDC Staff

Date:  
Interviewee Name and Title:  
Interviewer:  
LDC:

<table>
<thead>
<tr>
<th>Key Research Area</th>
<th>Related Question</th>
</tr>
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<tbody>
<tr>
<td>Program design</td>
<td>14-19</td>
</tr>
<tr>
<td>Program management and delivery</td>
<td>1-6</td>
</tr>
<tr>
<td>Project tracking and M&amp;V</td>
<td>20-22</td>
</tr>
<tr>
<td>Marketing PSUI to customers</td>
<td>7-13</td>
</tr>
<tr>
<td>Opportunities for improvement</td>
<td>23-26</td>
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<tr>
<td>Macroeconomic analysis and benefits</td>
<td>3-4</td>
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<tr>
<td>Financing</td>
<td>16</td>
</tr>
<tr>
<td>ISO 500001</td>
<td>27-33</td>
</tr>
</tbody>
</table>

Green text: for interviewer only; do not read
Red text: interviewer to supply appropriate wording

Prior to the interview, interviewer will contact LDC staff by email to ensure the person we are speaking to is the most appropriate person at the LDC and set up a time to call. Note that we may be speaking with a key account manager (KAM) or a roving energy manager (REM), so get this background before the call if possible (ask questions 1-3 in the scheduling email so we can shorten the call). We have a list of REMs from IESO and some KAMs pulled from iCon.

The guide is not meant to be followed verbatim, a skilled interviewer will use this guide to ensure important information is gathered.

INTRODUCTION

OPA (now part of the IESO) has hired Econoler and Cadmus to evaluate the Process and Systems Upgrade Initiative, which I’ll refer to as PSUI. As a part of this evaluation, we are collecting feedback from participating local distribution company (LDC) staff like you. We are speaking to multiple LDC staff members and results will be reported anonymously; feel free to speak candidly.

Do you have any questions before we begin? [If needed: this call should take about 45 minutes.]

LDC PROGRAM ADMINISTRATION

Let me start by asking questions to understand your role in the program.

1. Please describe your background at [LDC] and role in PSUI.
2. How long has [LDC] been offering PSUI?
3. How many [LDC] staff worked on PSUI in 2013 and 2014 (FTEs)?
   a. How many are Roving Energy Managers and how many are Key Account Managers (KAMs)?
   b. Is this staffing level adequate for the amount of program activity?
4. What is the value of PSUI to [LDC]? (Probe energy savings goals, economic benefits, customer satisfaction, etc.)
5. How did IESO or the TR prepare [LDC] to offer PSUI?
   a. Is there any other type of training or resource you would like from IESO to be more effective at promoting PSUI to customers? (probe sales training)
6. How do you communicate with the TR and IESO about PSUI projects?
   a. What challenges, if any, have there been working with the TR/IESO on PSUI?

MARKETING AND OUTREACH
Now I want to discuss your customers and how they become aware of PSUI.
7. How many PSUI eligible customers does [LDC] have?
   a. What percent of these customers would you say are aware of PSUI?
   b. How many customers has [LDC] contacted regarding PSUI? How many customers reach out to [LDC]?
   c. What barriers prevent customers from participating in PSUI?
8. How does [LDC] encourage customers to participate in PSUI?
   a. Does [LDC] work with any third party consultants/vendors/ESCOs/TR to market PSUI?
9. Does [LDC] promote specific energy-efficiency improvements or otherwise target certain customer sectors for PSUI offerings?
   a. Is freeridership a consideration when marketing PSUI to customers? [Explain: customers who would have made those changes without any incentive.]
10. Do [LDC] or the TR staff discuss non-energy benefits when promoting PSUI to customers? [IF SO] Which non-energy benefits are commonly discussed? [Do not read list. Probe.]
   - Increased productivity/quality/competitiveness/comfort/safety
   - Lower operation and maintenance costs/Return on Investment
11. Are there any barriers to marketing PSUI? (Probe program confusion, lack of training or other resource needs)
12. Are outcomes from marketing efforts tracked and measured?
13. What marketing approaches seem to be working well?
PROGRAM PARTICIPATION
Let’s discuss the various components of PSUI.

14. For engineering Studies:
   a. What is working well, what could be improved?
   b. Does the incentive structure make sense, especially since customers are not required to go through with a project to get the incentive?
   c. What percent of engineering study customers proceed to implement a capital incentive project?
   d. What barriers prevent engineering study customers from proceeding with a capital incentive project?
   e. What kind of follow-up do you conduct to encourage customers to move forward?

15. Energy Managers:
   a. How well is the Roving Energy Manager initiative working?
   b. What about the Embedded Energy Manager initiative?
   c. How do you manage energy managers and track their progress? (If speaking to a roving energy manager at the LDC, ask how their performance is tracked.)

   a. What is working well, what could be improved?
   b. Does this option shorten the amount of time needed to complete a project?

17. Monitoring and Targeting:
   a. What is working well, what could be improved?
   b. How are customers using the M&T system to produce savings?

18. Capital Incentives for projects:
   a. What is working well, what could be improved?
   b. Are the eligibility requirements and incentive levels able to drive participation? [Explain: are the incentives enough to make up for the effort of meeting program requirements.]

