Process Evaluation of the Process and Systems Upgrade Initiative (PSUI)

A Report Prepared for Ontario Power Authority

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ES 1  Executive Summary
This report describes the findings from a process evaluation of the Process and Systems Upgrade Initiative (PSUI) that began in June of 2011. PSUI is a state of the art program designed to increase the energy efficiency of Ontario industrial firms connected to OPA’s electrical network through Local Distribution Companies (LDCs). Another program, the Industrial Accelerator Program (IAP), targets industrial firms connected to the Ontario Power Authority electric grid at the transmission level. The firms connected at the transmission level tend to be the larger industrial firms and those connected through the LDCs tend to be mid-size and smaller although this is not always the case. There is a separate process report for the IAP and the two reports should be read together because they contain different but complementary materials.

ES 1.1 Overview
The PSUI provides funding for energy managers, roving energy managers, preliminary and detailed studies, and incentives for energy efficiency projects. Incentives are available for projects, micro-projects, and retrofits. PSUI and IAP are largely the same except that the PSUI is delivered by the LDCs and supports energy managers while IAP is delivered by OPA and does not support energy managers.

The goal of this process evaluation is to:

• Establish an early baseline understanding of program operations,
• Provide early feedback about the operations of the PSUI, and
• Provide recommendations for process improvement.

ES 1.2 Methods Used
This report is based on several sources of information including:

1  Information obtained directly from the pages of the OPA website,
2  Supporting documents downloaded from the OPA website and other sources,
3  Interviews with OPA staff responsible for managing the PSUI program,
4  Interviews with three Willis engineering staff members,
5  Interviews with nine individuals responsible for implementing the PSUI program at LDCs.
   One of the interviews included three respondents and another had two participants, and,
6  An interview with a responsible party at the Ministry of Energy.

Because the program was in the early stages and there were few projects in advanced stages, interviews were not conducted with industrial firms.

The content of the documents and interviews were analyzed and tagged. This material was then organized based on the tags and the report written.
ES 1.3 Program Background
The report covers the initial phases of the implementation of the PSUI from June of 2011 through June of 2012. Because of an internal reorganization at OPA, the PSUI was rolled out slowly. The Technical Review Team was put in place in late October of 2011 and most of the energy manager contracts were being signed between April and June of 2012. In May of 2012, it was reported that there were 42 “completed and submitted” energy manager applications and 20 approved roving energy manager applications. Six Micro-Projects and one PSUI energy efficiency project were underway as well as two-generation projects. There were applications for 12 preliminary studies and twenty-two detailed studies. The combined MW reduction for the projects under construction was 0.96. The combined estimated energy savings for the study projects was about 60 MWs. This is well below the stated goals for the program.

ES 1.4 Major Findings
A few of the larger LDCs are likely to have several firms participating in PSUI. A modest number of LDCs will have from one to a few PSUI projects and a very substantial number of LDCs are unlikely to have PSUI projects because they have no industrial firms that would qualify.

ES 1.4.1 Marketing
LDC marketing efforts are largely one-to-one efforts directed to the largest customers. LDCs are also using letters introducing the program and holding periodic breakfast meetings to which large customers are invited to discuss program initiatives and other topics of interest to customers.

LDCs are also using channel partners to bring customers to them. Channel partners bring resources that LDCs do not have, for example, metering capability, and because of their previous program experience they help customers through the process and produce studies that meet the technical and administrative requirements of PSUI. The technical reviews provided by the LDCs give industrial firms confidence that vendor claims are accurate.

ES 1.4.2 Timing
There was disappointment and concern with the amount of time that it has taken to get the energy manager and roving energy managers in place.

There were strong concerns about how realistic it is to expect the energy managers and roving energy managers to get 300 MW of projects into place in the first year. Given the time it takes to implement industrial projects, both because of how projects are implemented in user facilities and the PSUI decision-making timeline, there were concerns that PSUI would not meet its long term goals and that substantial savings would be left on the table.

ES 1.4.3 Energy Managers and Roving Energy Managers
Energy manager and roving energy manager resources are essential for a strong LDC industrial program.

Customers have responded well to the Energy Manager Initiative. Cash-strapped customers particularly value the Energy Manager Program.
The LDCs have viewed the Energy Manager Program as a way to get large projects into the pipeline in an early and timely way.

Many energy managers have been appointed from among internal employees. This gives the energy manager credibility with the senior management. It also means energy managers are already familiar with the plant and its operations.

Training of the energy managers is a critical and overlooked area that is in urgent need of attention. Energy managers need administrative training, technical training, and training in managing cultural change within plants. Energy Manager programs at other utilities have suffered from inadequate support of energy managers in the early going.

The annual goal of 300 MW is unrealistic for a first year energy manager. There is limited time to get the energy manager in place, to identify projects, to do preliminary and detailed studies, obtain incentives, and implement large scale projects in a timeline consistent with customer needs. The current contracts may have unintended consequences such as encouraging energy managers with new found skills to move on.

*ES 1.4.4 Metering*

Metering is an important resource that is under appreciated and which needs immediate attention. It is particularly important for finding savings that might otherwise be overlooked. It is also important, especially to energy managers for developing credible business cases with senior management.

The failure to get the meter lending library in place is a serious deficiency in the PSUI program.

*ES 1.4.5 Barriers to Program Participation*

The PSUI and OPA programs already have a reputation for being cumbersome. This significantly impedes LDC marketing efforts.

Some cited the need for a solvency certificate as a barrier.

The respondents understood the importance of the technical review process but also felt that the technical review process was using the same standard regardless of the anticipated savings. There is very strong sentiment that the level of technical review needs to be correlated with the amount of risk.

There was also strong criticism of the length of the various contracts and the opaqueness of those instruments. Executives are not likely to deal with lengthy documents. Medium and small firms do not typically have legal counsel and refer documents to an outside firm. LDC respondents expressed a need to be able to present a simple and understandable document early in the sales process so that the requirements and rules are easily understood.

*ES 1.4.6 Payback*

Firms are interested in quick paybacks. A part of the sales process is to get firms to think about energy efficiency projects with longer paybacks.

Reducing paybacks to one to two years is a strong incentive to participate.
If paybacks can be reduced to a year, there may be opportunities to finance projects from maintenance and operating funds rather than capital funds that take more time. This could speed both the decision process and the implementation rate.

**ES 1.4.7 Free riders and Enabled Savings**

The general consensus among the respondents was that there were likely to be few free riders. Many of the projects being considered had previously been rejected because of the lengthy paybacks or had not previously been identified.

LDC representatives are concerned about how free ridership will be handled in the impact assessment. They want to know the criteria by which free ridership will be determined so that they do not put large amounts of time and effort into projects that may have extensively discounted savings; they want assurance that the criteria will be applied in an objective rather than subjective manner; and they want to know that the history and context of projects is understood so that adjustments are not based on a cursory examination of the situation.

LDC representatives identified a number of instances of enabled savings many related to maintenance and operations issues such as replacement of failed components that caused increases in energy use, elimination of redundant systems operating simultaneously, reduction in leaks in systems, and improvements in blower technologies that did not qualify for incentives but nonetheless resulted in energy reductions.

**ES 1.4.8 Measurement and Verification (M&V) Requirements**

The 10-year M&V period with the claw-back provision was identified as a significant obstacle to participation. The respondents suggested that an M&V period of two to three years should be adequate.

**ES 1.4.9 The Retrofit Program**

LDC respondents saw the Retrofit Program as the likely alternative to PSUI.

It was reported that customers are under reporting estimated savings so that they qualify for the Retrofit Program.

It was suggested that the upper limit for the Retrofit Program be raised.

It was suggested that prescriptive measures be removed from the Retrofit Program for large customers and that the program be limited to engineering worksheets and custom projects.

Inconsistencies in incentives were reported between the prescriptive and the engineered worksheets.

**ES 1.4.10 ICON**

Respondents report that it is difficult to enter and retrieve data from ICON.

Respondents need a highly usable customer relationship management system.

The system needs to include functions beyond project reporting, project status, and financial management of contracts and incentives.
ES 1.4.11  The Industrial Working Group (IWG) and Change Management

The IWG is viewed as ineffective in communicating LDC needs and concerns relating to the PSUI program.

ES 1.5 Recommendations

ES 1.5.1  Energy Manager Training

- Training for energy managers should be given a very high priority.
- LDCs should focus one-on-one to assist energy managers to become well established in their first six months on the job.
- Funding for at least some basic training should accompany the funding for an energy manager position and not be separate from it.
- As soon as possible (within 30 to 60 days) LDC Managers and KAMs, and perhaps some energy managers, should hold a well-facilitated focused workshop to identify the content and assemble the basics of a training program for Energy Managers and Roving Energy Managers.
- LDCs that are assembling their own training programs should collaborate with each other to develop the energy manager training.

ES 1.5.2  Energy Manager Goals and Contracts

- For a variety of reasons commercial and industrial projects may have lengthy implementation timelines. In this context, the goals for energy managers are not realistic. The goals of the Energy Manager contracts should be revisited to establish a more realistic first year outcome. The goal of the first year should include assembling a portfolio of potential projects that are capable of saving 300 KW. The second year goals should be to have implemented or nearing the completion of 300 KW of projects and have assembled additional projects for that amount in year three.
- The OPA should consider extending energy manager contracts by two years.

