London Hydro Report EM-13-04, *Energy Conservation and Demand Management – Annual Report of London Hydro's 2012 Activities & Achievements*

September 2013

EXECUTIVE SUMMARY

The provincial *Green Energy and Green Economy Act, 2009* created the legislative framework for the Minister of Energy & Infrastructure to issue a series of directives. On March 31st, 2010, the Minister of Energy & Infrastructure issued a directive to the Ontario Energy Board to:

- establish CDM targets for each licensed distributor,
- make such targets a condition of a distributor's license, and
- develop a CDM Code that includes rules relating to the planning, design, approval, implementation evaluation, measurement and verification, reporting requirements and performance incentives associated with CDM programs and to such other matters as the Board considers appropriate.

Ontario Energy Board Decision and Order EB-2010-0215 / EB-2010-0216, *CDM Targets for Licensed Electricity Distributors*, dated November 12, 2010, defined the energy conservation and demand management (CDM) targets for all LDC's. London Hydro's CDM targets are as follows:

- 2014 Net Peak Demand Savings.....41.440 MW
- 2011 – 2014 Net Cumulative Energy Savings:.....156.640 GWh

The Ontario Power Authority (OPA) is a provincial agency established by Bill 100, *The Electricity Restructuring Act, 2004* which set out several objectives for the organization, including (but not limited to):

- To engage in activities that facilitates load management.
- To engage in activities that promotes electricity conservation and the efficient use of electricity.

In carrying out the "*conservation*" component of its mandate, the OPA is responsible for the design of a portfolio of provincial energy conservation and demand management programs that are referred to in the industry as Tier 1 CDM programs. Toward this goal, the OPA has developed a number of provincial CDM initiatives geared to the following customer classifications:

- Residential Customers
- Commercial and Institutional (C&I) Customers
- Low-Income Customers
- Industrial Customers

The portfolio of provincial CDM programs targeted to residential customers fall under the umbrella saveONenergy™ FOR HOME brand illustrated below.

The saveONenergy FOR HOME portfolio includes the following elements:

- saveONenergy FRIDGE & FREEZER PICKUP program;
- saveONenergy HEATING & COOLING INCENTIVE program;
- saveONenergy *peaksaver* PLUS™ program;
- saveONenergy COUPON EVENT program; and
- saveONenergy EXCHANGE EVENT program.

The portfolio of provincial CDM programs targeted to commercial, industrial and institutional customers fall under the umbrella saveONenergy FOR BUSINESS brand illustrated below.

The saveONenergy FOR BUSINESS portfolio includes the following elements:

- saveONenergy DEMAND RESPONSE program;
- saveONenergy SMALL BUSINESS LIGHTING program;
- saveONenergy RETROFIT PROGRAM;
- saveONenergy AUDIT FUNDING program;
- saveONenergy EXISTING BUILDING COMMISSIONING program;
- saveONenergy HIGH PERFORMANCE NEW CONSTRUCTION program;
- saveONenergy PROCESS & SYSTEMS program; and
- saveONenergy NEW HOME CONSTRUCTION program.

The provincial CDM program that is targeted to social and assisted housing is branded saveONenergy HOME ASSISTANCE.

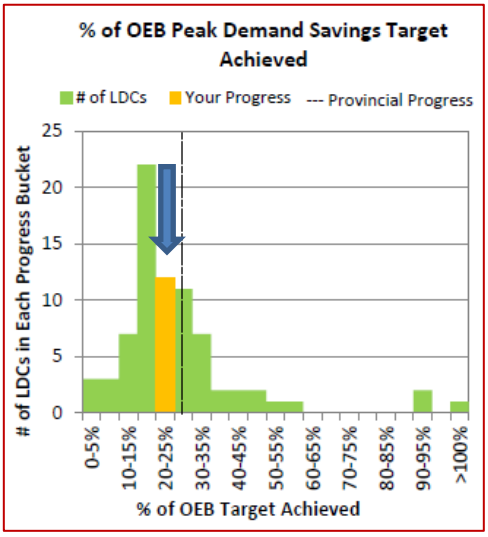
London Hydro's 2012 achievements on the energy conservation and demand management front can be looked at from two perspectives, namely (i) how did London Hydro fare in comparison to its CDM targets, and (ii) how did London Hydro fare in comparison to the community of other LDC's in the province?

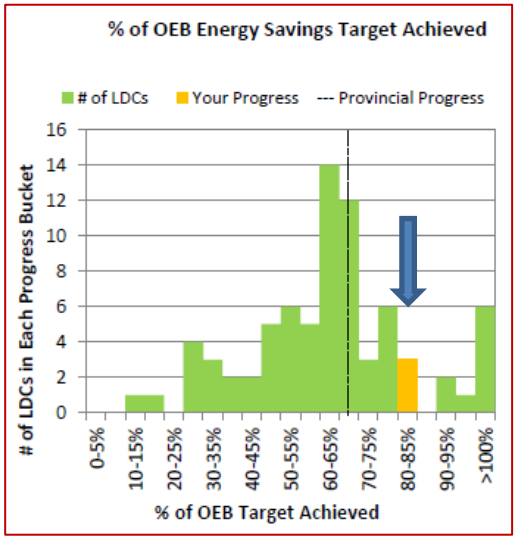
For 2012, London Hydro received credit for the following CDM achievements:

- 6.7 MW of peak demand reduction – this represents 16.1% of London Hydro's net peak demand reduction target (but could be as low as 9.7% if all participants in the saveONenergy DEMAND RESPONSE program opted out prior to December 2014); and

- 84.04 GWh of net accumulated energy savings – this represents 54% of London Hydro's four-year accumulated net energy savings target.

The two (2) charts below compare London Hydro's 2012 CDM performance against the 2012 achievements of the other LDC's in the province.





It will be seen that although the 2012 achievement with respect to peak demand reduction is less than the internal objective of 50%, London Hydro is positioned well ahead of most LDC's in the province. With respect to energy savings, London Hydro has achieved 81% of its four-year target by the end of the second year. As such, London Hydro fully expects to exceed its accumulated net energy savings by 2014.

It should be noted that there were several fairly large energy-efficiency projects that were completed as so-called *2010 ERIP Carry-Over* projects for which London Hydro has yet to receive credit from the Ontario Power Authority. Once these are credited, it will push London Hydro's 2012 results higher than indicated in the two charts above.

It is also noteworthy that more than $2 million in incentive payments was distributed throughout 2012. If one makes the general assumption that incentives represent 35% to 40% of the overall project cost, then London Hydro's CDM activities spurred some $5 to $5½ million in local economic activity.

In its 2011 submission, London Hydro identified a number of early warning signs of more intractable issues (e.g. flaws with the underlying delivery model, needless program participation barriers, etc.) that were anticipated to become more significant in 2012 and beyond. These predictions came to be and as an unfortunate consequence, LDC's that wished to succeed with their CDM endeavors could not achieve their full potential.

In reporting these matters herein, London Hydro has adopted a "*warts and all*" reporting style. London Hydro is firmly committed to the success of CDM within its franchise service territory and it does not serve the industry well to "*sugar coat*" challenges that are ultimately barriers to London Hydro's customers actively participating in CDM programs.

Finally, it will be seen that London Hydro is fully committed to working with the LDC community (via active participation on various joint Electricity Distributors Association / Ontario Power Authority working groups), the supply chain partners, and its customers to truly create the desired outcome of *a culture of conservation* in this province.

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1 INTRODUCTION

1.1 Background

The provincial *Green Energy and Green Economy Act, 2009* created the legislative framework for the Minister of Energy & Infrastructure to issue a series of directives. On March 31st, 2010, the Minister of Energy & Infrastructure issued a directive to the Ontario Energy Board to:

- establish CDM targets for each licensed distributor,
- make such targets a condition of a distributor's license, and
- develop a CDM Code that includes rules relating to the planning, design, approval, implementation evaluation, measurement and verification, reporting requirements and performance incentives associated with CDM programs and to such other matters as the Board considers appropriate.