19. Financing: Currently PSUI does not offer financing or facilitate finding financing for customer energy projects. Do you think financing would encourage more customers to complete capital incentive projects?
   a. Are customers already using financing or lines of credit at their bank for energy efficiency projects?
   b. Which customers need financing?
   c. What are customer’s financing needs?
PROJECT TRACKING

20. Do you find the time it takes to complete each step in the PSUI process reasonable?
   a. Where are the bottlenecks?
   b. Any ideas for removing those bottlenecks?

21. Do you track energy efficiency projects that customers implement without capital incentives (after
    the engineering study or as a result of any enabling initiatives)?
   a. [If yes] How are these savings tracked? (Do you ask for documentation? Are they
      reported to IESO as Enabled Savings?)
   b. Are the savings or projects verified in any way?

22. What kind of feedback do you have about the iCon system?
   a. What do you like about it?
   b. What should be improved?

CUSTOMER RESPONSE

23. Have you heard any feedback from customers about PSUI?
   a. [IF SO] What are they saying about it?

PROGRAM SUMMARIES

Finally, we would like to ask you a few summary questions:

24. Do you think that having the LDCs like yourself administer PSUI works well? Why or why not?

25. Are there any important lessons learned we have not already discussed?

26. Are there any improvements that you would suggest for PSUI to make it more attractive to LDCs?
    To customers?

INTERNATIONAL STANDARDS

In conclusion, we just have a couple more questions for you about awareness of energy management
standards.

27. Have you ever heard of the ISO50001 standard on energy management?
   a. Yes
   b. No

28. [ASK IF YES IN Q16] On a scale from 1 to 10 where “1” means “Not at all familiar” and “10”
    means “Extremely familiar”, how familiar are you with the ISO50001 standard on energy
    management?

29. [ASK IF YES IN Q16] Do the companies or organizations you work with in Ontario ask you about
    the ISO50001 standard and its implementation?

30. [ASK IF YES IN Q16] Among the companies or organizations you work with in Ontario, what
    proportion are ISO50001 certified?
31. [ASK IF YES IN Q16] In your opinion, what motivates companies or organizations to align with the ISO50001 standard?

32. [ASK IF YES IN Q16] Conversely, what do you think impedes companies or organizations to align with the ISO50001 standard?

33. Do the companies or organizations you work with in Ontario use energy performance indicators to better manage their energy consumption (kWh per unit produced for example)? If so, which one(s)?

Thank you for your time and the valuable feedback you have provided.
Appendix X
PSUI EEM GUIDE

IESO INDUSTRIAL PROGRAM EVALUATION
Process and Systems Upgrade Initiative (PSUI)

PSUI Participant/Partial Participant Online Survey

<table>
<thead>
<tr>
<th>Key Research Area</th>
<th>Related Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program design</td>
<td>12 - 14</td>
</tr>
<tr>
<td>Program management and delivery</td>
<td>3 - 8</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>15 - 20</td>
</tr>
<tr>
<td>Project tracking and M&amp;V</td>
<td>8, 22</td>
</tr>
<tr>
<td>Marketing PSUI to customers</td>
<td>1, 2</td>
</tr>
<tr>
<td>Training and networking</td>
<td>21 - 25</td>
</tr>
<tr>
<td>Opportunities for improvement</td>
<td>26, 27, 32</td>
</tr>
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<td>Macroeconomic analysis and benefits</td>
<td>9 - 11</td>
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<td>Financing</td>
<td>28 - 29</td>
</tr>
<tr>
<td>ISO 500001</td>
<td>33 - 41</td>
</tr>
<tr>
<td>EE policy and performance indicators</td>
<td>42 - 44</td>
</tr>
</tbody>
</table>

Red text: Skip patterns
Green text: instructions

Sampling
We recruited responses from the list of 53 embedded energy managers (EEMs) provided by IESO. The list contains both email addresses and phone numbers, however the list of emails was more complete (16 or 30% of EEMs were missing phone contact information). We sent a link inviting all EEMs on the list to provide feedback about their experience with PSUI and sent two email reminders to those who have not completed the survey to maximize response rates. EEMs wishing to take the survey by phone were provided with a contact at Cadmus.

We did a pretest with 5 random EEMs first, then adjusted based on initial responses.

Platform
Qualtrics is an industry leader in online survey software. This tool allows us to design and field surveys in-house, with a flexible survey design that allows Cadmus to easily gather information from customers on program participation and experiences. Using customer contact information, provided by IESO (formerly OPA), we are able to send a link for the survey to each customer, and due to the ability to save and return to the survey, customers are then able to respond to the questions whenever is most convenient to them. Through Qualtrics we are able to track their progress through the survey, and to reach out to unresponsive customers and those who only partially completed the survey to request...
action. The tool also allows us to graph and visually view responses as respondents complete the survey in real time.

Recruitment Email

Dear [CONTACT NAME]:

To assess the effectiveness of the Process and Systems Upgrade Initiative program, the Independent Electricity System Operator (IESO) (formerly the Ontario Power Authority) has engaged a third-party contractor, Cadmus, to evaluate this program. As part of this evaluation, we are reaching out to Embedded Energy Managers, such as yourself, to gather feedback on your experience.

Please use the link provided to access the survey. You will be able to save and return to the survey at a later time to make this as convenient as possible, however please complete the questions no later than March 20, 2015.16

All individual data and survey responses will be maintained in strict confidentiality, and Cadmus will only provide reports to the IESO at an aggregated level. This evaluation will have no impact on your projects and is designed only to improve the program’s effectiveness and its ability to achieve energy savings for Ontario.