ES 1.5.3  Meter Lending Library (MLL)

- The OPA’s assumptions about the risks associated with the MLL appear to be completely out of line with the actual risks. A more realistic assessment of the risks of the Meter Lending Library should be undertaken within a 30 to 60 day period and approve its establishment.
- An MLL librarian should be appointed immediately.
- The Meter Lending Library should be established as soon as a librarian is in place.
- OPA should liaise with the MLLs at BC Hydro and at the PG&E Energy Center to see how these libraries are operated and what other support is provided.
- OPA should call upon local and regional expertise to assist LDCs in the use of metering, providing case studies, and perhaps opportunities for mentoring of either LDC personnel or energy managers.
• OPA should investigate the establishment a roster of engineering or metering firms that are qualified to do metering that can work with energy managers to install and remove the meters.

• Energy managers should be given a metering allowance.

• Firms that do not have energy managers but who are conducting detailed studies should be provided a metering allowance in an application for a detailed study.

**ES 1.5.4 The Technical Review Process**

• The technical resources used to evaluate studies need to relate to the size of the projects. A series of limits on the amount spent on technical reviews should be instituted for projects costing less than $100,000.

• Alternative approaches to assessing studies and incentive applications should be considered before a technical review begins and an assessment should be made as to whether more costly approaches would add sufficient precision to justify their costs.

• More costly approaches should only be considered in cases where the added precision may change the decision of the firm contemplating the project.

• Incentives can be adjusted on the basis of actual results once the project is commissioned.

**ES 1.5.5 Contracts and Contract Templates**

• The current contract templates are opaque and cumbersome given the level of risk that OPA assumes.

• Contracts should be simplified, made more transparent, and their length reduced to between one quarter and one half of their current length.

**ES 1.5.6 Measurement and Verification Requirements**

• A ten-year contract with a measurement and verification requirement and a clawback provision is probably not realistic given the dynamics of industrial processes and markets.

• It is recommended that measurement and verification activities be limited to the payback period for a project without an incentive or five years whichever is less.

• PSUI might want to institute a sliding scale of incentives based on the size of the project, the amount of the incentive, and the willingness of participants to engage in a longer-term contract.

• It is recommended that consideration be given to raising the upper limit of savings for Retrofit Projects.

• It is recommended that the incentives for the different types of Retrofit Programs, prescriptive, engineering worksheet, and custom be made consistent.
ES 1.5.7 ICON

• A good customer relationship management system is essential to a well marketed, administered, and productive efficiency program. It is recommended that OPA invest the resources that are needed to make ICON more functional and productive for participants.

ES 1.5.8 The Change Management System

• Respondents reported that many of the findings and recommendations in this report have previously been made known to OPA directly and through the IWG. Some felt very strongly that the OPA was not being sufficiently responsive to the need for immediate changes. Although there is a change management process, some of these respondents felt that the process had become a barrier to making the program more effective in a timely manner.

• It is recommended that the change management process immediately revisit the change management process and revise it or temporarily suspend it with a view to making needed changes to the program right away.

The near consensus view of the respondents is that the PSUI program has great potential but that it is significantly hampered by program processes and rules and is at significant risk of failure from the burden of these processes. To paraphrase one respondent, the major risk to this program is not that money will be ill spent, but that the processes and the rules will result in the program being a major failure that will negatively influence the ability of the LDCs to deliver energy efficiency services for the long term. The major concerns are that the program will not recover from a very slow rollout and that the program requirements and timelines will prevent the LDCs and their industrial partners from completing significant numbers of projects before the conclusion of the program in December 2014. The PSUI is in greater jeopardy than the IAP because the firms are smaller, they have fewer internal resources to develop and implement projects, and, while they have essentially the same rules as IAP, there are additional layers of decision-makers at the LDCs.
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1 Introduction

This is a report of a process evaluation of the Ontario Power Authority’s Process and Systems Upgrade Initiative (PSUI). The PSUI targets the Ontario Power Authority’s approximately 10,000 distribution connected small industrial, commercial and municipal customers. The program is channeled and administered through the Local Distribution Companies (LDCs). The goal of PSUI is to increase the efficient use of electrical energy and reduce the energy intensity of industrial facilities in Ontario. The mechanism to accomplish this is to provide financial incentives for efficient equipment upgrades and process system improvements so that the rate of return for major energy efficiency projects is competitive with other investment opportunities that industrial firms have.

1.1 Program Background

The PSUI has several elements. One element allows LDCs to hire a total of about 40 energy managers or roving energy managers. As employees of industrial firms, energy managers assist in identifying efficiency opportunities, developing energy efficiency plans, and implementing projects. Roving energy managers are employed by one or more LDCs and assist multiple smaller industrial firms to achieve the same goals as their energy manager cousins.

PSUI provides funding for two levels of engineering studies, preliminary and detailed. Preliminary studies allow organizations to scope the opportunities within their facilities to assess the range of potential of projects and/or to identify projects that have promising paybacks. Detailed studies are designed to provide a more detailed investment grade analysis in support of a business case for an energy efficient investment. An organization can apply for incentives to support the preliminary and detailed studies or they can complete these studies on their own.

A detailed study plan is attached to a Project Incentive Application and a measurement and verification plan. When the LDC accepts the incentive application after a technical and financial review, and the firm or organization receives and accepts the agreement, the construction can commence. Projects must be completed within two years. The organization must comply with the measurement and verification requirements and submit reports over the length of the incentive agreement (currently ten years for regular projects and five years for micro-projects).

Participants may also complete micro-projects. These projects typically produce fewer savings but are approved through a more simplified process. As the name implies micro-projects are limited to projects with a single focus.

A parallel OPA program, the Industrial Accelerator Program (IAP), is conducted directly by the OPA targeting transmission-connected large industrial firms. The PSUI program is very similar to the IAP program although it is marketed by the LDC Key Account Managers (KAMS) rather than OPA KAMS and includes the energy manager and roving energy manager elements that are not part of the IAP program. Generally, the industrial transmission-connected customers served by the IAP program are among the largest users of electricity in Ontario although there are some firms that are large users of electricity that are distribution connected. A few firms with multiple facilities have some facilities that are
transmission connected and others that are distribution connected and therefore eligible for both programs.

1.1 The Goals of the Process Evaluation

In 2011, OPA contracted with ADM/Innovologie to conduct process and impact evaluations for both the IAP and PSUI programs. Because of an internal reorganization at OPA, the evaluation got underway in November 2011 although some preliminary work was done prior to that in the spring of 2011. One IAP project was completed in 2010 and one in 2011 and impact assessments of those projects have been completed.

The goal of this process evaluation is to:

- Establish an early baseline understanding of program operations,
- Provide early feedback about the operations of the PSUI, and
- Provide recommendations for process improvement.

The detailed findings for the IAP evaluations can be found in a separate report.¹

1.2 The Scope and Methods Used in this Evaluation

This report is based on several sources of information including:

1. Information obtained from the webpages of the OPA website
2. Documents downloaded from the OPA website and other sources,
3. Interviews with OPA staff responsible for managing the PSUI program,
4. Interviews with three Willis engineering staff members,
5. Six interviews with nine individuals responsible for implementing the PSUI program at LDCs. One of the interviews included three respondents and another had two participants.
6. An interview with a responsible party at the Ministry of Energy.

A more in-depth process analysis of the program will be completed later in the life cycle of the program.

Open-ended in-depth interviews of the OPA and Willis staff were completed in November of 2011. The interviews were based on interview guides constructed after a review of the available program documentation. These interviews focused on:

- The roles of the respondents,
- How PSUI operations were structured,

¹ Readers are encouraged to examine both reports because the findings often complement each other. Reed, John H., Jeff Riggert, Moria Morrissey. Process Evaluation Early Results of the Industrial Accelerator Program. Rockville MD; Innovologie, June 2012.
• How operations had changed and were expected to change,
• The effectiveness of operations and the program to date,
• Interactions between the LDCs, OPA, and the industrial firms, and
• Recommendations for changes to the program.

The interviews with OPA and Willis Staff were conducted face-to-face in a conversational style taking from 45 minutes to an hour and a half. The open-ended nature of the interviews allowed for immediate clarification and follow-up of points raised. The interview guides helped to insure that there was consistency of content across the interviews.

The interviews with representatives of LDCs were conducted by telephone in May and June of 2012. These interviews were also open-ended in-depth interviews based on an interview guide. All of the interviews except two were recorded with permission of the respondents for use exclusively by evaluation contractor staff for quality control. The interviews with the LDC representatives focused on:

• How they marketed the program,
• The response of the industrial firms to the program
• The operation of the program,
• Recommendations for program improvement, and,
• Detailed information about projects at specific firms.