Ontario Energy Board Decision and Order EB-2010-0215 / EB-2010-0216, *CDM Targets for Licensed Electricity Distributors*, dated November 12, 2010, defined the CDM targets for all LDC's. London Hydro's CDM targets are as follows:

- 2014 Net Peak Demand Savings.....41.440 MW
- 2011 – 2014 Net Cumulative Energy Savings:.....156.640 GWh

There are three types of CDM programs that LDC's can consider for meeting or exceeding their targets, namely:

- Tier 1 CDM programs – are turn-key province-wide programs, developed by the Ontario Power Authority (OPA), which are to be the foundation of each LDC's CDM strategy.
- Tier 2 CDM programs – are developed by groups of local distribution companies, also called multi-LDC programs.
- Tier 3 CDM programs – are unique programs designed by individual LDCs.

Note: The latter two classification of CDM program require specific approval by the Ontario Energy Board and are therefore often referred to as "Board-Approved CDM Programs".

LDC CDM portfolios can have a mix of the different types of conservation programs.

Section 2.1, *CDM Strategy Requirements*, of the OEB publication "*Conservation and Demand Management Code for Electricity Distributors*" [Ref 1], includes a regulatory requirement that licensed distributors file their respective CDM strategy with the Board by November 1, 2010.

London Hydro's CDM strategy document is entitled: *London Hydro's Energy Conservation and Demand-Side Management (CDM) Strategy, 2011 through to 2014*; dated October 29, 2010. [Ref 3]

1.2 Purpose

Section 2.2, *Annual Reports*, of the OEB publication entitled "*Conservation and Demand Management Code for Electricity Distributors*" [Ref 1], mandates that "*A distributor shall file an Annual Report with the Board by September 30 of each year. The Annual Report shall cover the period from January 1 to December 31 of the previous year.*" The CDM Code also stipulates the required format and content for such annual reports.

1.3 Scope

This document is London Hydro's second Annual CDM Report and covers the period from January 1, 2012 to December 31, 2012.

1.4 Program Naming Conventions

For the provincial Tier 1 CDM programs, there are differences in the program names used by the Ontario Power Authority in legal agreements with LDC's and program names used in the marketplace. For example, whereas the program name "Direct Install Lighting" is used in legal agreements between the OPA and the community of LDC's, the program is promoted in the marketplace under the name "saveONenergy SMALL BUSINESS LIGHTING". Similarly the "appliance retirement initiative" is known in the marketplace by the name "saveONenergy FRIDGE & FREEZER PICKUP".

Given that the intended audience for this report is primarily the Ontario Energy Board, London Hydro's customers, London Hydro's Board of Directors and Executive Management team, and the Mayor's Sustainable Energy Council, London Hydro has elected to identify programs herein by their respective marketplace names.

Note: A cross-reference between the customer-facing CDM program names and the program identifiers used on the various OPA-generated program schedules within the Master CDM Program Agreement is included as Appendix C in this Report.

1.5 References

[1] Ontario Energy Board publication: *Conservation and Demand Management Code for Electricity Distributors*; September 16, 2010.

[2] Ontario Energy Board Decision and Order EB-2010-0215 / EB-2010-0216, *CDM targets for licensed electricity distributors*; November 12, 2010.

[3] London Hydro report entitled: *London Hydro's Energy Conservation and Demand-Side Management (CDM) Strategy, 2011 through to 2014*; October 29, 2010.

[4] Addendum #1 to London Hydro Report EM-10-05, *Strategic Outlook for Energy Conservation and Demand-Side Management (CDM) Programs, 2011 through to 2014*; June 13, 2011.

[5] Ontario Energy Board publication EB-2012-003, *Guidelines for Electricity Distributor Conservation and Demand Management*; April 26, 2012.

1.6 Terminology

The definitions given below are not intended to embrace all legitimate meanings of the terms. They are applicable only to the subject matter treated in this Report.

Adjusted Gross Savings means the Gross Savings that are adjusted to include what can be physically counted and reliably measured, such as installation/in-service rates, breakage of equipment, data errors, hours of use, measure persistence rates, etc. Adjusted Gross Savings can also be calculated by applying a Realization Rate to Gross Savings estimates (see Realization Rate definition below).

Behavior-Based Programs are energy efficiency programs that utilize an understanding of how individuals interact with energy in order to decrease energy demand.

Demand Response is the reduction of customer energy usage at times of peak usage in order to help address system reliability, reflect market conditions and pricing, and support infrastructure optimization or deferral.

Effective Useful Life is the median number of years that an energy-efficiency measure is likely to remain in-place and operable, i.e. the number of years that a program's annual savings will last.

Energy Savings is the reduction in electricity use (kWh) or in fossil fuel use in thermal unit(s).

ENERGY STAR qualified refers to a program that was first developed in 1992 by the US Environmental Protection Agency (EPA) as a method to identify and promote products that are energy efficient. For example, appliances carrying the ENERGY STAR® label typically are 10 to 20% more energy efficient than non-rated models. Since its initial onset, the government has partnered with other industry members, to promote and expand the scope of this project to include, not only major appliances, but also new homes and buildings.

Ex-ante Estimate is a phrase used in conjunction with demand response programs meaning an engineering estimate "*before the event*" of the amount of load that will be curtailed. The opposite of ex-ante is ***ex-post*** (actual).

Free Rider is a CDM program evaluation term that describes energy efficiency program participants who would have taken the recommended actions on their own, even if the CDM program did not exist. Free riders can be 1) total, in which the participant's activity would have completely replicated the program measure; 2) partial, in which the participant's activity would have partially replicated the program measure; or 3) deferred, in which the participant's activity would have completely

replicated the program measure, but at a future time rather than the program's timeframe.

Free Ridership Rate is the percent of savings attributable to free riders.

Gross Savings is the change in energy consumption and/or demand that results directly from program-related actions taken by participants in an efficiency program, regardless of why they participated.

Interactive Effects is the impact of an energy efficient measure on the operation of other electrical or gas-fired equipment at the facility in which the measure is installed. For example, the installation of energy-efficient lighting systems in a retail store may measurably decrease the air conditioning load in the summer and the use of natural gas for space heating in the winter.

Measure Persistence Factor is the duration of an energy consuming measure, taking into account business turnover, early retirement of installed equipment, and other reasons measures might be removed or discontinued.

Net-to-gross ratio is a factor is applied to gross CDM program savings to determine a particular CDM program's net impact. The net-to-gross ratio equals the net program load impact divided by the gross program load impact.

Net Savings is the total change in energy consumption or demand that is attributable to an energy efficiency program. This change in energy consumption and/or demand may include, implicitly or explicitly, the effects of free drivers, free riders, energy efficiency standards, changes in the level of energy service, and other causes of changes in energy consumption or demand.

Realization Rate is a comparison of observed or measured (or evaluated) information to original estimated savings. Evaluations may include multiple realization rates (e.g., energy realization rate, demand realization rate, etc…). A Realization Rate is typically used to adjust Gross Savings to Adjusted Gross Savings, and reflects adjustments such as: data errors, persistent factors, in-service rate, interactive effects, etc.

Retrofit Measure refers to the replacement of currently functioning equipment with a more energy-efficient technology before its end of economic life. In buildings, retrofits may involve either structural enhancements to increase strength, or replacing major equipment central to the building's functions, such as HVAC or water heating systems. In industrial applications, retrofits involve the replacement of functioning equipment with new equipment

Rebound Effect is a modern term for the Jevons Paradox, a theory developed in the 1860's in Britain by William Stanley Jevons, which says that as machines become more efficient and use less energy, society responds by growing and using even more energy. With reference to energy conservation, the rebound effect can occur when a consumer adopts an energy-efficient technology, such as compact fluorescent lamps or an ENERGY STAR qualified central air conditioner, but then elects to operate the CFLs for longer time periods or to reduce the thermostat setting on the air

conditioning system, both being behavioral changes that diminish the benefits of using those more energy-efficiency technologies.

Savings Persistence Factor is a factor that reflects changes in program impacts over time (e.g. retention and degradation of measures).