If you have questions or concerns about this evaluation, please contact me via the information provided below. Thank you for your cooperation.

Best Regards,

Althea Koburger
CADMUS: 703-247-6155
althea.koburger@cadmusgroup.com

Alternate contact:
Tyler Brown
CADMUS: 303 389-2552
tyler.brown@cadmusgroup.com

16 This date will be sooner for the pre-test
Awareness and Participation

1. How did your organization first learn about the Process and Systems Upgrade Initiative (PSUI)?
   a. From my local distribution company
   b. Word of mouth
   c. A contractor or engineering firm
   d. Equipment supplier
   e. Other: [Specify]
   f. Don’t know

2. Please indicate which PSUI offerings your organization is aware of:
   a. Opportunity Accelerator
   b. Engineering Studies
   c. Capital Incentive
   d. Monitoring and Targeting

3. Please indicate which PSUI offerings your organization has participated in:
   a. Opportunity Accelerator
   b. Engineering Studies
   c. Capital Incentive
   d. Monitoring and Targeting

4. [IF 3=b] How did you use the results of the engineering study?
   a. [Record response box]

5. [IF 3=c] How long did it take to get your company or organization’s approval to do a capital incentive project?
   a. [Record response box]

6. [IF 3≠c] In general, what would prevent your organization from moving forward with a capital incentive project?
   a. [Record response]
7. [IF 3=c] What was the motivation for pursuing a capital incentive project? [check all that apply]
   a. Return on investment/payback
   b. Resource conservation
   c. Meet corporate sustainability goals
   d. Replace failed equipment/building maintenance
   e. Improve productivity
   f. Improve workplace comfort
   g. Increase workplace safety
   h. Decrease operation and maintenance costs
   i. Other: [Specify]
   j. Don’t know

8. Do you consider the measurement and verification requirements associated with capital incentive projects reasonable?
   a. They were reasonable and do not pose a barrier to participation
   b. They were unreasonable and pose a barrier to participation
   c. Other: [Specify]
   d. Don’t know

9. Prior to submitting an Embedded Energy Manager (EEM) application, were you already employed by your company?
   a. I was hired to fill the EEM role
   b. I was employed prior to the EEM application

10. Why did your organization decide to apply for an EEM?
    a. [Record response]

11. Without the support from PSUI, would your organization have been able to dedicate staff resources towards making the organization/business more energy efficient?
    a. Yes
    b. No
    c. Don’t know

12. The Embedded Energy Manager Agreement specifies that at least 30% of the Annual Savings Target be attributed to projects not financed by an incentives received from the IESO or an LDC. How would you describe your experience with achieving this target?
    a. Very easy
    b. Somewhat easy
    c. Somewhat difficult
    d. Very difficult

13. [IF 12=c or d] What percentage of the Annual Savings Target would you consider to be a more achievable target for non-incentivized projects?
a. [Record response]
14. Why do you say achieving the 30% target is [insert response from 13]?

a. [Record response]

Satisfaction

15. [IF 3=a] Please rate your satisfaction with the Opportunity Accelerator program:
   a. Very satisfied
   b. Somewhat satisfied
   c. Not too satisfied
   d. Not at all satisfied

16. [IF 3=b] Please rate your satisfaction with the engineering study program:
   a. Very satisfied
   b. Somewhat satisfied
   c. Not too satisfied
   d. Not at all satisfied

17. [IF 3=c] Please rate your satisfaction with the capital incentive program:
   a. Very satisfied
   b. Somewhat satisfied
   c. Not too satisfied
   d. Not at all satisfied

18. [IF 3=d] Please rate your satisfaction with the monitoring and targeting program:
   a. Very satisfied
   b. Somewhat satisfied
   c. Not too satisfied
   d. Not at all satisfied

19. Please rate your satisfaction with each aspect of the PSUI program’s EEM offering: [grid options: very satisfied, somewhat satisfied, not too satisfied or not at all satisfied]
   a. The SharePoint Hub
   b. The training you attended
   c. Program support

20. How satisfied are you with the PSUI program overall?
   a. Very satisfied
   b. Somewhat satisfied
   c. Not too satisfied
   d. Not at all satisfied
Training and networking

21. Did you attend any of the following training sessions?
   a. End-use program
   b. Basic Energy Manager program
   c. Certified Energy Manager program
   d. IESO events
   e. Other: [Specify]
   f. Don’t know

22. How regularly do you use the SharePoint hub resource for energy managers?
   a. Very often
   b. Somewhat often
   c. Not too often
   d. Never
   e. Don’t know

23. [IF 22≠d or e] What do you use the hub for?
   a. Tracking progress towards energy savings goals
   b. Educational materials
   c. Networking
   d. Discussion boards
   e. Events calendar
   f. Don’t know

24. What sort of resources would you find useful that are not already on the hub?
   a. [Record response]

25. Has IESO provided any other training or networking opportunities that you have taken advantage of?
   a. [Record response]

Barriers and Opportunities

26. What challenges do you face in championing energy-saving improvements to your facility?
   a. [Record response]

27. Is there anything the PSUI program, your LDC, or IESO could offer to help overcome those challenges?
   b. [Record response]

28. If the PSUI program offered attractive project financing, what impact would this have on your company’s interest in and ability to implement projects?
   a. [Record response]
29. **[IF 9=a, b, or c]** What sort of financing offering would be most helpful? (e.g. direct financing through IESO, negotiated special rates or referrals to regional lenders)
   
   b. [Record response]