The interviews also focused on LDC representatives reporting about industrial firms with respect to:

• The importance of energy efficiency prior to exposure to PSUI,
• How firms became involved with the program,
• Project identification,
• Projects for which an application for a study or incentive had been made,
• Decision-making surrounding the projects,
• The likelihood that the projects would have proceeded without PSUI or were accelerated by it,
• Progress toward implementing projects,
• Benefits and challenges in dealing with PSUI from the perspective of the industrial firms, and,
• Recommendations for program changes,

The interviews with the LDCs were based on a purposive rather than random sample. The LDCs were selected because they had hired energy managers or because they had industrial
firms in their jurisdiction that had begun implementing and/or had completed projects. The size of the projects ranged from smaller projects to very large projects.

2 Program Logic Model

The purpose of the program logic model is to provide a description of the program and the program logic. It serves as a baseline from which changes to the program can be determined and it provides a logical framework that can be used for program analysis.

A logic model is two-dimensional. One dimension, in this case the horizontal, summarizes the logical progression of a few key program activities. The second dimension summarizes the logic of the activities, the outputs of the activities, collaborators in the activity, the target audience for the activity, near-term outcomes, and long-term outcomes or impacts associated with the activity. In evaluator terminology, outputs are the results of the program activities. Outcomes are what partners and participants do in response to program outputs. The model also identifies external factors that may influence the outcomes of the program.

2.1 Program Activities

The logic model for the PSUI program (see the attached Figure 1) identifies nine activities. The program differs from the industrial accelerator program in that OPA has limited or no direct contact with the LDC customers. OPA undertakes activities that enable the LDCs to conduct outreach, recruit customers, appoint energy managers, work with customers to develop studies, implement projects, and conduct follow-up with customers. A key difference between IAP and PSUI is the provision of energy managers. A key similarity is the strategy of identifying projects, conducting studies, and implementing projects. The contract agreements between LDCs and their customers are modeled upon the contract for IAP.

- Develop OPA infrastructure
- Outreach to and enrollment of LDCs
- LDC outreach and enrollment of distribution connected industrials
- Approve applications for energy managers
- Approve applications for studies
- Approve studies and incentive applications
- Implement projects
- Measurement and verification
- Reporting and evaluation

2.2 Program Outputs

The OPA infrastructure development activity produces a number of outputs including market research and characterization, program goals, design collaboration with the LDCs, a program design, an OPA organizational structure, a budget, staffing, workflow management, contract templates, a reporting management system (ICON), a technical review contract as well as other activities.
OPA conducts outreach to its LDCs to make them aware of the program, inform them of program rules and requirements, and enable them to mount the PSUI program in their service territories. The principal modes of contact with the LDCs are one-to-one communications and seminars and webinars.

In turn, the LDCs use existing internal personnel or hire key account managers who conduct outreach to their own industrial customers depending on the size of the industrial sector within their service territories. They also utilize other marketing channels such as written communications, seminars and webinars, and publications to reach customers.

Firms can either apply for preliminary or detailed study grants or they can conduct their own preliminary and detailed studies. The LDC reviews the application for the study grants, refers them to a technical contractor for review, and then approves them. Industrial firms can bypass the preliminary study and start with the detailed study and in some instances they may bypass detailed studies and submit an incentive application. Also, firms can decide to apply for retrofit projects.

Having energy managers and roving energy managers is one of several key PSUI implementation strategies. In recent years mid-size and smaller industrial firms have tended to outsource engineering functions and as a result they do not have sufficient staff or do not have staff with the capability to plan and implement energy efficiency projects. The Energy Manager Program allows industrial firms to apply for funding to support a full-time energy manager or share a roving energy manager. The LDCs selectively work with their customers to identify and obtain applications for energy managers who are hired by industrial firms with one or more facilities. LDCs may work independently or with other LDCs to identify several firms that could collectively benefit from a roving energy manager. Slots for energy managers are approved by OPA.

The firms and their contractors or vendors can then conduct the studies that are approved by the technical reviewers and the LDC. The firm then submits an incentive application that is approved by the technical reviewer and the LDC. The firm is provided with a monitoring and verification plan. The industrial firm and its contractors then implement the project.

Projects are subject to verification and monitoring. Installations are verified and data collected by the participants is monitored for compliance with the goals of the incentive application.

Finally, there is reporting and evaluation; the process is examined, the savings impacts analyzed, and attribution of savings to the program determined. Recommendations for changes to the program are made.

2.3 With Whom and for Whom

Activities are frequently conducted with partners and they are targeted to specific audiences. For example, the enrollment activity is targeted to industrial firm managers, and to a lesser extent, to vendors and engineering firms that may influence them and help to recruit industrial firms. Contractors, vendors, and engineering firms can all assist participants in preparing applications for studies and incentive applications.
2.4 Near-term Outcomes

The PSUI program has both LDC and industrial firm outcomes. Near-term outcomes are the immediate responses of LDCs to OPA activities or the responses of industrial firms to the activities of LDCs. In PSUI, the near term LDC outcomes are: LDC awareness of PSUI, enrollment in PSUI and creation of internal PSUI organizational structures to support the recruitment and development of projects by industrial firms. LDCs may use internal personnel to support the program or, if the size of the industrial sector warrants, may hire one or more key account managers (KAMs).

A key activity for LDCs is contacting and promoting the program with industrial firms. The outcome of this activity is for industrial firms to become aware of the program, in conjunction with their KAM or someone representing the LDC, they may apply for an energy manager or a roving energy manager. At this stage, industrial firms typically work with the LDC to review efficiency opportunities within the plant; they may conduct their own review; or apply for a grant for a preliminary engineering study to conduct a plant assessment. As projects become identified, the firm may assess whether they want to apply for a detailed study, apply for a micro-project, or complete a retrofit project. Micro-projects are for smaller projects and have fewer requirements. Retrofit projects typically replace less efficient equipment such as lighting with more efficient equipment.

If the firm applies for and receives funding for an energy manager position they then appoint someone to the position. Often these are internal candidates that have extensive knowledge of the plant while in other cases they may be hired externally. An energy manager is responsible for establishing an energy baseline for the plant, identifying potential energy efficiency opportunities, conducting a preliminary assessment of those opportunities and developing an energy management plan. The plan lists opportunities, prioritizes them on the basis of payback and other factors such as the availability of capital or the opportunity to coordinate the efficiency upgrade with other planned changes to the plant. The energy manager may also develop and manage employee awareness and involvement campaigns. Such campaigns enlist the aid of employees in identifying opportunities and changing operational behaviors in ways that reduce energy consumption. During later stages in the process, the energy manager is also responsible for conducting and managing studies, submitting incentive applications, and ultimately for managing the installation, monitoring and verification of projects. The energy manager is also responsible for keeping the energy management plan updated.

The energy manager submits reports to the LDC on a quarterly basis that allow the LDC to track activity and to provide assistance as may be needed. One aspect of the Energy Manager Program that was not clear was how the energy managers are to be trained. In programs at other utilities, the training and mentoring of the energy managers, especially in the first few quarters of their endeavors, had a strong influence on the initial results of the Energy Manager Program.

Roving energy managers are shared across LDCs and different firms. Grants for roving energy managers are assigned to firms where it would be difficult to justify a full-time energy manager. Their duties are similar to those of a full-time energy manager but spread across firms.

Firms that apply for studies are responsible for managing and completing them. Firms awarded study incentives sign an agreement with the LDC. A consultant or a contractor is
then hired to do metering and collect data. The result is a technical report that addresses a specific opportunity. The report establishes a baseline for a process, identifies the equipment and operating parameter changes that are to be made to the process, presents an engineering analysis of the changes in demand and consumption due to the alterations in the process, projects the cost of implementing the changes, and evaluates the energy benefits and costs for the project.

This report forms the basis for an incentive application that is submitted for review and approval. If the application is approved by the LDC and by the technical reviewer the firm then signs a contract with the LDC, hires a contractor to make the changes to the process, or uses its own internal staff to complete the installation.

There are several steps in the installation process that can make the timing and completion of projects difficult. The firm has to make capital allocations. Equipment has to be ordered. The installation has to be scheduled which may depend on maintenance outages for firms with continuous process operations. In addition, metering and monitoring equipment to monitor operations subsequent to the changes have to be installed and validated.

Once the equipment is installed, it must be commissioned and operations verified. In addition, the savings must be tracked and the energy savings verified. An important outcome for the firm is confirmation for management that their efforts have been worthwhile. It is the confirmation of the results that prepares management for undertaking similar projects at this and other plants. Outcomes of the monitoring, reporting and evaluation activities are the actual changes to policy and program structure and operation.

2.5 Long-term Outcomes

The near term outcomes produce additional activities and that results in the long-term impacts, some of which are contributions to the stated goals of the program. The desired long-term outcomes from this program are reductions in kW demand, consumption (kWh), and energy intensity. However, there are other long-term outcomes for participants. The program may result in reduction of labor inputs, reduction in emissions, improved operational efficiencies, improved product quality, reduced costs, improved profit margins and improved global competitiveness. Some of these long-term outcomes also represent larger societal benefits such as reductions in emissions, improved public health, and maintaining jobs and industries.

Other important benefits are the cultural changes that occur within facilities and more broadly within industrial firms. Successful projects may lead to increased attention to energy efficiency, a broader array of efficiency projects and replication of the projects in the same or other facilities. Competitors may emulate these activities producing even more savings.