Spillover, also called "***free drivers***", is a CDM programs evaluation term that describes energy efficiency program participants who take the recommended actions, but never claim the incentives. There are two categories of spillover as identified following:

- ***Non-Participant Spillover***: Non-participant spillover refers to energy efficient measures installed by program non-participants due to the program's influence. The non-participant spillover rate is savings from spillover measures expressed as a percentage of savings installed by non-participants through an energy efficiency program.
- ***Participant Spillover***: The situation where a customer installed equipment through the program and then installed additional equipment of the same type due to program influences, but without any financial or technical assistance from the program. The participant spillover rate is savings from spillover measures expressed as a percentage of savings installed by participants through an energy efficiency program.

Third Party Review is a review of program savings by an independent third party.

1.7 Acronyms, Abbreviations and Symbols

1.7.1 Acronyms

Acronyms used within this report are presented following in alphabetic order:

CDM	=	Conservation and Demand Management
CFL	=	Compact Fluorescent Lamp
CSA	=	Canadian Standards Association
DR	=	Demand Response
EDA	=	Electricity Distributors Association
EM&V	=	Evaluation, Monitoring and Verification
EUL	=	Effective Useful Life
IPSP	=	Integrated Power System Plan
LDC	=	Local Distribution Company
LED	=	Light-Emitting Diode
LICO	=	Low-Income Cut-Off
NTG	=	Net-to-Gross
OEB	=	Ontario Energy Board
OPA	=	Ontario Power Authority
RPP	=	Regulated Price Plan

TOU = Time of Use

1.7.2 Abbreviations

Abbreviations used in this report are presented following in alphabetic order:

GWh = gigawatt-hour
kW = kilowatt
kWh = kilowatt-hour
MW = megawatt
MWh = megawatt-hour

These abbreviations are consistent with CSA Standard Z85-1983, *Abbreviations for Scientific and Engineering Terms*.

2 BOARD-APPROVED CDM PROGRAMS

2.1 Time-of-Use Electricity Pricing

2.1.1 Background

Key excerpts from Section 3, *CDM Targets*, of the Ontario Energy Board publication EB-2012-003, *Guidelines for Electricity Distributor Conservation and Demand Management* [Ref 5] have been replicated below as a convenience of reference:

> *The Board recognizes the manner in which the CDM targets were developed and that a portion of the aggregate electricity demand target was intended to be attributable to savings achieved through the implementation of Time-of-Use ("TOU") prices.*
>
> **:**
>
> *… The Board has deemed the implementation of TOU pricing to be a Board-Approved CDM program for the purposes of achieving the CDM targets. …*
>
> **:**
>
> *In accordance with the Directive, for savings to be eligible to be counted towards the CDM targets, distributors must rely on the verified savings that are the result of using the OPA's Evaluation, Measurement and Verification ("EM&V") Protocols. The Board is of the view that any evaluations of savings from TOU pricing should be conducted by the OPA for the province, and then allocated to distributors. An approach that permitted distributors to conduct their own evaluations could result in aggregate savings in excess of the savings assessed for the province as a whole.*

As of September 2013, the Ontario Power Authority (OPA) has not released its preliminary results of TOU savings to distributors. Therefore London Hydro is not able to provide any verified savings related to London Hydro's TOU program at this time. London Hydro will report these results upon receipt from the OPA.

2.1.2 TOU Program Description

The provincial time-of-use electricity pricing initiative is a behavioral CDM program that is targeted to residential and small business customers (i.e. customers in the "*residential*" and "*general service < 50 kW*" tariff classifications). The TOU initiative is designed to encourage the shifting of energy usage. Therefore peak demand reductions are expected, and energy conservation benefits may also be realized.

The TOU pricing program is offered year round.

Figure 2-1, Sensus iCon-A Smart-Meter

Figure 2-2 below illustrates the seasonally adjusted time periods for on-peak, mid-peak and off-peak electricity pricing.

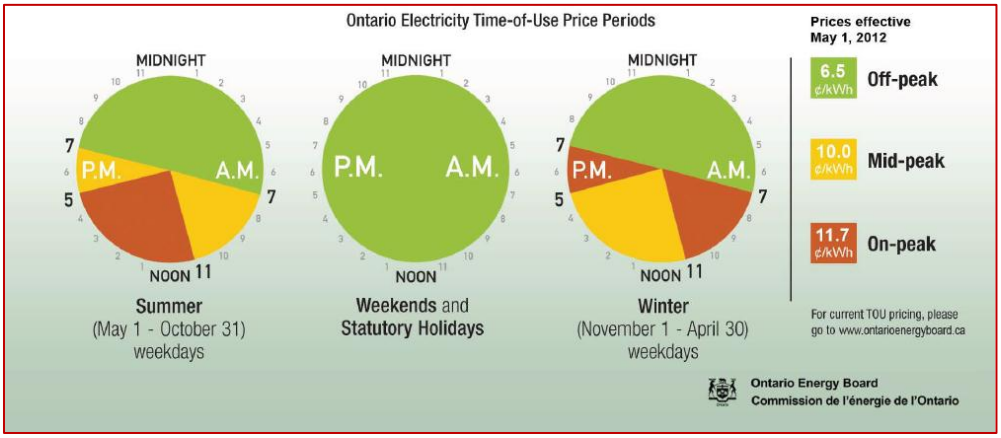

Figure 2-2, Regulated Time-of-Use Price Periods

It should be noted that, in the summer, the on-peak period extends from 11:00 am to 5:00 pm. In the winter, however, there are two distinct on-peak periods; the first extending from 7:00 am to 11:00 am, and the second extending from 5:00 pm to 7:00 pm. All weekends and statutory holidays have off-peak electricity pricing throughout the day.

The regulated time-of-use electricity price is adjusted twice annually by the Ontario Energy Board. A chronology of the Regulated Price Plan – Time-of-Use (RPP-TOU) electricity price schedules is provided below:

Table 2-1, Regulated Price Plan - Time-of-Use Electricity Prices

Effective Date	Electricity Rate (¢/ kWh)		
	On-Peak	Mid-Peak	Off-Peak
(Col 1)	(Col 2)	(Col 3)	(Col 4)
November 1, 2010	9.9	8.1	5.1
May 1, 2011	10.7	8.9	5.9
November 1, 2011	10.8	9.2	6.2
May 1, 2012	11.7	10.0	6.5
November 1, 2012	11.8	9.9	6.3
May 1, 2013	12.4	10.4	6.7

Customers with Smart-meters are able to view their hourly electricity consumption profiles via the Internet. Figure 2-3 below shows one view of the web presentment feature available to London Hydro's customers.

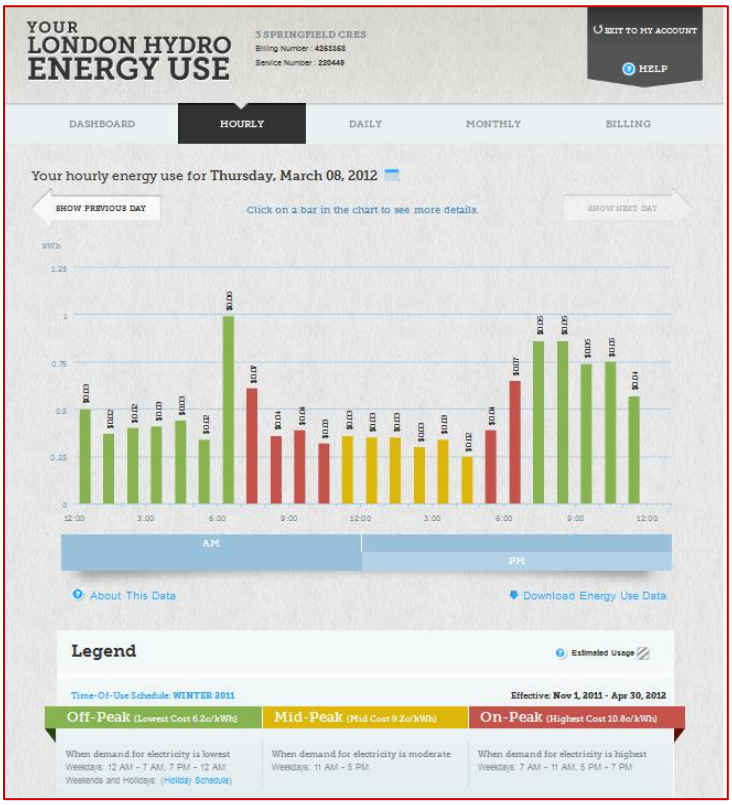

Figure 2-3, Web Presentment of Hourly Consumption Data

Beginning in December 2011, London Hydro commenced the transition process by moving 20 pilot group customers to TOU billing. Based on the positive feedback and no transition issues, customers were given the 30 days' notice in January. Migration of customers based on their billing period started in February and was substantially complete by mid-March 2012 as indicated in Table 2-2[1] below.