30. Is your organization planning to complete any energy efficiency project in the near future?
   
   c. Yes
   
   d. No

31. **[IF 14=a]** How likely is your organization to go through PSUI for that future energy-efficiency or behind the meter generation projects?
   
   a. [Very likely, somewhat likely, not too likely, not at all likely]

32. Please provide suggestions you have for improving the PSUI program.
   
   b. [Record response]

**International Standards**

33. We would now like to ask you about your company’s familiarity with international energy efficiency standards. Have you or your company ever heard of the ISO50001 standard on energy management?
   
   a. Yes
   
   b. No

34. **[IF 33=a]** How familiar are you with the ISO50001 standard on energy management?
   
   a. [Scale of from 1 to 10 where “1” means “not at all familiar” and “10” means “extremely familiar”]

35. **[IF 33=a]** Is your company or organization ISO50001 certified?
   
   a. Yes
   
   b. No
   
   c. Don’t know

36. **[IF 35=b]** Would your company or organization consider aligning with the ISO50001 standard in the next two years?
   
   a. Yes
   
   b. No
   
   c. Don’t know

37. **[IF 36=b]** What factors are blocking your company or organization from pursuing this standard?
   
   a. [Record response]

38. **[IF 36=a]** Why is your company or organization choosing to pursue the ISO50001 standard?
   
   a. [Record response]

39. **[IF 36=a]** In your opinion, what concerns, if any, would your company or organization have about aligning with the ISO50001 standard?
   
   a. [Record response]
40. Has your company or organization implemented the ISO standard for quality management (ISO 9000) or environmental management (ISO 14001)?
   a. Yes
   b. No
   c. Don’t know

41. [IF 40=a] Which one(s)?
   a. ISO 9000
   b. ISO 14001
   c. Both

42. Does your company or organization have a policy for energy efficiency, either at the company or corporate level?
   a. Yes
   b. No
   c. Don’t know

43. [IF 42=a] Could you please describe this policy?
   a. [Record response]

44. What energy performance indicators does your company use to better manage its energy consumption (kWh per unit produced for example)?
   a. [Record response]

Thank you for taking the time to answer our questions – have a wonderful day.
Appendix XI
TRADE ALLY GUIDE

IESO INDUSTRIAL PROGRAM EVALUATION
Industrial Accelerator Program (IAP)
and Process and Systems Upgrade Initiative (PSUI)

Guide for Trade Ally Interviews

Date: 
Interviewee Name and Title

Interviewer
Organization

<table>
<thead>
<tr>
<th>Key Research Area</th>
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<tbody>
<tr>
<td>Program management and delivery</td>
<td>1-10</td>
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<tr>
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<td>11-16</td>
</tr>
<tr>
<td>Opportunities for improvement</td>
<td>5, 6, 12, 15</td>
</tr>
<tr>
<td>Macroeconomic analysis and benefits</td>
<td>17-20</td>
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<tr>
<td>Financing needs</td>
<td>8</td>
</tr>
<tr>
<td>ISO50001</td>
<td>21-27</td>
</tr>
</tbody>
</table>

Green text: instructions for interviewer
Red text: interviewer to supply appropriate wording

TRADE ALLY TYPES
Trade Allies may not have experience with both IAP and PSUI, so the questions will need to be adjusted accordingly. Also, there are three types of trade allies interviewed: engineering firms who conduct the studies, contractors who install projects and equipment suppliers who manufacture project inputs.

INTRODUCTION
Hello, may I speak with [Contact name]? My name is [Interviewer name] and I’m calling from Cadmus on behalf of the IESO (OPA merged with IESO this year). OPA/IESO hired Cadmus to gather feedback on the Industrial Accelerator program (or IAP) and the Process and Systems Upgrade Initiative (PSUI). We are talking with businesses like yours that provided services to IAP or PSUI participants. Our findings will be reported anonymously so please feel free to speak candidly. Are you the best person in your company to speak with about the IAP and PSUI programs?

[IF NOT] Can I please speak to the person at your company who knows the most about IAP and PSUI?
[IF SO] Is now a good time to share your opinions? [If needed: this call should take about 20 minutes.]

RESPONDENT’S ROLE AND RESPONSIBILITIES
First, I’d like to know more about your background and involvement with the program(s).

1. What is your role at [trade ally organization]?
2. And are you familiar with IAP, PSUI or both programs?
3. Did you interact with program staff (OPA/IESO or the TR) or only with your client?
   a. If program staff: Who did you interact with, and which organization?
4. At which stages of [IAP/PSUI] have you been involved and what services have you provided?
   a. Opportunity Accelerator
   b. Preliminary/Detailed engineering studies
   c. Enabling initiatives: Energy Manager or Monitoring and Targeting
   d. Installation/implementation of energy-saving improvements
   e. M&V of the energy-saving improvements

PROGRAM DELIVERY
5. What has your experience been working with these aspects of the program? [For each component in Q4 ask]
   a. What worked well?
   b. What could be improved?
6. Have you helped your clients fill out application forms or provide documentation for the program(s)?
   a. Which ones?
   b. Was the application easy to fill out?
   c. Was the amount of information requested reasonable?
   d. Did you receive feedback from the TR or OPA/IESO after their technical review of the documentation?
      • Was this feedback valuable?
      • From your perspective, what can be improved about this process to minimize the number of clarification questions?
7. [If interviewee is involved at the engineering study phase] After completing an engineering study, what kind of follow-up, if any, would you conduct to encourage clients to move forward with an energy-efficiency project?
   a. What kind of barriers prevent customers from moving forward with projects identified through engineering studies?
8. Is lack of financing a barrier for clients to complete a capital investment project?
   a. [If Yes] How often does lack of financing prevent clients from pursuing energy-efficiency projects?
   b. What type of clients face this barrier?
9. Do clients complete projects without applying for a capital incentive from [IAP/PSUI]?
   a. [If Yes] How often does this happen?
10. What feedback, if any, have you heard from customers about [IAP/PSUI]?