Finally, the projects may produce new and refined practices (best practices), more technically sophisticated engineering and industrial firms, increased clean energy knowledge, and better global business strategies.

2.6 External Factors

External factors may influence the outcome of programs such as PSUI. A global recession like the one that occurred in 2008 may prevent companies from investing because of the lack of capital, out of concerns for prudence, or because it may be difficult to explain to workers and local communities why capital investments are being made during periods of austerity.
Governments could change how the program operates, the terms of participation, or policies that make the program more or less attractive, for example, emissions criteria or carbon credits. Global business strategies may influence companies to invest or not invest in these or other facilities.

3 The Program As It Stands

The program has been very slow in getting underway. This is attributable to a number of factors including significant changes to internal OPA operations in 2011, a slow roll out of the rules, and slowness in approving energy manager and roving energy manager positions.

One of the respondents with whom we spoke supplied us with selected slides from the Industrial Working Group (IWG) meeting held on May 22, 2012. It was reported that there were 42 “completed and submitted” energy manager applications and 20 approved roving energy manager applications. According to the materials in the slide, as of April 30, 2012 there are six Micro-Projects and one PSUI energy efficiency project underway. The slide identified two-generation projects. There were applications for 12 preliminary studies and twenty-two detailed studies. The combined MW reduction for the projects that are in construction is 0.96MW. The combined estimated MW reduction for the study projects is about 60 MWs. This is well below the stated goals for the program.

The near consensus view of the respondents is that the PSUI program has great potential but that it is significantly hampered by program processes and rules and is at significant risk of failure from the burden of the processes. To paraphrase one respondent, the major risk to this program is not that money will be ill spent, but that the process and the rules will result in the program being a major failure that will negatively influence the ability of the LDCs to deliver energy efficiency services for the long term. The major concerns are that the program will not recover from a very slow rollout and that the program requirements and timelines will prevent the LDCs and their industrial partners from completing significant numbers of projects before the conclusion of the program in December 2014.

With respect to this, some of the respondents were quite critical of OPA PSUI program leadership. There was fair agreement among some respondents that the manner in which the program was implemented was “inherently risk averse” for OPA. Some respondents perceived that the risks were mostly assigned to the industrial firms rather than being shared creating a potential barrier to participation. There was a suggestion that the fault for this lay in both the legislation and the bureaucratic nature of OPA culture with its inclination to use bureaucratic processes to protect the institution and its employees.

The findings that follow give form to these comments. There are significant and mostly negative consequences to a highly bureaucratic process. Among the potential consequences are:

- PSUI eligible firms will shun the program or limit their involvement to minimize the requirements they need to meet. The result will be significantly fewer savings than could be the case.

- In the future firms may be very wary of conservation efforts promoted by OPA and the LDCs.
• The energy managers and LDCs will not meet their goals and thus the program as a whole will miss its goals.

• The Ministry of Energy, which is under pressure from other Ministries who have their own agenda or wish to share the wealth, will not be able to demonstrate the worth of the program and the funding will either be shared or lost.

Based on the evaluators’ experiences, the PSUI concept is excellent. The ideas of having energy managers, meter lending libraries, conducting studies, and providing incentives working in concert are state-of-the-art. However, the evidence from the field suggests that the process is in serious need of being streamlined to make the program successful and extending PSUI for one to two years would allow fielding of the program and for firms to implement and complete projects needs to be considered. This needs to be acted upon quickly.

4  Findings

4.1  The Size of the Market

The various LDC representatives commented on their markets. The key point is that only a few have more than several customers that qualify for the PSUI program. One respondent pointed out that a customer typically must be over one MW before they qualify and went on to say that they have 15 larger customers. Another reported five or six customers over five MW and about 100 at one MW. Another reported targeting PSUI to about 120 customers with about 50 being five MW or greater. About 600 have one MW of load but this includes large shopping centers and institutions. Some LDCs do not have any customers or just one or two customers who qualify for the program.

4.2  Marketing

All of the LDCs described their approach to marketing as being essentially one-on-one contact with their largest customers. Generally LDCs have segmented their customer base and then approached the largest customers through one-to-one contacts and direct mail. One respondent commented that they had pre-existing relationships with the big industrial customers that allowed them to access these customers and have greater credibility. LDCs also reported holding workshops and breakfast meetings to introduce customers to the various programs.

The LDCs also use channel partners. One respondent reported sending customers to channel partners (for example, engineering firms) that know and understand the program. As this respondent pointed out, channel partners that know the program make it easier for the customers to participate.

One respondent reported that their LDC had about 300 channel partners of which 12 are compressor vendors. Three of those 12 are able to do good compressor audits. The technical reviewer confirms the channel partners’ recommendations and that gives the customer the confidence to move forward. This person went on to say that it really helps when the channel partner does the metering because the LDC does not have the resources to do it.

Another respondent reported a similar example. A customer was sitting on the fence about replacing old machines. The company had a hard time believing vendor claims that new
machines would cut energy consumption to one sixth of their previous level. OPA’s detailed engineering study and the third party review helped the customer to have the confidence to make the decision. This respondent observed that, “the OPA and the LDC really help companies take action with confidence. The client sees us (the LDC) as a hand-holder to get them through the process of taking action.”

A respondent commented that it was really interesting to watch firms get tuned in to the fact that energy is part of the industrial process. Historically energy has been viewed as a commodity and the costs were perceived as just a part of doing business. Energy is increasingly being viewed as something that is controllable that can contribute to the bottom line.

As was noted in the IAP report, companies are beginning to look to Europe for technologies. The previously mentioned customer with the antiquated machines is now researching technologies for their firm in Europe. The bottom line is that the one-to-one contacts, the hand holding, and the technical expertise that confirm vendor judgments help customers to act.

4.3 Timing

In the IAP report, the issue of timing was discussed in some detail. The main points from that report were that industrial firms have timing constraints such as having to do installation during downtimes or maintenance periods, the time it takes to make purchases and receive equipment, internal budgeting which may require waiting for another budget year, and capital allocation which may expire if not used within a certain period. Thus, it is important that OPA and LDC processes are completed in a timely way. The reader is urged to examine that report because many of the issues that were discussed in that report also arise in the PSUI Program. LDC representatives consistently raised the timing issue but it was less focused on the timing between customers and more related to delays caused by OPA. Several timing issues were mentioned:

1. Almost all of the respondents commented on how much time it took to get the energy manager contracts into place. As the evaluators note below, it took almost a year.
2. The LDC representatives expressed concern that delays in getting the energy managers in place delayed getting large projects in place and large projects may take from 9 to 24 months to complete installation. These delays make the announced goals for LDC annual savings and savings required of energy managers unrealistic.
3. If it takes nine months to get through preliminary and detailed studies and incentive approvals and another one to two years to install the projects then many efforts will not show results until April of 2014 at the earliest. The program closes in December of 2014 so there is little time to implement further rounds of projects.
4. A third timing issue was the delay in getting the technical reviewer in place. LDCs had some retrofit projects ready for review as early as June 2011 but there was no one to do the technical reviews until late October 2011.
5. The timing of coordination between the customer, the LDCs, and OPA was also identified as an issue. As one customer put it, “The biggest challenge with PSUI delivery is that customers have schedules to meet and the program rules are too
restrictive and make us unable to react to customer needs in terms of production schedules, etc.”

4.4 Energy Manager and Roving Energy Managers

The energy manager and roving energy manager elements are potentially among the most effective parts of the PSUI. Over the last 20 to 25 years, the trend has been for industrial firms, particularly smaller industrial firms, to outsource engineering. The facility manager or chief operators may be engineers but they are usually fully engaged with managing a plant on a daily basis. Thus, the capacity to observe and investigate plant operations, explore options for alternative processes or equipment, develop specifications, and manage the implementation of changes in facilities is often limited or lacking. When engineering expertise is needed, the firm will contract with an outside engineering firm to provide the design and implementation expertise needed to make changes to a facility.

4.4.1 Energy Manager Resources are Critical

Studies of industrial programs have consistently identified the personnel resources needed to implement changes as a major barrier to industrial efficiency. The Energy Manager Program provides this critical resource. To paraphrase one respondent, my second largest customer is a visionary with respect to what can be done at their facility but this executive is too busy with other things. A real benefit of the program is that the energy manager can do the contract management for the company.

More than one of the respondents linked getting the energy managers in place to being able to complete large projects. As a respondent put it, we market the imbedded energy manager program first and get them in place first and foremost and then go after the big projects (PSUI). One representative reported that his LDC used the Energy Manager Program as an early marketing strategy to get energy managers in place so that they could shoulder the burden of the larger PSUI program with its significant requirements.

The LDC representatives reported that firms are responding well to the Energy Manager Program. To paraphrase one representative, cash-strapped customers really value the OPA program to hire energy managers. Another commented that customers like the funding for energy managers.

But, even though customers like the program, its implementation has not been easy. One LDC representative said that it takes a long time for a company to decide to hire someone because many of them are in a hiring freeze and then there are the legal expenses associated in dealing with OPA. It really has made it tough to get projects going through PSUI.