Table 2-2, Actual Customer Transition to TOU Electricity Rates

Weekend	Customer Accounts Cut-Over to TOU Rates	Cumulative Customers on TOU Electricity Rates
November 1, 2011	20	20
February 25, 2012	18,530	18,550
March 3, 2012	52,595	71,145
March 10, 2012	32,206	103,351
March 17, 2012	35,147	138,498
Poly-phase meters	6,597	145,095
New installs	55	**145,150**

[1] London Hydro Inc. filing ED-2002-0557, *Narrative for Smart Meter Cost Recovery Application* (Board File Number EB-2011-0181), Section 8.1, *Conversion of Customers to TOU Electricity Rates*; pg 55.

There were a small number of customers that were not transitioned to time-of-use electricity pricing for several months past mid-March for a variety of reasons, including customer refusals to have a Smart-meter installed, premise access issues, etc.

2.1.3 Preliminary Observations Concerning Energy Consumption Patterns

As previously noted in Section 2.1.1 herein, the OPA is responsible for quantifying the energy savings resulting from time-of-use electricity pricing. Nonetheless, certain preliminary observation can be made with respect to energy consumption trends amongst the population of residential customers.

2.1.3.1 Household Energy Consumption

The red line in Figure 2-4 shows the average monthly billed energy consumption (in kWh) per residential customer over the timeframe from 2006 to 2012. It will be seen that in 2006 the average monthly billed energy consumption was 717 kWh and in 2012 the average monthly billed energy consumption declined to 676 kWh.

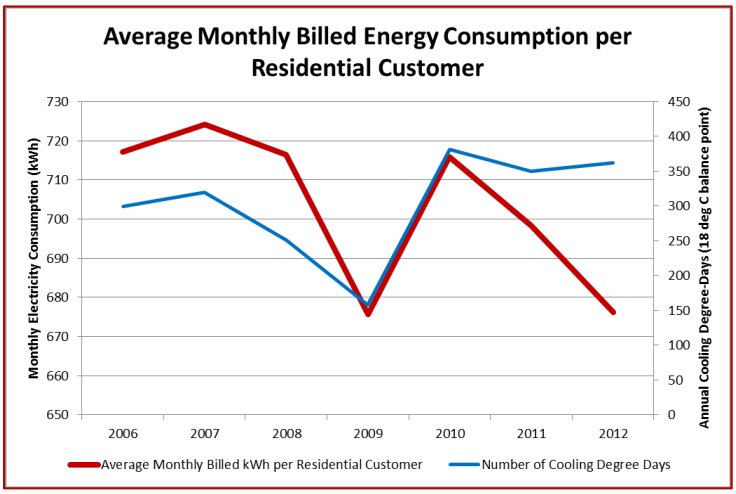

Figure 2-4, Trends in Residential Energy Consumption

As with most LDC's in southwestern Ontario, air conditioning has a significant impact on summer energy sales. The blue line in Figure 2-4 shows the number of cooling degree-days (using an 18°C balance point) for each of the years. It will be observed that 2009 was characterized by an unseasonably cool summer and hence energy sales were significantly lower than in other years.

It is interesting to note that 2010, 2011 and 2012 can be characterized as having hot summers with 350 or greater cooling degree-days, and yet the average monthly billed energy consumption throughout this period steadily decreased from 716 kWh per month in 2010 to 698 kWh per month in 2011 to 676 kWh per month in 2012.

Clearly energy-efficiency is occurring amongst the residential sector, but this downward trend clearly preceded the introduction of Smart meters and time-of-use

electricity pricing. Some of this observed decrease is attributable to residential energy conservation programs (such as the saveONenergy HEATING & COOLING INCENTIVE program), but it is likely that a greater share was the result of natural events, e.g. the adoption of CFL's had reached the tipping point in the marketplace, customers were replacing their traditional cathode-ray tube television sets with large flat-panel liquid crystal display televisions due to plummeting prices, customers were replacing their first generation home computer systems (with CRT screens and power hungry printers) with modern home computer systems (with flat screen monitors and more energy-efficient printers), various household appliances (e.g. refrigerators, dishwashers, etc.) that had reached end-of-life were being replaced with household appliances that are inherently more energy-efficient (due to more stringent energy performance standards for consumer appliances), etc.

2.1.3.2 The Shifting of Electricity Usage

The purpose of installing Smart-meters is given in the landmark ECSTF report *Tough Choices: Addressing Ontario's Power Needs*, and the appropriate passage is replicated below for convenience of reference:[2]

4. *Consumers should be encouraged to shift consumption from periods of high demand and high prices. In order to achieve this, they will need both the incentives in terms of differentiated prices and the technology in the form of smart meters.*

In the 20 months that London Hydro has offered time-of-use electricity pricing to its residential customers, the consumption pattern is illustrated in Figure 2-4 below.

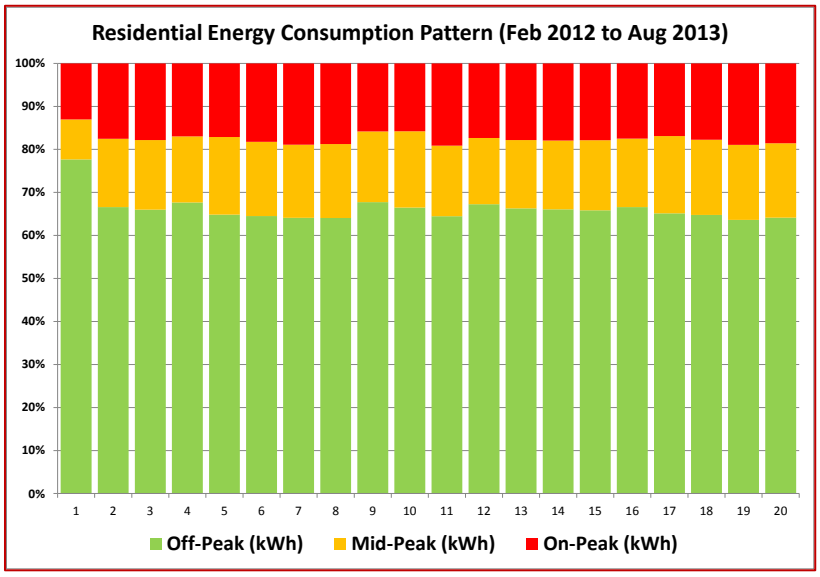

Figure 2-5, Residential Energy Consumption Pattern

[2] Electricity Conservation & Supply Task Force report: *Tough Choices: Addressing Ontario's Power Needs*; Final Report to the Minister; January 2004; page 45

It can be observed from Figure 2-5 that, for the residential sector, the proportion of on-peak consumption (as depicted by the "*red*" segment on the stacked bar graph) has remained relatively constant at about 17.7%.

Clearly no discernible load shifting by residential customers is occurring. As such, it would seem that there is a missed opportunity here. Customers don't need to know the theory of Smart-meters or the intricate details of the electricity marketplace. Rather there needs to be an action-oriented information campaign that tells customers exactly what simple things that they can do to shift their energy consumption from on-peak periods to mid- and off-peak periods.

In the 19 months that London Hydro has offered time-of-use electricity pricing to its small business customers, the consumption pattern is illustrated in Figure 2-6 below.