PROGRAM RECRUITMENT AND TRAINING
11. How did you first learn about [IAP/PSUI]?
12. Did you or anyone in your company receive any training or information about [IAP/PSUI]?
   a. What did the training cover?
   b. Who provided the training?
   c. What impact, if any, did the training have on your business?
   d. How could the training be improved?
13. Did OPA/IESO/ClearResult/LDC staff provide you with any materials to better understand and promote [IAP/PSUI]? If so, what are they? Are they useful? [PROBE WEBSITE MATERIALS]
   a. Would you or your company be interested in taking on a more active role in lead generation and customer recruitment for the OPA/IESO industrial programs?

PROGRAM MARKETING
14. What would you say is the level of awareness of these programs amongst your industrial clients?
15. Do you promote [IAP/PSUI] to your clients?
   a. [If Yes] How do you promote the program(s)? Are there any challenges to promoting [IAP/PSUI]? [Probe whether there is any confusion about which program to use]
   b. [If No] What prevents you from promoting [IAP/PSUI]?
   c. How can OPA/IESO or the LDC work with companies like yours to promote participation and energy efficiency?
16. Do you discuss any non-energy benefits with customers when you are promoting energy efficiency studies or projects? [PROBE FOR BENEFITS SUCH AS IMPROVED OR INCREASED: productivity, product quality, workplace safety, competitiveness, comfort. ALSO PROBE FOR REDUCED: material waste, material consumption, operation and maintenance costs, and water use]
PROGRAM-RELATED HIRING AND STAFFING AT TRADE ALLY’S ORGANIZATION

IESO is interested in understanding the benefits [IAP/PSUI] brings to businesses like yours.

17. How important is [IAP/PSUI] to your business?

18. How many staff at [trade ally company] worked on IAP or PSUI projects in 2013 and 2014?
   a. How many were full time and how many were part time on IAP/PSUI?
   b. How many of those staff members maintained their employment primarily because of their work on [IAP/PSUI] projects?
   c. How much project work is needed for your business to justify hiring a new employee?

19. On average, what percent of a project’s budget goes towards labor versus equipment/supplies?

20. Aside from business activity, has your organization received any other benefits from being involved with IAP/PSUI? (such as increased capabilities, new service offerings, etc.)

ISO50001 QUESTIONS

Finally, I have some questions about your awareness of energy management standards.

21. Have you ever heard of the ISO50001 standard on energy management?

22. [ASK IF YES IN Q21] On a scale from 1 to 10 where “1” means “Not at all familiar” and “10” means “Extremely familiar”, how familiar are you with the ISO50001 standard on energy management?

23. [ASK IF YES IN Q21] Do the companies or organizations you work for in Ontario ask you about the ISO50001 standard and its implementation?

24. [ASK IF YES IN Q21] Among the companies or organizations you work for in Ontario, what proportion is ISO50001 certified?

25. [ASK IF YES IN Q21] In your opinion, what motivates companies or organizations to align with the ISO50001 standard? Any others?

26. [ASK IF YES IN Q21] Conversely, what impedes companies or organizations to align with the ISO50001 standard? Any others?

27. Do the companies or organizations you work for in Ontario use energy performance indicators to better manage their energy consumption (kWh per unit produced for example)? If so, which one(s)?

Those are all the questions I have for you today. Thank you for your time and the valuable feedback you have provided.
## Appendix XII
### BEST PRACTICES GUIDE

**IESO INDUSTRIAL BEST PRACTICES REVIEW**

**Best Practices Guide - Interviews with Industrial Program Staff-PMA and Utilities Delivering to End-use Customers**

**March 2015**

Date ________________________________ Interviewer ____________________________

Interviewee Name ______________________________ Organization ______________________

Title ___________________________

Phone __________________________________Email _____________________________

<table>
<thead>
<tr>
<th>Key Research Area</th>
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<td>Q6-Q9, Q15, Q17</td>
</tr>
<tr>
<td>Utility staffing levels/Organizational structure: What are key roles and staffing levels for program success?</td>
<td>Q1-Q5, Q16,</td>
</tr>
<tr>
<td>Program process and delivery: How are key process milestones managed and barriers addressed? What metrics are tracked and how is success measured?</td>
<td>Q10-Q14</td>
</tr>
<tr>
<td>Marketing and outreach: How is the program marketed? How marketing goals are established tracked and measured? What are successful marketing strategies?</td>
<td>Q19-Q25</td>
</tr>
<tr>
<td>Data tracking systems: What hardware and software tools are used by stakeholders and participants to effectively store, track and share program data?</td>
<td>Q26</td>
</tr>
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<td>Q8</td>
</tr>
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<td>Q27-Q32</td>
</tr>
<tr>
<td>Trade Allies: What is the strategy for using third party players? What are their roles and responsibilities?</td>
<td>Q33</td>
</tr>
<tr>
<td>Customer response: What are the barriers for customer participation and strategies to overcome these? How is customer feedback collected and used?</td>
<td>Q34-Q35</td>
</tr>
<tr>
<td>ISO 50001: How aware are utilities and customers of ISO 50001 standards? Do utilities provide support to customers on the standard?</td>
<td>Q36-Q38</td>
</tr>
<tr>
<td>Community impact: What effect has the program had on job creation in the community?</td>
<td>Q18</td>
</tr>
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</table>