Another respondent points out that it took from June 2011 until May 2012 to get contracts in place to hire embedded energy managers. “It was a long process.” Some of the LDC representatives were critical of OPA because it took so long to establish the framework between OPA and the LDCs and to get the approvals to implement the energy manager program. The bulk of the energy manager positions had just begun to be filled in the April and May 2012 time frame.

According to the LDC representatives, many of the energy managers are internal employees with many years of experience at the facility that have been reassigned to the energy manager position. A requirement of the program is that the energy manager be free of other obligations. The LDC representatives report that firms appear to be meeting this requirement
when assigning an internal person to this position. This is consistent with the practices observed in other utility energy management programs.

A benefit of selecting an internal employee as the energy manager is that the employee has pre-existing knowledge of the plant, the personnel, and the plant culture. The internal employee is also likely to have standing and credibility with the employees. Studies at other utilities have shown that energy managers appointed internally have the trust of management and are likely to receive a hearing and respect for their ideas. Externally hired energy managers can be effective as well but they have to learn about the facility, build trust with the employees, and gain the trust and ear of management.

As noted above, the duties of the energy manager are to establish an energy baseline, identify and prioritize opportunities, develop a plan for implementing the changes, sell the plan to management, apply for and conduct preliminary and detailed studies, submit incentive applications, manage the implementation, and manage the measurement and verification activities upon completion of the installation.

4.4.2 Training Is a Critical but Overlooked Area

Some of the LDC respondents raised the issue of training. Training was important for the newly appointed LDC KAMs and the energy managers. There are at least three types of training: 1) technical training, 2) program management training, and 3) training for strategies to implement change.

1. The technical training includes understanding the basics of energy efficiency, measurement and verification, and opportunities to improve energy efficiency. One LDC that sought funding to support Certified Energy Manager training (CEM) said that the decision to fund training took so long that the LDC had to cancel the training. Due to scheduling many of the newly appointed energy managers (April, May, and June) will have to wait until fall to receive the CEM training.

2. With respect to program management training, there are specific requirements for energy managers spelled out in the contracts with the industrial firms, for example, the need for quarterly reporting and the development of an energy management plant. One LDC representative observed that the new energy managers need training in this area and was planning to hold a webinar or workshop for his new energy managers. This is extremely critical. Although there is no data from the just appointed energy managers, evaluators found that new energy managers in another program consistently struggled to get started because they were unclear about the expectations for reports and plans, how to go about developing reports and plans, and how that related to their overall goals. The result was that initial reports and plans were below expectations.

3. The third area of training mentioned above is training for change management. This issue was actually raised by an energy manager associated with a firm that participates in the IAP program but is relevant here as well. This energy manager’s point is that the engineering is often the least difficult part of making changes. The difficult part is that the changes often go to the core of a firm’s processes that have a well-established culture around them that dictates what gets done, who does it,

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2 These are proprietary reports and not publicly available.
and the expectations around the outcomes. Thus, energy managers may need training in understanding industrial culture, organizational resistance to change, and strategies for managing change.

There are several takeaways concerning training:

- Early training is very important to an energy manager’s ability to perform. Many of those being assigned to energy manager positions know their plants but do not necessarily have the requisite energy management skill set.

- Program management training is an essential part of the overall training and early exposure to the expected approaches and protocols are important, as is one-on-one coaching of new energy managers through the first few months.

- Understanding how to create and manage change is as least as important as technical knowledge and energy managers need at least some training in this area as well.

- Training is an essential component to an energy managers success therefore, funding for at least some basic training should accompany the funding for an energy manager position and not be separate from it.

- There is an urgent need for a high degree of collaboration among the LDC Managers and KAMs to coordinate the development of energy manager program training. The evaluators recommend that the LDC Managers and KAMs, and perhaps some energy managers, hold a well facilitated focused workshop as soon as possible to identify the content and assemble the basics of what energy managers need to know.

4.4.3 Adjustments Are Needed to Energy Manager Goals and Contracts

The Energy Manager Agreement states that the energy manager shall achieve 300 kW of demand savings in a 12-month period commencing with the energy manager’s employment date. LDC representatives have raised two issues with regard to this. The first is whether the savings were net or gross. If the goal is net savings, then the energy manager would likely have to achieve demand savings in the range of 320 to 360 kW. To the evaluators’ knowledge, this issue is still unresolved.

The second issue has to do with meeting the target. As is the case with many industrial energy efficiency programs, the goals for the first and second years are set too high and are not likely to be achieved. Participation typically follows an s-curve with relatively few projects initially with the growth in the number of projects accelerating over time as participants gain experience and observe the experience of others. Participants typically test-drive a program before fully committing.

At least two different LDC representatives pointed out that achieving a 300 kW reduction in the first year of a program is unlikely because of the nature of the process. The energy manager has to be hired, potential projects have to be assessed, detailed studies need to be completed, incentive applications must be prepared, capital must be set aside, and equipment must be purchased, and then installed. The assessments, studies, incentive application, equipment purchases, and installation all require substantial time. But it is more
than a problem of just sequencing a series of project activities. One LDC respondent described the problem in these terms; “The 300 KW annual energy savings quotas for energy managers don’t line up well with the one year contract for energy managers because of construction periods and budget schedules.” Another respondent said that none of his LDC’s energy managers will meet the 300 KW reduction target in the first year because it takes so long to get projects going. One potential outcome of this goal is that Energy Managers and the LDC KAMs may focus on micro-projects as a way to achieve the goal. This is not necessarily desirable from the overall perspective of the program because it may tend to delay KAMs from laying the groundwork for larger projects.

The evaluators agree with the LDC representative that meeting this goal is unlikely unless the energy manager has a few large projects that are at the incentive stage at the beginning of the contract period and is able to shepherd those projects through the system very quickly. The 300 KW goal may be more appropriate as a two-year goal although projects may sometimes require more time than that.

Consideration should be given to adjusting the goals so that they more realistic in terms of what can be accomplished. First year goals might be defined in terms of having a defined plan with near term goal with savings that exceed 300 KW, one or more incentive agreements in place, detailed studies in process, and commitments from the firm to implement projects if they have paybacks of two years or less with the incentives.

The evaluators are also concerned that a program based on one year contracts for energy managers may have unintended consequences. It is not known how long an energy manager has to be in place to see projects implemented but based on experiences elsewhere the evaluators believe that it may take as long as two years and perhaps even more to make substantial progress.

Single year contracts may encourage persons nearing the end of their first year in the energy manager program to take their newfound skills and look for new opportunities that may pay more and/or be more secure. This is likely to be a loss to the program and a loss to the firm in terms of lost institutional memory. It is suggested that the contracts be revised to include a second year with a provision for termination for lack of progress toward meeting the revised goals after a first year review is conducted.

The issue of the goals and length of contracts need immediate attention. These issues should be resolved before the bubble of energy managers hired in the spring of 2012 reach their halfway point in October of 2012.

### 4.5 Metering

One of the features of the IAP and PSUI programs was to be a Meter Lending Library (MLL). The concept of the MLL was that industrial firms would be able to borrow high quality metering devices for a short period to monitor processes behind the revenue meter. In order to understand plant operations it is often necessary to isolate specific pieces of equipment using special metering devices.
An evaluation study at another utility\(^3\) found that energy managers strongly supported such temporary sub-metering because it enabled them to more fully understand the energy consumption and characteristics of their operations and it gave them firm evidence that enabled them to convince their managers that the savings were real and were associated with the changes that they were making to the plant rather than other factors such as changes in production. Being able to demonstrate the savings meant managers were more willing to consider new projects and it also demonstrated to managers the value of metering, thus allowing the energy managers to promote the inclusion of more permanent metering in their industrial systems. Three findings stood out in that study: the importance of metering for energy managers in determining what to do, the need for more metering equipment in the lending library, and the need for great urgency in establishing metering protocols to take the best advantage of the metering.

In our discussions with London Hydro, they pointed out that they are unique among their peers because they do in-house metering for their customers. They noted that the other LDCs do not have the equipment. London Hydro does the metering as a customer service and has been doing it for their rebate programs for some years now. Metering becomes a marketing tool that provides credibility for LDC recommendations. The London Hydro respondents said that “as soon as we suspect there is something, we go and meter it . . . we rely on it [metering] to quantify the project. I don’t know how you do this kind of thing without a meter. The problem with doing an energy audit without a meter is that you walk right by . . . equipment and you never stop to think about the energy that the equipment is using.” These comments are consistent with the comments from users of the lending library in the aforementioned study.

According to another respondent, the MLL has never gotten off the ground. This respondent said that there was initially real customer interest because they were going to have metering information. Apparently, the OPA Legal Department raised concerns about the MLL Program. The risks of concern were that someone might get hurt while installing, using, or removing the equipment and/or that there might be some disruption to an industrial process while attempting to use the metering equipment that would result in liability.

Safety is typically the highest priority in most industrial plants. Electrical managers at industrial firms are very conscious of risks to personnel and processes. For example, when outside engineering teams go into plants they are usually closely supervised or required to let a plant electrician make the connections when taking measurements. Thus, the evaluators do not find this assessment of risks to be credible in terms of the context of plant operations and especially in light of the fact that other utilities have MLLs, for example, BC Hydro and PG&E, to name two. Unless the meter is defective, and one function of a MLL librarian is to verify the operation of the equipment before it is lent, the user or the users’ agent is responsible for knowing how to install, use, and remove the equipment they are borrowing especially in relation to the process and the operation of the process that is to be monitored.