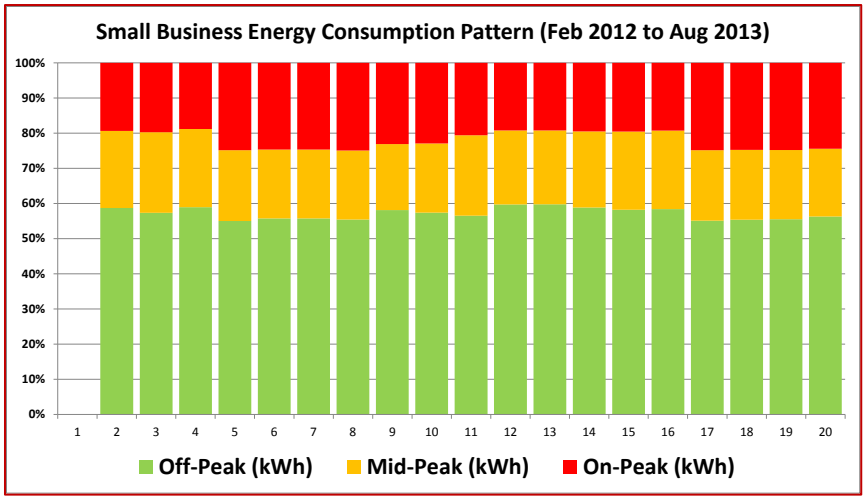

Figure 2-6, Small Business Energy Consumption Pattern

The small business sector (i.e. customers classified as "*General Service less than 50 kW*") is non-homogeneous ranging from an advertising billboard with photocell-controlled lighting loads to a neighbourhood convenience store with significant refrigeration load. One cannot make general statements about the prevailing opportunities for load shifting within this customer category.

2.2 Other Board-Approved CDM Programs

In 2012, London Hydro neither made application for Board-approved CDM programs nor were any such programs executed in London Hydro's franchise service territory.

3 OPA-CONTRACTED PROVINCE-WIDE CDM PROGRAMS

3.1 General Overview

The Ontario Power Authority (OPA) is a provincial agency established by Bill 100, *The Electricity Restructuring Act, 2004* which set out several objectives for the organization, including (but not limited to):

- To engage in activities that facilitates load management.
- To engage in activities that promotes electricity conservation and the efficient use of electricity.

In carrying out the "*conservation*" component of its mandate, the OPA is responsible for the design of a portfolio of provincial energy conservation and demand management programs that are referred to in the industry as Tier 1 CDM programs. Toward this goal, the OPA has developed a number of provincial CDM initiatives geared to the following customer classifications:

- Residential Customers
- Commercial and Institutional (C&I) Customers
- Low-Income Customers
- Industrial Customers

From an LDC perspective, customers are classified somewhat differently. For 2012, the customer classifications and the number of London Hydro customers in each tariff classification are shown in Table 3-1 below.[3]

Table 3-1, London Hydro's 2012 Customer Profile

Tariff Classification	Customer Count
Residential	136,032
General Service < 50 kW	12,058
General Service > 50 kW	1,649
Large User > 5,000 kW	3

Customers in the "*general service < 50 kW*" tariff classification would generally be considered "*small business*" customers, e.g. clothing stores, independent restaurants, dry cleaners, medical offices, beauty salons, convenience stores, gas stations and repair garages, and other small retailers. It will be seen that there are special provincial CDM programs (such as saveONenergy SMALL BUSINESS LIGHTING) within the OPA's "*commercial and institutional*" portfolio that are specifically directed to these customers.

[3] Ontario Energy Board publication: *2012 Yearbook of Electricity Distributors*; August 2013; page 61

Customers in the "*general service > 50 kW*" and "*large user > 5,000 kW*" tariff classifications would generally be eligible for multiple CDM programs within the OPA's "*commercial and institutional*" and "*industrial*" portfolios of CDM programs.

The contractual relationship between the OPA and the community of LDC's that operate as delivery agents within their respective franchise service territories is governed by a so-called *Master CDM Program Agreement*. The various provincial CDM programs are included as "*Schedules*" to the Master CDM Program Agreement.

The CDM program name identified on the various schedules often bears little resemblance to the marketing (or customer-facing) name of the program. As such, Appendix C herein provides a cross-reference between the marketing name for each Tier 1 CDM program and the program name that is used on the Schedules for the Master CDM Program Agreement. Also included in this cross-reference table is the date that the various Schedules were posted to the LDC community and the date that London Hydro formally registered as the delivery agent for each program.

For residential customers, London Hydro operates the saveONenergy FOR HOME suite of CDM programs that are individually described in Section 3.2.1 (starting on page 14 herein).

For commercial, institutional and industrial customers, London Hydro operates the saveONenergy FOR BUSINESS suite of CDM programs that are individually described in Section 3.2.2 (starting on page 18 herein).

For those residential customers that fulfill the eligibility criteria for "*low income*", London Hydro also operates the saveONenergy HOME ASSISTANCE program that is described in Section 3.2.3 (starting on page 26 herein).

3.2 Program Descriptions

3.2.1 Residential CDM Programs

The portfolio of residential CDM programs fall under the umbrella saveONenergy™ FOR HOME brand as illustrated in Figure 3-1 below.

Figure 3-1, saveONenergy FOR HOME Branding

The saveONenergy FOR HOME portfolio includes the following elements:

- saveONenergy FRIDGE & FREEZER PICKUP program;
- saveONenergy HEATING & COOLING INCENTIVE program;

- saveONenergy *peaksaver* PLUS™ program;
- saveONenergy COUPON EVENT program; and
- saveONenergy EXCHANGE EVENT program.

The individual residential programs are outlined in the subsections below. Complete descriptions of the various residential consumer initiatives can be found on the saveONenergy website at URL:: https://saveonenergy.ca/Consumer.aspx

3.2.1.1 saveONenergy FRIDGE & FREEZER PICKUP –

Residential customers with a fridge or freezer that is 15 years or older can have the OPA's provincial contractor pick the unit up for free from the customer's home and recycle the unit in an environmentally-friendly manner. Window air conditioners and dehumidifiers will also be picked up by the contractor if a refrigerator or freezer is being picked up.

Note: This initiative is essentially a continuation and re-branding of the Ontario Power Authority's Great Refrigerator Round-Up program.

Note: Commencing in January 2013 there is a change in the eligibility criteria whereby appliances will need to be 20 years or older (as opposed to the 15 year criteria that was in effect for 2011 and 2012).

Figure 3-2, saveONenergy FRIDGE & FREEZER PICKUP Branding

The saveONenergy FRIDGE & FREEZER PICKUP program operates year round.

For this program, the OPA centrally contracts for province-wide marketing, a call center, appliance pickup, and appliance decommissioning.

London Hydro's involvement is limited to active program promotion within its franchise service territory. Examples of program promotional material are included as Appendix A herein.

3.2.1.2 saveONenergy HEATING & COOLING INCENTIVE –

Residential and small business customers are eligible for a rebate if they purchase and arrange for a participating HVAC contractor to replace central heating or cooling equipment with premium-efficiency units. A premium-efficiency unit would be a natural gas furnace with a high-efficiency blower motor (often referred to as an electronically-commutated motor or ECM blower motor) or a central air conditioner unit that is ENERGY STAR qualified.

Figure 3-3, saveONenergy HEATING & COOLING INCENTIVE Branding

The saveONenergy HEATING & COOLING INCENTIVE program operates year round.

Note: This initiative is essentially a continuation and re-branding of the Ontario Power Authority's *Cool Savings Rebate* program

For this program, the OPA centrally contracts for province-wide marketing, and the registration of HVAC contractors that meet the OPA's eligibility requirements.

For this program, London Hydro's involvement is limited to active program promotion within its franchise service territory.

3.2.1.3 saveONenergy *peaksaver* PLUS™ -

The *peaksaver* initiative involves the installation of a remotely-activated load control switch (by London Hydro's contractor) to control the operation of central air conditioners for short periods of time when there is a generation shortfall or constraint on the provincial transmission grid.