**Green text: for interviewer only; do not read**

*NOTE: Interviews will focus on each utility’s Industrial programs and contacts interviewed will be*
preselected, based on their knowledge of the programs. Cadmus will attempt to preschedule all interviews.

Introduction

Hello, my name is______ and I am from Cadmus. We are a third-party consultant evaluating IESO (formerly Ontario Power Authority)’s industrial efficiency programs. We are conducting interviews to identify best practices for industrial programs. IESO identified [Utility program name] as a model program for us to include in this study. We would like to interview you about program practices that have made your programs a success. This will take about one hour. May we speak with you now or could we schedule a time that is convenient for you?

Roles and Responsibilities

Q1. Please describe your role in your organization’s industrial programs and your specific responsibilities in this role.

Q2. How long have you been working in this role?

Q3. Do you utilize a program implementer?
   a. (If a program implementer is used) What are their roles and responsibilities?
   b. How are they compensated? Fixed cost, incentives, other? Is this the approach you would recommend to other utilities? Why?

Q4. Do you utilize a third-party to deliver the program to the (utility or customers)?
   a. (If a delivery agent is used) What are their roles and responsibilities?
   b. How are they compensated? Fixed cost, incentives, other? Is this the approach you would recommend to other utilities? Why?

Q5. What role do Account Managers play in these programs?
   a. (If applicable) Do the Account Managers have assigned program goals?
   b. What kinds of goals? (kWh savings, participation)

Program Overview

Q6. Who are your target customers? Do you have targets for specific business sectors or rate classes?
Q7. How is eligibility determined? (Probe specific qualifications, such as usage, savings potential, business sectors, specific measure opportunities, etc. Plus, if not answered here or above, ask: Are large non-industrial customers eligible?)

Q8. [Verify our background research] What are the program offerings?
   a. Feasibility studies? Who pays for these?
   b. Equipment monitoring?
   c. Training for customers?
   d. Training for contractors, other?
   e. Technical assistance or energy managers?
   f. On-site staff? (Embedded energy managers, etc.)
   g. Rebates/incentives?
   h. Financing? (Probe for financing and strategies. Is financing necessary for program success? What is the most effective financing strategy: utility financing, assistance obtaining financing, other? )
   i. Offer programs to gas customers (either your own gas customers or through collaboration with a gas utility)? If so, what has worked for you in offering gas collaboration programs?
   j. Other

Q9. Of the offerings on the list we just discussed, which of these is the most important for driving program success? The second most important?

Q10. How do you measure program success?
   a. Participation
   b. Energy Savings
   c. Demand Savings
   d. Peak Demand Savings
   e. Both
   f. Other

Q11. What program metrics do you track?
Q12. How do you keep application approval, project verification and rebate flow times to a minimum?
   
   a. What bottlenecks have you commonly observed?

Q13. How long does the average technical review take? What steps define its start and completion?

Q14. Do your programs require customers to sign a contract? If so, for what period? How do you deal with program non-performance? How long does it take to produce the contract (for customer review) after the review is complete?

Q15. Do the incentives target specific payback periods, % of project cost, $/KWh?

Q16. How many staff member work on your programs full-time? How many others dedicate at least 20% of their time to the program?
   
   a. Do you consider your staffing level to be sufficient?

Q17. Have the programs taken any steps to limit freeridership (that is, customers receiving incentives for measures that they would have installed without the program)? (Examples of such steps: not allowing retroactive rebates, requiring pre-approval…)

Q18. What effect do you think your programs have had on job-creation or the economy in general in your service territory, if any? Do you use a methodology to calculate job creation? What methodology?

Marketing and Outreach

Q19. (If not answered above) Who markets the programs to the end user?

Q20. Do the programs have any specific marketing goals, e.g. do you try to reach a specific number of customers through marketing every year?

Q21. Is there a marketing plan, marketing timeline, or calendar? [Probe for details on seasonality, targeting for different customer segments, etc.].

Q22. Did you conduct or use any market barrier research to inform the plan(s)?

Q23. Do you cross-market your programs?
   
   a. If so, how do you go about doing that?

   b. Have these efforts been successful? How do you track this?

Q24. What strategies do you think have been most effective in marketing the programs? Why?

Q25. How are the marketing initiatives tracked and measured?
Data Tracking Systems

Q26. Please tell us about your data tracking systems?
   a. What hardware and software systems do you use?
   b. How easily does your system interface with the systems of other program stakeholders?
   c. With which stakeholders do you exchange data?
      i. How easy is that exchange? What barriers have you encountered?
   d. How are projects tracked? (Probe: What metrics? Can they be tracked from application to payment?)
      i. Can you pull reports that track the project from application to payment? How easy is that?
   e. Who has access to this report?