Apparently, alternative ways for making the equipment available have been suggested but to no avail. It was reported that some customers have gone out and purchased metering equipment.

\(^3\) This is a proprietary study and not publicly available.
The evaluation team recommends that:

- The risk assessment be reviewed immediately and made a more.
- The OPA appoint a librarian.
- The Meter Lending Library should be established immediately.
- OPA send the librarian and perhaps others to visit the MLLs at BC Hydro and at the PG&E Energy Center to view the operations and support services provided by these libraries.
- OPA obtain and disseminate information on best practices to LDCs about the use of metering, providing case studies, and perhaps opportunities for mentoring for either LDC personnel or energy managers.
- OPA establish a roster of engineering or metering firms that are qualified to do metering that can work with energy managers to install and remove the meters.
- Energy managers should be given a metering allowance.
- Firms that do not have energy managers but who are conducting detailed studies be allowed a metering allowance in the application for a detailed study.

4.6 Major Barriers to Program Participation

The LDC representatives were much more vocal about the barriers to participation in the program than either the OPA KAMs or the IAP customers with whom the evaluators spoke. Most of the LDC respondents suggested that the OPA’s process does not reflect an adequate understanding of the operations, investment decision-making, and other issues faced by the target audience for PSUI and represent a major barrier to customer participation.

PSUI was implemented after the IAP program. One reason that the LDC representatives may be more vocal is, as one respondent summarized the situation, the degree of program complexity between OPA and the customer increased between the IAP and the PSUI program even though PSUI generally applies to customers less well equipped and with fewer resources to deal with process.

Distribution connected industrial customers mostly tend to be smaller than the IAP customers and are much less likely to have in-house attorneys to assess contracts and have fewer engineering resources to support projects. A further reason that the LDC respondents were quite concerned was that delays in implementing PSUI would result in a failure to meet the annual and overall program goals.

4.6.1 The Program’s Reputation with Potential Customers

At least two different respondents pointed out that the PSUI program already has a reputation among customers, contractors, and consultants for being cumbersome. One of them suggested that the reputation of PSUI is so bad in the market place that everyone is trying to do energy efficiency through the Retrofit Program instead.

That reputation appears to not be entirely without merit. One respondent related that their largest distribution customer is also transmission connected and that customer had a less
than satisfactory experience with IAP. According to the respondent there were a lot of issues with the Technical Reviewer and OPA processes.

According to another respondent this reputation among customers places the LDC representatives at a disadvantage with the customer at the start of their efforts to sell the program. The LDC respondent with the previously mentioned large customer said, “we had to really do some hard work to get them [the customer] to trust IAP again through the PSUI [PSUI is a derivative of IAP] . . . but they are getting close to trying it again with . . . PSUI.”

The importance of the reputation and the linkage to program participation was spelled out in other comments. One respondent said that the complexity of the legal and technical hurdles associated with PSUI stifles its marketability. A related comment was that OPA does not understand that energy conservation is not a legal exercise but a sales exercise. Another respondent commented that customers are de-rating the incentive values from IAP and PSUI because of the hassles of participation. According to another, the poor reputation is traceable to the program implementation and that PSUI and IAP should have been designed with more shared responsibility instead of placing the entire burden on the customer. And finally one respondent seemed to capture much of the sentiment saying that the paperwork, bureaucracy, and non-transparency of OPA are big opportunity costs for LDC customers.

The pessimism about marketability was not totally unrelieved. One respondent noted that customers are enticed to participate because the incentives for PSUI are double those of the Retrofit Program.

4.6.2 More Specific Comments about Barriers to Participation

There were two principal barriers to participation that were identified: the solvency requirement, the technical review, and contracts processes.

4.6.3 The Solvency Requirement

There was objection to the requirements for a solvency certificate and the requirement to provide electronic financial statements and/or other financial information. The assertion was made that at least some private companies are not willing to provide this information.

4.6.4 The Technical Review Process

Although there was some commentary about the Technical Review with respect to detailed studies and incentive applications, most PSUI projects were not far enough along to have reached these stages. However, one respondent commented that while at a high level the concept of the Technical Reviewer sounds like a good idea, in practice it might not produce value. Rather, it produces enormous amounts of paperwork with engineering costs that are likely comparable to incentives.

A much more detailed discussion of the Technical Review process can be found in the companion IAP Process Evaluation Report and it is likely that many of those same issues apply here as well.

There was a comment about the resources being spent reviewing Preliminary Engineering Study Funding applications. A situation was described in which a technical reviewer wrote a several page long report and charged three days of engineering time to assess the need for a Preliminary Study that cannot not exceed $10,000. The cost of the review was estimated to represent more than 40 percent of the value of the $10,000 incentive. The application
identifies the scope of the effort, the systems to be reviewed, the data to be collected, the preliminary calculations to be performed, and perhaps some preliminary ballpark estimates of savings, and a cost for the study.

It is not clear whether this situation was an isolated event, was something that occurred in the past but no longer continues, or a practice that continues. It seems reasonable that a Technical Reviewer should be able to examine the technical aspects of the application and provide a decision memorandum in a few hours. The need for review is not at issue but rather the amount labor involved in the review. The decision to be made here is whether the application provides evidence that a preliminary study is warranted and will be conducted such that the results will allow a clear-cut decision about whether to proceed to more costly studies or implementation steps. In a probabilistic sense, if one in ten preliminary studies results in a decision to not continue with any further activity, then the expected dollar value to assess the merits of the application has to be $1,000 or less. If not, then it would make sense to accept all applications.

Preliminary feasibility studies are typical fare for industrial programs. In other settings, incentives for feasibility studies are as small as $3,000 to $4,000 for an engineering consultant to conduct a study. Most engineering firms that the evaluators have spoken with have suggested that those amounts are borderline and too low if travel and other expenses are involved.

4.6.5 The Contract Templates

Nearly all of the respondents commented on the length and complexity of one or more of the various agreements. Some cited specifics related to the various agreements.

The Embedded Energy Manager Agreement may now be an issue that is largely in the rearview mirror because the embedded energy managers are mostly in place. It will still arise in the future if new energy managers are appointed so, it is worth noting that some of the respondents were less than satisfied with the agreement and it was one of several items cited in comments about delays in getting the energy manager program in the field.

One respondent pointed out that the length of the document (approximately 30 pages) is not commensurate with the risk involved. OPA’s risk is limited because the Energy Manager must produce documents and reports in prescribed formats and deliver at least 300 kW of demand reduction annually. Quarterly payments are made based on meeting these requirements.

There are similar criticisms of the Agreement for Preliminary Engineering Study Funding that is roughly a 20-page document. Again it was noted that the risk to OPA is minimal, essentially zero, because the consultant must provide a deliverable in a prescribed format before they are paid. In addition, the industrial customer has to move the terms from their agreement with the LDC to their agreement with the engineering consulting firm.

LDC managers report that the complexity and rigor of the PSUI Incentive Agreement contract is a substantial barrier to program participation. The 100 page long PSUI contract is lengthy and even intimidating to some prospective PSUI participants. One respondent observed that the PSUI program process is long and slow and with a 100-page contract, it means the LDC has to do a lot of handholding for the customer.
As another put it, “The client does not want to sign a 10-year contract for a 150K incentive. There is no interest in signing long-term agreements. Even a 5-year contract period for M&V is too much for them. There is no appetite to go through program process for smaller PSUI projects when it is less than a 500KW project.” Another respondent put it a bit differently, “It’s OK to have a lot of requirements for projects over $5 million like the 100 page contract, but smaller projects need a lighter simpler faster version of contracting. It just takes too long to get things done at OPA and OPA keeps hitting their heads against the wall.”

In one further observation on the contracts, a respondent noted that the contract requires that any future green credits for program enabled reduction in greenhouse gas emissions goes solely to the OPA, and this has deterred some participants that anticipate legislation that would perhaps create a carbon credit market in Canada that financially rewarded greenhouse gas reducing actions. One or two firms have apparently reported putting projects on hold because of uncertainty about future cap-and-trade legislation and potential green credits for renewables and efficiency.

Overall, one respondent summarized the technical and legal requirements as follows: the technical review and legal costs of PSUI projects are much higher than the risks of being inaccurate on savings estimates. While this may or may not be a true statement for a given project, it does identify the need to align the costs of technical rigor and contracting with the level of anticipated savings.

4.7 Paybacks and Incentives

One respondent suggested that customers are only interested in quick paybacks. Another commented that there is a lot of interest in projects with six-month paybacks but it is more difficult to get the customers to think about energy efficiency projects with longer paybacks and/or significant changes in their processes. This respondent observed that customers are not thinking in long-range terms and they don’t usually have the staff to think big and redesign their systems. There are two basic points here. The first is that you have to get customers to think in terms of the big picture and motivate them to do projects and the second is that because they are not thinking in these terms, they aren’t likely to be free riders, at least in the short term. A further point is that if the incentive reduces the payback to a year, the value proposition for the customer may change because the project can then be funded from operating and/or maintenance funds rather than capital funds.