Participants in the program receive an in-home electricity monitor that provides near real-time feedback on the amount of electricity the participant is consuming at any particular time, and the amount of money the participant is spending on electricity consumption, based on the prevailing electricity rates.

Figure 3-4, saveONenergy peaksaver PLUS Branding

Given that this initiative is primarily for the cycling control of central air conditioning during summer heat waves, from a practical and effectiveness perspective, program promotion and installation of control equipment would generally be limited to late spring and early summer.

For this program, the Ontario Power Authority contracts with a central demand response aggregator to initiate a demand response event via wireless paging signals. Alternatively, the LDC can assume responsibility for dispatching signals within its franchise service territory.

London Hydro's role includes promotion of the *peaksaver* PLUS initiative, enrollment of customers, and the procurement and installation of control technology for the cycling control of central air conditioner systems.

While London Hydro has enrolled to deliver the *peaksaver* PLUS program within its franchise service territory, there are technology issues associated with the requisite in-home display that preclude London Hydro from offering this program in 2012. The challenges are fully described in London Hydro Report EM-12-01, *Strategy for Supplying In-Home Displays for the peaksaver-PLUS® Residential CDM Program*. Courtesy copies of this document were provided to both the Ontario Power Authority and Ministry of Energy.

3.2.1.4 saveONenergy COUPON EVENT –

Coupon events are held in both the Spring and Fall each year. Coupons provide discounts for the purchase of a variety of energy-efficient products (e.g. compact fluorescent lamps, weather stripping, hot water pipe wrap, timers, programmable thermostats for baseboard heaters, etc.) from participating retailers.

Figure 3-5, saveONenergy COUPON EVENT Branding

For this program, the OPA centrally contracted for the printing and distribution of coupon booklets across Ontario, and entered into agreements with retailers to honor the coupons. The coupons in these booklets could be used throughout the year.

London Hydro's involvement was limited to distribution of additional coupon booklets at local events within its franchise service territory. There was also provision whereby customers could electronically download coupon booklets from an LDC's website.

Note: This initiative is essentially a continuation and re-branding of the Ontario Power Authority's *Every Kilowatt Counts* power savings coupons program

London Hydro distributed coupon booklets at numerous events during promotion or recognition of conservation initiatives. London Hydro sponsors many local community groups, environmental initiatives and employer-hosted events. Such events are natural places to promote the coupon booklets. In recognition of the participation in our commercial retrofit programs, London Hydro often prepares information for employees of such companies to participate at home in the available residential programs.

3.2.1.5 saveONenergy EXCHANGE EVENT –

Customers with dehumidifiers and window air conditioners that are at least 10 years old and in working condition can drop off their old units at participating retailers (on defined dates each Spring) and receive a $50 coupon towards the purchase of a new ENERGY STAR® qualified window air conditioner or dehumidifier.

Figure 3-6, saveONenergy EXCHANGE EVENT Branding

For this program, the Ontario Power Authority contracts with participating retailers for the collection of eligible units and redemption of discount coupons. In 2012, the retail chains that participated were Canadian Tire stores, Giant Tiger Stores Ltd, TSC Store, and Home Depot.

London Hydro's involvement is limited to supporting participating retailers that request a London Hydro presence at their events.

3.2.2 Commercial, Industrial and Institutional CDM Programs

The portfolio of commercial, industrial and institutional CDM programs fall under the umbrella saveONenergy FOR BUSINESS brand as illustrated in Figure 3-7 below.

Figure 3-7, saveONenergy FOR BUSINESS Brand

The saveONenergy FOR BUSINESS portfolio includes the following elements:

- saveONenergy DEMAND RESPONSE program;
- saveONenergy SMALL BUSINESS LIGHTING program;
- saveONenergy RETROFIT PROGRAM;
- saveONenergy AUDIT FUNDING program;
- saveONenergy EXISTING BUILDING COMMISSIONING program;
- saveONenergy HIGH PERFORMANCE NEW CONSTRUCTION program;
- saveONenergy PROCESS & SYSTEMS program; and
- saveONenergy NEW HOME CONSTRUCTION program.

The individual residential programs are outlined in the subsections below. Complete descriptions of the various residential consumer initiatives can be found on the saveONenergy website at URL:: https://saveonenergy.ca/business.aspx

3.2.2.1 saveONenergy DEMAND RESPONSE –

Demand response programs compensate participating commercial, industrial or institutional customers for curtailing their plant load or activating standby emergency generators at times when wholesale market prices for electricity are high or there is a greater risk to the reliability of the electricity grid due to a generation shortfall or transmission line constraint. There are two distinct participation streams, namely:

- DEMAND RESPONSE VOLUNTARY DR1 - This voluntary initiative is a flexible way for the participant to earn monthly payments only when the participant chooses to take part in activation notices.
- DEMAND RESPONSE CONTRACTUAL DR3 - This contractual initiative offers higher incentive rates in return for a firm commitment to take part in activation notices.

Figure 3-8, saveONenergy DEMAND RESPONSE Branding

Note: The VOLUNTARY DR1 offering was formally withdrawn from the provincial marketplace on December 4, 2012 due to lack of participation and interest.

The OPA initially qualified five (5) private companies (Direct Energy, Energy Curtailment Specialists Inc., EnerNOC Inc., Constellation Energy Resources, and Rodan Energy) to serve as demand response aggregators in the marketplace. However, two (2) of these companies (Direct Energy and Constellation Energy Resources) ceased offering demand response aggregation services in the Ontario marketplace effective May 1, 2012.[4] London Hydro is not privy to the reasons that these two companies suspended DR aggregation operations in Ontario.

These demand response aggregators usually approach the customers directly. London Hydro's role is simply one of supporting the program, i.e. reassuring eligible customers of the legitimacy of the demand response program, and informing them of the program parameters and the potential opportunity for their organization.

3.2.2.2 saveONenergy SMALL BUSINESS LIGHTING –

Under this program, London Hydro's electrical contractors will provide turn-key lighting upgrades worth up to $1,000 in qualifying small businesses (i.e. those with an

[4] E-mail of September 26, 2013 to Mike Isber (London Hydro) from Amy Snook (OPA); re: *DR*.

electricity demand of less than 50 kW such as clothing stores, independent restaurants, dry cleaners, medical offices, beauty salons, convenience stores, garages and other small retailers) at no cost to the small business customer.

Note: This program is essentially a continuation and rebranding of the Power Savings Blitz initiative.

Figure 3-9, saveONenergy SMALL BUSINESS LIGHTING Branding

The saveONenergy DIRECT INSTALL LIGHTING program operates year round.

London Hydro's involvement includes engaging local electrical contractors to carry out the turnkey energy efficiency measures, approving SMALL BUSINESS LIGHTING applications, carrying out field verification activities (to ensure consistency between the installed energy-efficiency measures and the application), and active program promotion within its franchise service territory.

3.2.2.3 saveONenergy RETROFIT PROGRAM –

This initiative provides substantial financial incentives to commercial, industrial and institutional customers for replacing existing equipment with high efficiency equipment and for installing new control systems that will improve the efficiency of operational procedures and processes. Eligible energy-efficiency measures include, but are not necessarily limited to, the following:

- Lighting retrofits
- Lighting controls
- HVAC re-design
- Chiller replacement
- Variable frequency drives

Note: This program is essentially a continuation and rebranding of the Electricity Retrofit Incentive Program (ERIP).

Figure 3-10, saveONenergy RETROFIT PROGRAM Branding

There are three (3) distinct participation tracks in the RETROFIT PROGRAM, namely:

- Prescriptive projects – The "*prescriptive*" track provides a defined list of end-use energy-efficiency measures and a corresponding per-unit incentive. Examples include upgrades to lighting, motors, unitary A/C, etc.