Measurement/Verification and QC

Q27. Do you have defined and documented quality assurance guidelines?
Q28. How are these communicated to the program staff or implementation partner?
Q29. How do you verify the program is in compliance?
Q30. Do you have defined and documented measurement and verification guidelines?
Q31. How are these communicated to the program staff or implementation partner?
Q32. How do you verify the program is in compliance?

Trade Allies

Q33. (If third parties are noted in Q19, ask) How do you use third party players to deliver the program?
   f. Who are the third party players associated with the program? (Contractors, up-stream third party market actors such as suppliers, distributors?)
   g. (Probe if needed) What are their roles and responsibilities?
   h. Do you provide them with training? How often?
   i. Do you communicate regularly? Is your current communication plan sufficient for the administration and maintenance of the program?
Customer Response

Q34. What barriers, if any, do your customers seem to face when signing up for your programs?
   a. What are your strategies to overcome those barriers?

Q35. Do you have a method for collecting customer feedback (satisfaction surveys, customer panels, regular evaluation reports, etc.)? What do you do with their feedback?

Company Information

Thank you. I have a few final questions.

Q36. Is your organization aware of the ISO 50001 standards?
   j. Very aware
   k. Somewhat aware
   l. Not too aware
   m. Not at all aware

Q37. Are your customers aware of the standard?
   n. Very aware
   o. Somewhat aware
   p. Not too aware
   q. Not at all aware

Q38. Do you provide support to your customers around the ISO 50001 standards? Did the introduction of the ISO 50001 increase participation in the programs?

Q39. And finally, do you have any additional best practice suggestions for IESO?
Best Practices Guide - Interviews with Industrial Program Staff-PMA Delivering through Utility

March 2015

Date ________________________________    Interviewer ________________________________

Interviewee Name ______________________________ Organization ______________________

Title ___________________________ 

Phone __________________________________ Email __________________________________

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NOTE: Interviews will focus on each utility’s Industrial programs and contacts interviewed will be preselected, based on their knowledge of the programs. Cadmus will attempt to preschedule all interviews.

Introduction

Hello, my name is_____ and I am from Cadmus. We are a third-party consultant evaluating IESO (formerly Ontario Power Authority)’s industrial efficiency programs. We are conducting interviews to
identify best practices for industrial programs. [Utility program name] was identified by Ontario Power as a model program. We would like to interview you about program practices that have made your programs a success. This will take about one hour. May we speak with you now or could we schedule a time that is convenient for you?

Roles and Responsibilities

Q1. Please describe your role in your organization’s industrial programs and your specific responsibilities in this role.

Q2. How long have you been working in this role?

Q3. What is your organization’s role in implementing industrial energy efficiency programs? (If they say that they don’t have a direct role, ask whether they require their utility customers to offer such programs)
   a. Who designs the program?

Q4. What is the utility’s role in implementing the industrial energy efficiency programs?

Q5. How do you work with the utilities on these programs?

Q6. Do you have account managers that work:
   i. With your wholesale customers?
   ii. With the utilities?
   b. What is the role of account managers in these programs?
   c. Do they have individual goals or targets? (Probe for both those who work with customers and those who work with utilities)

Program Overview

Q7. Who are your target customers? Do you have targets for specific business sectors or rate classes?

Q8. How is eligibility determined? (Probe specific qualifications, such as usage, savings potential, business sectors, specific measure opportunities, etc. Plus, if not answered here or above, ask: Are large non-industrial customers eligible?)

Q9. [Verify our background research with Interviewee; ask about both wholesale customer and utility programs] What are the program offerings?
   a. Feasibility studies? Who pays for these?
b. Equipment monitoring?
c. Training for customers?
d. Training for contractors, other?

e. Technical assistance or energy managers?
f. On-site staff? (Embedded energy managers, etc.)
g. Rebates/incentives?

h. Financing? (Probe for financing and strategies. Is financing necessary for program success? What is the most effective financing strategy; utility financing, assistance obtaining financing, other?)

i. Offer programs to gas customers (either your own gas customers or through collaboration with a gas power utility)? If so, what has worked for you in offering gas collaboration programs?

j. Other

Q10. Of the offerings on the list we just discussed, which of these is the most important for driving program success? The second most important?

Q11. How do you measure success for your programs?

a. Customer Participation

b. Energy Savings

c. Demand Savings

d. Peak Demand Savings

e. Utility participation

f. All of the above

g. Other

Q12. What program metrics do you track?

Q13. Do the incentives target specific payback periods, % of project cost, $/KWh?

Q14. How many staff member work on your programs full-time? How many others dedicate at least 20% of their time to the program?

a. Do you consider your staffing level to be sufficient?
b. How many staff do your utility partners usually dedicate to this program? Do you consider that staffing level to be sufficient?

Q15. Have the programs taken any steps to limit freeridership (that is, customers receiving incentives for measures that they would have installed without the program)? (Examples of such steps: not allowing retroactive rebates, requiring pre-approval…)

Q16. What effect do you think your programs have had on job-creation or the economy in general in your service territory? Do you use a methodology to calculate job creation? What methodology?

**Marketing and Outreach**

Q17. (If not answered above) Who markets the programs to the end user?

Q18. Does the program have specific marketing goals, e.g. customer contacts?

Q19. Is there a marketing plan, marketing timeline, or calendar? [Probe for details on seasonality, targeting for different customer segments, etc.].