4.8 Free-riders and Enabled Savings

There were a number of discussions around the issues of free ridership and enabled savings. Free ridership occurs when customers participate in the program but would have implemented the projects in the program’s absence. People sometimes distinguish between partial and full free riders. A partial free rider is a firm that accelerates the implementation of a measure that it would have done later thereby accruing some savings during the program period. A full free rider implements a project that they would have done anyway in the program timeframe and claims the incentives. Enabled savings occur, when in the course of a project, a firm encounters savings opportunities and implements them of their own accord.

The LDC representatives conveyed that most of the projects being put forward would not have happened without the program. One representative spoke of a manufacturer that had identified five large projects, four of which had been known for three years and four of which were not sufficiently attractive even with low-level incentives to move them forward. Four of
the five would not have happened at all without PSUI’s better incentives. Another representative talked about the fact that the PSUI program buys down the cost of capital improvements sometimes reducing the payback by more than half (often from 5 years down to a 2 year payback which is frequently the threshold for company action), there is probably little free ridership associated with the program. PSUI funds large expensive projects for which company internal capital is simply not available. Yet another respondent argued that PSUI free ridership is non-existent for municipalities and local governments because they do not have the budgets to do big projects. This probably overstates the situation but there is some truth in some cases.

There was concern among LDC representatives about free ridership because they do not know how the savings will be adjusted to account for what would happen in the absence of the program. One concern was the degree to which the assessment of free ridership would be bounded by the current program period. One respondent pointed out “some of the energy efficiency awareness and education we at the LDC did years ago has led to a lot of projects finally getting done today. When estimating free-ridership please do not overlook the groundwork laid down a few years prior.”

LDC managers reported several forms of program enabled energy savings. One form occurs when customers stumble upon other projects and measures and process changes that will save energy as they began to examine processes and investigate the implementation of program incented measures. One example that was cited was a redundant system that could be shutdown entirely. The measure would cost nothing but would create a great deal of savings.

The direct savings from compressor projects typically result from moving from mechanical drives to variable speed motors or from sizing and staging compressors. Even so, enabled savings are often found in compressor projects. Drive projects also often lead to identifying and fixing leaks in piping that produces substantial (enabled) savings. In some instances piping systems are rationalized. Because fixing leaks is typically considered to be maintenance, incentives are not given and the savings not counted. Nonetheless, the savings are real.

One respondent reported that assessing a compressor system led to a blow-off reduction project. Air is used in a variety of applications including drying parts after washing, sheet cleaning in strip mills, part or component cooling, pre-paint cleaning, etc. The use of the hand dryers in a public restroom is a common example of a blow-off application. In industrial settings such applications are often crudely implemented with air being directed from the end of a pipe or through holes drilled in it. While inexpensive to manufacture, such implementations can require much more air than manufactured parts directing air flow through more refined air knives, air amplifiers, and air nozzles. Introducing such mechanisms can significantly reduce air requirements, leading to resizing compressors and other outcomes. For example, blade hand dryers use less energy than older style hand dryers. Our respondent reported that doing the compressor blow-off reduction led to three additional projects. Thus, projects begat projects some of which could result in enabled savings if the company does them on their own.

Another example of enabled savings that was cited is a situation in which a building automation system was not working, a situation that was discovered during an assessment. The customer was induced to get the system back on line and that resulted in energy
savings but there was no associated project costs. A respondent cited an example of redundant systems where one system could be removed or the systems cycled so that the two systems are not operating simultaneously. Yet another result of the program was the reduction in lighting fixtures and lamps in over lit areas.

One area that has not been discussed is the auxiliary or non-energy benefits. One respondent reported, “Customers feel they are getting more from the increases in productivity and less downtime from new equipment than from the energy savings.” There was not a lot of discussion of these because many projects are just being identified or getting underway.

4.9 Measurement and Verification Requirements
The M&V requirements do provide valuable information to customers about the industrial processes. Having stated that, it is generally felt that the rigor of M&V is excessive, sometimes to an immaterial degree. Sample size, data collection requirements, and analysis methods for each M&V project should be calibrated so that costs of the M&V are in reasonable alignment with savings and incentives. Attempts to increase precision should be avoided if the result is materially inconsequential.

The 10-year M&V period with a claw-back provision is a significant deterrent to participation because most firms do not know where technology and the market will be a full ten years out. It would be better to shorten the M&V period to two or three years or match it to the payback period of the project. Most LDCs and their customers would prefer that the claw-back provision be removed, or at least add in a reward provision if savings estimates turn out to be understated after M&V is completed. One LDC reports using the M&V as a sales pitch to customers by casting it in a way that helps the customer monitor and understand their processes better.

4.10 Retrofit Program
The LDC representatives with whom we spoke were quite positive about the Retrofit program and some have had good success in implementing it. In 2011, one LDC reported that it had completed 350 retrofit projects saving 7,421 kW. One LDC described how it actively marketed the program with monthly breakfasts and an annual trade show, cold calls with case studies, and presentations at any meeting that the LDC sponsors.

There were numerous comparisons between the Retrofit Program and PSUI. It was reported that some customers are de-rating the value of PSUI participation because of the hassle, long time lags, and are opting for the less well-subsidized Retrofit Program. It was reported that some customers were understating the expected savings from projects so that they could qualify for the Retrofit Program instead of PSUI. Compared to PSUI, participation in the Retrofit Program is viewed as much easier. Even with the smaller incentives, one representative described the Retrofit Program as often better than PSUI.

4.11 ICON
Tracking systems are a key element in programs of this nature but they can be a weak link if poorly implemented. Frequently little thought is given to tracking systems until programs are well underway. It is not unusual to find poorly conceptualized spreadsheets being used to track and manage programs. When tracking systems are available they tend to focus on the financial aspects of the program, incentives and payments, with little or no attention to
customer relationship management. In other settings the evaluators have found tracking systems severely lacking with respect to contact information, the status of customer marketing and customer projects, calendars, event tracking, and notification.

Tracking systems appear to be an issue in this program as well. LDCs seem largely to be on their own with respect to tracking. One LDC representative described their contact management tool as, “a spreadsheet with too many people working on it.” The representative went on to say that they were moving away from the spreadsheet to a “real” contact management system.

ICON, the CRM system meant to support the program, was identified as having input and output problems. This representative said that, “putting our OPA required energy audit data into Icon was a major problem. Icon is a black hole. They require us to enter data but it is almost impossible to get data back out of Icon.” The evaluators reserve judgment on ICON because they have not seen it. The evaluators were told that many of its fields were not well populated. The limited evidence that we have suggests that it needs substantial work to adequately support the program.

4.12 Industrial Working Group and the Change Management Process

There was substantial commentary about the Industrial Working Group, (IWG) one of several advisory groups formed in 2009 to provide input and feedback to OPA in regard to implementing efficiency programs. LDCs as well as OPA and the Ministry of Energy are represented on the IWG.

The effectiveness of the IWG was strongly criticized by some respondents because few changes have been made in response to inputs and feedback from this group. Indeed, many of the findings and recommendations in this report are part of the 25 issues that have been raised with the IWG. Resolution to these issues is widely reported to be lagging.

The evaluators have also seen the diagram from the Change Management Process slide that was distributed to the IWG at their May 22, 2012 meeting. The evaluators fully understand the importance of having a change management process in a large organization such as OPA. Indeed it is important to have a defined process so that change is accomplished in an orderly way.

The evaluators do however believe that the stakes for PSUI and for industrial energy conservation in the Province of Ontario are so high that an exception to the change process is required so that OPA can meet its responsibility to the industrial firms and ratepayers in Ontario.

The evaluator’s recommend that Senior Management be immediately informed that:

- PSUI is conceptually a strong state of the art program.
- Based on programs at other utilities, a program such as this can be expected to deliver high levels of savings.
- The current implementation of PSUI is severely burdensome.
- There is a substantial probability that PSUI will fail significantly to meets its goals.
• Change management procedures are believed by some to be an obstacle to moving the program forward. It is recommended that the current procedures be quickly revised or temporarily suspended so that needed changes can be made to PSUI.

5 Summary and Recommendations

The near consensus view of the respondents is that the PSUI program has great potential but that it is significantly hampered by program processes and rules and is at significant risk of failure from the burden of the processes. To paraphrase one respondent, the major risk to this program is not that money will be ill spent, but that the process and the rules will result in the program being a major failure that will negatively influence the ability of the LDCs to deliver energy efficiency services for the long term. The major concerns are that the program will not recover from a very slow rollout and that the program requirements and timelines will prevent the LDCs and their industrial partners from completing significant numbers of projects before the conclusion of the program in December 2014. The PSUI is in greater jeopardy than the IAP because the firms are smaller, they have fewer internal resources to develop and implement projects, and while they have essentially the same rules as IAP there are additional layers of decision-makers at the LDCs.

5.1 Major Findings

A few of the larger LDCs are likely to have several firms participating in PSUI. A modest number of LDCs will have from one to a few PSUI projects and a very substantial number of LDCs are unlikely to have PSUI projects because they have no industrial firms that would qualify.