- Engineered projects – The "*engineered*" track consists of a series of preset calculation worksheets (i.e. spreadsheets) that estimate reductions in peak demand and/or electricity consumption associated with the installation of more energy-efficient equipment or solutions. Electronic worksheets are available for the energy-efficiency measures listed below:
  - Commercial Interior Lighting Engineering Worksheet
  - Commercial High Bay Lighting Engineering Worksheet
  - Commercial Directional Lighting Engineering Worksheet
  - Unitary A/C Engineering Worksheet (i.e. rooftop units and split systems)
  - Variable Speed Drive on Fan Engineering Worksheet
  - Variable Speed Drive on Pump Engineering Worksheet
  - Compressed Air Engineering Worksheet
- Custom projects - The "*custom*" track is available for more complex or innovative solutions not covered in the "*prescriptive*" or "*engineered*" track. Technology, equipment and system improvements are evaluated on their demand and energy-performance. Incentives are paid after installation, and once the savings have been measured and verified.

The saveONenergy RETROFIT PROGRAM operates year round.

London Hydro's involvement includes approving RETROFIT PROGRAM applications, carrying out field verification activities (to ensure consistency between the installed energy-efficiency measures and the application), and active program promotion within its franchise service territory.

Another role that London Hydro takes on is the celebration of successful CDM projects via such avenues as nominating selected energy-efficiency projects as contenders for the Mayor's Sustainable Energy Council's (MSEC)[5] annual *Outstanding EnergySaver Business* recognition initiative. One of the several nominated projects that received community recognition by MSEC is described in Appendix B herein.

London Hydro promotes the saveONenergy RETROFIT PROGRAM heavily by participating in most meetings and local events hosted by the London Economic Development Corporation (LEDC), the London Property Management Association (LPMA), the Chamber of Commerce, Southwestern Ontario Chapter of the Canadian Manufacturers and Exporters, and similar events where potential participants are likely to attend.

3.2.2.4 saveONenergy AUDIT FUNDING –

Business customers are eligible for an incentive (up to 50% of the cost of an energy audit, based on requirements that take into account the size and complexity of the

[5] See URL: http://www.msec.london.ca/d.aspx?s=/Main/Business.htm

buildings) to complete energy audits assessing the potential for energy savings to be achieved through equipment replacement, operational practices, or participation in Demand Response initiatives and other building systems and envelopes projects.

Figure 3-11, saveONenergy AUDIT FUNDING Branding

The saveONenergy AUDIT FUNDING program operates year round.

London Hydro's involvement includes approving AUDIT FUNDING applications and active program promotion to building owners, property managers, and consulting firms within its franchise service territory.

3.2.2.5 saveONenergy EXISTING BUILDING COMMISSIONING –

This initiative applies to commercial and institutional buildings that use chilled water systems for space cooling. Funding is available for hiring an expert to analyze the chilled water system and make recommendations for increasing its energy efficiency and for subsequently implementing the recommended upgrades.

Figure 3-12, saveONenergy EXISTING BUILDING COMMISSIONING Branding

The saveONenergy EXISTING BUILDING COMMISSIONING program operates year round.

London Hydro's involvement includes approving EXISTING BUILDING COMMISSIONING applications and active program promotion to building owners, and HVAC consultants and contractors within its franchise service territory.

3.2.2.6 saveONenergy HIGH PERFORMANCE NEW CONSTRUCTION –

This initiative targets new construction and major renovations in the planning stages by financially rewarding builders and their project decision-makers that exceed the electricity efficiency standards specified in the Ontario Building Code.

Note: This program is essentially a continuation and rebranding of the High Performance New Construction (HPNC) program that was initially launched on March 26, 2008 and was delivered by Enbridge Gas Distribution Inc. for customers outside the 416 area code, and by Toronto's Better Buildings Partnership for projects within the City of Toronto.

Figure 3-13, saveONenergy HIGH PERFORMANCE NEW CONSTRUCTION Branding

The saveONenergy HIGH PERFORMANCE NEW CONSTRUCTION program operates year round.

London Hydro's involvement includes approving HIGH PERFORMANCE NEW CONSTRUCTION applications and active program promotion to developers, architects and consultants within its franchise service territory.

3.2.2.7 saveONenergy PROCESS & SYSTEMS –

This initiative targets industrial and large commercial, institutional and agricultural customers with (non-lighting) energy-efficiency projects or portfolios that are expected to generate at least 100 MWh of annualized electricity savings. The objectives of this initiative are to:

- offer distribution customers capital incentives and enabling initiatives to assist with the implementation of large projects and project portfolios;
- implement system optimization project in systems which are intrinsically complex and capital intensive; and
- increase the capability of distribution customers to implement energy management and system optimization projects.

Figure 3-14, saveONenergy PROCESS & SYSTEMS Branding

The saveONenergy PROCESS & SYSTEMS initiative is a comprehensive program made up of two complementary streams, namely:

- Energy Efficiency Upgrades -

  This participation stream helps eligible customers to find, to study, and to act on energy-efficiency opportunities via:

  - Funding for Engineering Studies – Usually, applications for capital funding must be supported by a PRELIMINARY or DETAILED engineering study (or both) wherein the umbrella PROCESS & SYSTEMS initiative provides the following funding:

    - PRELIMINARY Engineering Study Funding - This is a general assessment of a key process or single system, comparing the cost-

effectiveness of the various upgrades available to the customer. Funding of up to $10,000 per study is available.

- DETAILED Engineering Study Funding - Building on the preliminary recommendations, this study provides the customer with all of the in-depth technical and financial information needed to build a solid business case for the energy-efficiency project. Funding of up to $50,000 per study is available.

- Capital Incentives - The capital incentive for participants that elect to deploy an energy-efficiency technology is very attractive and is calculated as the lowest of:
  - $200/MWh of annualized electricity savings;
  - 70% of projects costs; and
  - A one year payback.

- Energy Management and Monitoring

  This participation stream provides a variety of support functions for identifying potential energy efficiency opportunities. The specific sub-initiatives are highlighted following:

  - Funding for an Embedded Energy Manager – Eligible customers can hire an on-site full-time energy manager as a dedicated resource to identify energy-efficiency opportunities. The funding parameters and requisite minimum performance requirements for an Embedded Energy Manager are summarized below:
    - Funding up to 80% of the Embedded Energy Manager's actual annual salary to a maximum amount plus up to 80% of actual reasonable expenses to a maximum amount per year; and
    - Embedded Energy Manager must achieve a minimum of 0.3 MW of peak demand savings and 0.3 MW x Facility Load Factor x 8,760 hours in energy savings each year. Of this, 30% of savings must be achieved without third party incentives.

    Note: There is also a variant Roving Energy Manager program for instances where hiring an Embedded Energy Manager full time by customer is not warranted, or there is simply not enough potential for energy savings. Roving Energy Managers may be employed by an LDC and are available for potential participants for a defined period of time to start identifying opportunities, develop energy-management plans and completing incentive applications.

  - Monitoring and Targeting – For facilities with a minimum annual electricity consumption of 15,000 MWh and a staff member designated as a resident energy manager, the PROCESS & SYSTEMS initiative provides funding, toward 80% of actual eligible costs (less any third party contributions), of up to $75,000 per site to purchase, install and make operational a monitoring and targeting system. The participating customer must contribute a minimum 20% of the actual project cost. In turn, the facility must demonstrate by the end of

the second year of operation, 0.2 MW in peak demand savings and 0.2 MW x Facility Load Factor x 8,760 hours in energy savings.

- Meter Lending Library – The central meter lending library allows LDC's and eligible customers to borrow, for short periods of time, portable measurement instruments that will allow customers to directly measure the load profile for a fan, pump, chiller or an entire industrial system and hence to better quantify the opportunities for energy management and energy efficiency.

The saveONenergy PROCESS & SYSTEMS initiative operates year round.

For this program, the OPA centrally contracts for a Technical Reviewer, an independent third-party engineering firm that reviews the applications, engineering studies, and post-project measurement & verification plans for conformance to engineering principles and compliance with the established program parameters.

London Hydro's role includes active program promotion within its franchise service territory, the development and execution of a variety of legal agreements with the participating customer (covering embedded energy managers, funding of engineering studies, incentives for energy-efficiency projects, etc.), and otherwise providing various types of support to participating customers in the PROCESS & SYSTEMS initiative.