Q20. Did you conduct any market barrier research to inform program development or marketing efforts?

Q21. What strategies do you think have been most effective in marketing the programs? Why?

Q22. How do you track and measure marketing initiatives?

**Data Tracking Systems**

Q23. Please tell us about your data tracking systems?

a. What hardware and software systems do you use?

b. How easily does your system interface with the systems of other program stakeholders?

c. With which stakeholders do you exchange data?

d. Do the distribution utilities’ upload their program data to your system?

   i. How easy is that exchange? What barriers have you encountered?

e. How are projects tracked? (Probe: What metrics? Can they be tracked from application to payment?)

   i. Can you pull reports that track the project from application to payment? How easy is that?

   ii. Who has access to this report?
Measurement/Verification and QC

Q24. Do you have defined and documented quality assurance guidelines?
Q25. How are these communicated to the utilities?
Q26. How do you verify the utilities are in compliance?
Q27. Do you have defined and documented measurement and verification guidelines?
Q28. How are these communicated to the utilities?
Q29. How do you verify the utilities are in compliance?

Trade Allies

Q30. Please describe for us any third party partnerships involved in delivering this program.
    a. What is your strategy in utilizing third parties in delivering the program?
    b. What are their roles and responsibilities?
Q31. How closely do you work with third party partners in delivering the program?
    a. Do you communicate regularly? Is your current communication plan sufficient for the administration and maintenance of the program?

Company Information

Thank you. I have a few final questions.

Q32. Is your organization aware of the ISO 50001 standards?
    a. Very aware
    b. Somewhat aware
    c. Not too aware
    d. Not at all aware
Q33. Are your distribution utilities aware of the standard?
    a. Very aware
    b. Somewhat aware
    c. Not too aware
d. Not at all aware

Q34. Do you provide support to your distribution utilities around the ISO 50001 standards? Did the introduction of the ISO 50001 increase participation in the programs?

Q35. And finally, do you have any additional best practice suggestions you think would be beneficial to IESO?
## Appendix XIII

### CANADIAN PROGRAMS ALIGNED WITH ISO 50001

<table>
<thead>
<tr>
<th>Organization</th>
<th>Program Name</th>
<th>Type</th>
<th>Detailed Incentives</th>
<th>Conditions/ Eligible Projects</th>
</tr>
</thead>
</table>
| BC Hydro              | Power Smart Strategic Energy Management Programs (SEMP)¹⁷                     | EMS  | Up to 75% in salary funding for 2 years  
100% of the cost for management coaching, required training for the company’s new energy manager or an on-site energy management assessment  
A fully funded SEMP workshop to facilitate the creation of a customized energy plan  
100% funding for an employee’s salary                                                                 | Annual energy cost of over $1 million |
| BEIE¹⁶,¹⁹, Quebec Government | ÉcoPerformance                                                              | EMS  | 50% of eligible costs up to $275,000:  
Hiring an energy manager: 50% of RH expenses up to $25,000  
Training: 50% of eligible costs up to $50,000  
Support from external specialists, audits and certification: 50% of eligible costs up to $100,000  
Data acquisition equipment and programming: 50% of eligible costs up to $100,000                                                                 | Implementation of an EMS within a 24-month period |

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¹⁶ BEIE : Bureau de l’efficacité et de l’innovation énergétiques. Free translation : Office of energy efficiency and innovation

¹⁹ Program started in 2013 but was put on hold until November 2015
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<tbody>
<tr>
<td>Efficiency Nova Scotia</td>
<td>On-site Energy Management Program&lt;sup&gt;20&lt;/sup&gt;</td>
<td>EMIS</td>
<td>12-month funding to have an on-site energy specialist from Efficiency Nova Scotia to hire a full-time energy manager or to offset training costs</td>
<td>Annual energy cost of over $1 million</td>
</tr>
<tr>
<td>Enbridge Gas Distribution</td>
<td>Run it Right</td>
<td>EMIS</td>
<td>100% of the using costs for the Enbridge EMIS for a 12-month period</td>
<td></td>
</tr>
<tr>
<td>Natural Resources Canada</td>
<td>ecoENERGY Efficiency for Industry&lt;sup&gt;21&lt;/sup&gt;</td>
<td>ISO 50001 and EMIS</td>
<td>50% of eligible costs up to $40,000 Eligible costs: development of an energy baseline, energy use assessment, energy performance monitoring and reporting, professional fees, training, and salaries of internal employees Ineligible costs include equipment purchases and capital projects</td>
<td>Implementation of EMIS is also incented, although not publicized on the website</td>
</tr>
<tr>
<td>SaskPower</td>
<td>SaskPower Industrial Energy Optimization Program&lt;sup&gt;22&lt;/sup&gt;</td>
<td>ISO 50001 and EMIS</td>
<td>Cumulative maximum of $400,000 per facility, 100% of prefeasibility report costs up to $15,000 50% of energy management plan costs up to $50,000 50% of certification/implementation costs up to $100,000</td>
<td></td>
</tr>
</tbody>
</table>

<sup>20</sup> [http://www.efficiencyns.ca/energy-solutions/on-site-energy-management/](http://www.efficiencyns.ca/energy-solutions/on-site-energy-management/)
<sup>21</sup> [http://www.nrcan.gc.ca/energy/offices-labs/industry/5699](http://www.nrcan.gc.ca/energy/offices-labs/industry/5699)