5.1.1 Marketing

LDC marketing efforts are largely one-to-one efforts directed to the largest customers. LDCs are also using letters introducing the program and hold periodic breakfast meetings to which large customers are invited to discuss program initiatives and other topics of interest to customers.

LDCs are also using channel partners to bring customers to them. Channel partners bring resources that LDCs do not have, for example, metering capability, and because of their previous program experience they help customers through the process and produce studies that meet the technical and administrative requirements of PSUI. The technical reviews provided by the LDCs give industrial firms confidence that vendor claims are accurate.

5.1.2 Timing

There was disappointment and concern with the amount of time that it has taken to get the energy manager and roving energy managers in place.

There were strong concerns about how realistic it is to expect that energy managers and roving energy managers to get 300 MW of projects into place in the first year. Given the time it takes to implement industrial projects, both because of how projects are implemented in user facilities and the PSUI decision-making timeline, there were concerns that PSUI would not meet its long term goals and that substantial savings would be left on the table.
5.1.3 Energy Managers and Roving Energy Managers

Energy manager and roving energy manager resources are essential for a strong LDC industrial program.

Customers have responded well to the Energy Manager Initiative. Cash-strapped customers particularly value the Energy Manager Program.

The LDCs have viewed the Energy Manager Program as a way to get large projects into the pipeline in an early and timely way.

Many energy managers have been appointed from among internal employees. This gives the energy manager credibility with the senior management. It also means energy managers are already familiar with the plant and its operations.

Training of the energy managers is a critical and overlooked area that is urgent need of attention. Energy managers need administrative training, technical training, and training in managing cultural change within plants. Energy Manager programs at other utilities have suffered from inadequate support of energy managers in the early going.

The annual goal of 300 MW is unrealistic for a first year energy manager. There is limited time to get the energy manager in place, to identify projects, to do preliminary and detailed studies, obtain incentives, and implement large scale projects in a timeline consistent with customer needs. The current contracts may have unintended consequences such as encouraging energy managers with new found skills to move on.

5.1.4 Metering

Metering is an important resource that is under appreciated and which needs immediate attention. It is particularly important for finding savings that might otherwise be overlooked. It is also important, especially to energy managers for developing credible business cases with senior management.

The failure to get the meter lending library in place is a serious deficiency in the PSUI program.

5.1.5 Barriers to Program Participation

The PSUI and OPA programs already have a reputation for being cumbersome. This significantly impedes LDC marketing efforts.

Some cited the need for a solvency certificate as a barrier.

The respondents understood the importance of the technical review process but also felt that the technical review process was using the same standard regardless of the anticipated savings. There is very strong sentiment that the level of technical review needs to be correlated with the amount of risk.

There was also strong criticism of the length of the various contracts and the opaqueness of those instruments. Executives are not likely to deal with lengthy documents. Medium and small firms do not typically have legal counsel and refer documents to an outside firm. LDC respondents expressed a need to be able to present a simple and understandable document early in the sales process so that the requirements and rules are easily understood.
5.1.6 Payback
Firms are interested in quick paybacks. A part of the sales process is to get firms to think about energy efficiency projects with longer paybacks.

Reducing paybacks to one to two years is a strong incentive to participate.

If paybacks can be reduced to a year, there may be opportunities to finance projects from maintenance and operating funds rather than capital funds that take more time. This could speed both the decision process and the implementation rate.

5.1.7 Free Riders and Enabled Savings
The general consensus among the respondents was that there were likely to be few free riders. Many of the projects being considered had previously been rejected because of the lengthy paybacks or had not previously been identified.

LDC representatives are concerned about how free ridership will be handled in the impact assessment. They want to know the criteria by which free ridership will be determined so that they do not put large amounts of time and effort into projects that may have extensively discounted savings; they want assurance that the criteria will be applied in an objective rather than subjective manner; and they want to know that the history and context of projects is understood so that adjustments are not based on a cursory examination of the situation.

LDC representatives identified a number of instances of enabled savings many related to maintenance and operations issues such as replacement of failed components that caused increases in energy use, elimination of redundant systems operating simultaneously, reduction in leaks in systems, and improvements in blower technologies that did not qualify for incentives but nonetheless resulted in energy reductions.

5.1.8 Measurement and Verification (M&V) Requirements
The 10-year M&V period with the claw-back provision was identified as a significant obstacle to participation. The respondents suggested that an M&V period of two to three years should be adequate.

5.1.9 The Retrofit Program
LDC respondents saw the Retrofit Program as the likely alternative to PSUI.

It was reported that customers are under reporting estimated savings so that they qualify for the Retrofit Program.

It was suggested that the upper limit for the Retrofit Program be raised.

It was suggested that prescriptive measures be removed from the Retrofit Program for large customers and that the program be limited to engineering worksheets and custom projects.

Inconsistencies in incentives were reported between the prescriptive and the engineered worksheets.

5.1.10 ICON
Respondents report that it is difficult to enter and retrieve data from ICON.

Respondents need a highly usable customer relationship management system.
The system needs to include functions beyond project reporting, project status, and financial management of contracts and incentives.

5.1.11 The Industrial Working Group (IWG) and Change Management

The IWG is viewed as ineffective in communicating LDC needs and concerns relating to the PSUI program.

5.2 Recommendations

5.2.1 Energy Manager Training

- Training for energy managers should be given a very high priority.
- LDCs should focus one-on-one to assist energy managers to become well established in their first six months on the job.
- Funding for at least some basic training should accompany the funding for an energy manager position and not be separate from it.
- As soon as possible (within 30 to 60 days) LDC Managers and KAMs, and perhaps some energy managers, should hold a well-facilitated focused workshop to identify the content and assemble the basics of a training program for Energy Managers and Roving Energy Managers.
- LDCs that are assembling their own training programs should collaborate with each other to develop the energy manager training.

5.2.2 Energy Manager Goals and Contracts

- For a variety of reasons commercial and industrial projects may have lengthy implementation timelines. In this context, the goals for energy managers are not realistic. The goals of the Energy Manager contracts should be revisited to establish a more realistic first year outcome. The goal of the first year should include assembling a portfolio of potential projects that are capable of saving 300 KW. The second year goals should be to have implemented or nearing the completion of 300 KW of projects and have assembled additional projects for that amount in year three.
- The OPA should consider extending energy manager contracts by two years.

5.2.3 Meter Lending Library (MLL)

- The OPA’s assumptions about the risks associated with the MLL appear to be completely out of line with the actual risks. A more realistic assessment of the risks of the Meter Lending Library should be undertaken within a 30 to 60 day period and approve its establishment.
- An MLL librarian should be appointed immediately.
- The Meter Lending Library should be established as soon as a librarian is in place.
- OPA should liaise with the MLLs at BC Hydro and at the PG&E Energy Center to see how these libraries are operated and what other support is provided.
• OPA should call upon local and regional expertise to assist LDCs in the use of metering, providing case studies, and perhaps opportunities for mentoring of either LDC personnel or energy managers.

• OPA should investigate the establishment a roster of engineering or metering firms that are qualified to do metering that can work with energy managers to install and remove the meters.

• Energy managers should be given a metering allowance.

• Firms that do not have energy managers but who are conducting detailed studies should be provided a metering allowance in an application for a detailed study.

5.2.4 The Technical Review Process

• The technical resources used to evaluate studies need to relate to the size of the projects. A series of limits on the amount spent on technical reviews should be instituted for projects costing less than $100,000.

• Alternative approaches to assessing studies and incentive applications should be considered before a technical review begins and an assessment should be made as to whether more costly approaches would add sufficient precision to justify their costs.

• More costly approaches should only be considered in cases where the added precision may change the decision of the firm contemplating the project.

• Incentives can be adjusted on the basis of actual results once the project is commissioned.

5.2.5 Contracts and Contract Templates

• The current contract templates are opaque and cumbersome given the level of risk that OPA assumes.

• Contracts should be simplified, made more transparent, and their length reduced to between one quarter and one half of their current length.

5.2.6 Measurement and Verification Requirements

• A ten-year contract with a measurement and verification requirement and a clawback provision is probably not realistic given the dynamics of industrial processes and markets.

• It is recommended that measurement and verification activities be limited to the payback period for a project without an incentive or five years whichever is less.

• PSUI might want to institute a sliding scale of incentives based on the size of the project, the amount of the incentive, and the willingness of participants to engage in a longer-term contract.

• It is recommended that consideration be given to raising the upper limit of savings for Retrofit Projects.
• It is recommended that the incentives for the different types of Retrofit Programs, prescriptive, engineering worksheet, and custom be made consistent.

5.2.7 ICON
• A good customer relationship management system is essential to a well marketed, administered, and productive efficiency program. It is recommended that OPA invest the resources that are needed to make ICON more functional and productive for participants.

5.2.8 The Change Management System
• Respondents reported that many of the findings and recommendations in this report have previously been made known to OPA directly and through the IWG. Some felt very strongly that the OPA was not being sufficiently responsive to the need for immediate changes. Although there is a change management process, some of these respondents felt that the process had become a barrier to making the program more effective in a timely manner.

• It is recommended that the change management process immediately revisit the change management process and revise it or temporarily suspend it with a view to making needed changes to the program right away.