London Hydro's approach to program promotion is based on tried and true one-on-one sales strategies. Specifically:

- London Hydro has initially targeted all customers with a peak demand that is greater than 200 kW and its Manager of Industrial CDM Programs calls on the customer, disseminates information about the opportunity, presents value propositions, and solicits customer interest in moving forward with energy-efficiency opportunities; and
- London Hydro shows up at venues where potential program participants are likely to also be present, such as the London Economic Development Corporation's annual "*For Manufacturers Only*" conference, the London Chamber of Commerce's annual *Business Achievement Awards* event, the Canadian Manufacturers and Exporters annual *Innovation in Manufacturing* event, etc.

Once potential energy-efficiency opportunities have been identified, London Hydro further removes program participation barriers by deploying its expertise to the customer's facility to carry out pre-project and post-project measurements of energy consumption using its roster of calibrated energy management instruments.

3.2.2.8 saveONenergy NEW HOME CONSTRUCTION –

This initiative is designed to encourage home builders and renovators to construct energy-efficient homes in Ontario by incorporating energy-efficiency into their construction or any extensive renovation.

Figure 3-15, saveONenergy NEW HOME CONSTRUCTION Branding

The saveONenergy NEW HOME CONSTRUCTION program operates year round.

London Hydro's involvement includes approving NEW HOME CONSTRUCTION applications and active program promotion within its franchise service territory.

Consistent with its sales-based approach of "*showing up where its customers are*", London Hydro applied for a membership within London Home Builders Association (LHBA) with the intention of engaging London's new home builders both at monthly association meetings and within the membership publication *Bang On*.

Conceptually, London Hydro was interested in using the NEW HOME CONSTRUCTION initiative to both leverage and add value to the London Energy-Efficiency Partnership (LEEP), an existing joint undertaking sponsored by London Home Builders Association and the City of London, and their *LEEP Innovator Initiative*.[6]

Several local builders are active participants in the ENERGY STAR® for New Homes program as well as the local LEEP initiative. Generally builders are very keen to participate in valuable and well organized programs in order to make their homes more marketable.

3.2.3 Low-Income CDM Programs

In Ontario, approximately 16 per cent of households are low-income, and they often occupy older, less energy efficient homes with older appliances. While financial assistance programs are important for helping with energy bills in the short term, providing Conservation and Demand Management (CDM) initiatives targeted at low-income households can have a greater impact by reducing energy bills on a sustained basis.[7] On July 5, 2010, the Minister directed the OPA to develop province-wide CDM programs targeted specifically at low-income consumers as part of its suite of province-wide CDM programs.

The low-income CDM programs are targeted to homeowners and tenants that meet the Low-Income Cut-Off (LICO) criteria and reside in one of the following dwelling types:

- Housing co-operatives;

[6] Publication: *LEEP Innovator Tool-kit – Working together to create a Sustainable Future for the Residents of London*; London Home Builders Association and City of London; January 2008.

[7] Environmental Commissioner of Ontario publication: *Annual Energy Conservation Progress Report, 2010 (Volume One): Managing a Complex Energy System*; pg. 36.

- Social housing buildings and complexes that in London would be under the governance of London Middlesex Housing Corporation;
- Rental apartments wherein the occupant receives some type of social benefit (e.g. the Ontario Ministry of Community and Social Services' "*Ontario Works*" or "*Ontario Disability Support Program*" financial assistance program, the Canadian *Guaranteed Income Supplement*, etc.); and
- Private dwellings wherein the owner-occupant meets pre-defined income eligibility criteria (e.g. recipient of the Ontario *Low-Income Energy Assistance Program* emergency financial assistance program, etc.).

All social and assisted housing may participate in one of the opportunity streams identified following:

- saveONenergy AUDIT FUNDING as previously described in Section 3.2.2.4 (starting on page 21 herein) and saveONenergy RETROFIT PROGRAM as previously described in Section 3.2.2.3 (starting on page 20 herein); or
- saveONenergy HOME ASSISTANCE as described in Section 3.2.3.1 below.

The participation stream is dictated by the defined eligibility parameters for the saveONenergy HOME ASSISTANCE program.

3.2.3.1 saveONenergy HOME ASSISTANCE

The CDM program that is targeted to social and assisted housing is branded saveONenergy HOME ASSISTANCE.

Figure 3-16, saveONenergy HOME ASSISTANCE Brand

The objective of this turnkey initiative is to offer the free installation of energy efficiency measures to income-qualified households for the purpose of achieving electricity and peak demand savings. All eligible customers receive a *Basic* and *Extended Measures Audit*, while customers with electric heat also receive a *Weatherization Audit*. The initiative is designed to coordinate efforts with gas utilities.

The saveONenergy HOME ASSISTANCE program operates year round.

Complete descriptions of this low-income initiative can be found on the saveONenergy website at URL:: https://saveonenergy.ca/homeassistance

London Hydro's involvement includes qualifying eligible customers, supplying and installing energy-efficiency measures (usually via a third-party contractor), and active program promotion within its franchise service territory.

3.3 Participation

3.3.1 Participation in saveONenergy FOR HOME Programs

3.3.1.1 Participation Synopsis

The participation level in the saveONenergy FOR HOME portfolio of CDM programs by customers within London Hydro's franchise service territory is given in Table 3-2 below.

Table 3-2, Participation in saveONenergy FOR HOME Programs

Marketplace Name of CDM Initiative	Program Description	Activity Unit	Program Uptake / Participation Units
FRIDGE & FREEZER PICKUP	Page 15	Appliances	2,370
HEATING & COOLING INCENTIVE	Page 15	Equipment	2,994
peaksaver PLUS™	Page 16	Devices	0
COUPON EVENT	Page 17	Coupons	29,815
EXCHANGE EVENT	Page 18	Appliances	65

Note: The entry for "COUPON EVENT" includes redemptions for the "*instant coupons booklet*" and the in-store coupons available at bi-annual retailer events.

The foregoing information was provided to London Hydro by the Ontario Power Authority pursuant to their obligations under Clause 8.2, *Reporting Requirements*, of the *Master CDM Program Agreement*. With the exception of the *peaksaver* PLUS program, there is no mechanism for London Hydro to verify the forgoing results.

3.3.1.2 saveONenergy FRIDGE & FREEZER PICKUP Participation Insight

Throughout 2006 and partway into 2007, London Hydro ran its comprehensive and highly successful *Chill Out – London* residential appliance recycling program wherein 14,463 refrigerators, freezers and room air conditioners were harvested. Given London Hydro's residential customer base at the time of 127,000 accounts, this represented an uptake in excess of 11%.

Throughout the duration of the Ontario Power Authority's successor *Great Refrigerator Round-Up* appliance retirement program, as anticipated, there wasn't a significant volume of refrigerators and freezers available for retirement, and the volumes decreased over time.

With the introduction of the Ontario Power Authority's saveONenergy FRIDGE & FREEZER PICKUP program, London Hydro sought unique methods of increasing the accessibility of the program and thereby hopefully maximizing the volume of retired refrigerated appliances. The City of London's Environmental & Engineering Services division operates three (3) drop-off stations (referred to as "*Community EnviroDepots*") for waste and material recycling that collectively attracts 100,000 drop-off visits by London residents each year.

London Hydro sought and received permission from the OPA to host a drop-off program for fridges and freezers for London residents.[8] [9] By leveraging the City's existing marketing and awareness campaigns, London Hydro has been able to sustain satisfactory annual volumes.

Note: Previously, the municipal EnviroDepots would not accept refrigerated appliances. The onus was on the London residents to arrange for appliance disposal via one of several local contractors certified for the removal and recycling of Freon™ refrigerant and incur the contractor's prevailing service fee.

London Hydro attempted to obtain 2012 information from the OPA to update this section. Unfortunately, unlike last year when the requested information was provided in a matter of hours, this year there was no response to e-mails or phone calls. As such the following is 2011 data, but anecdotal evidence suggests no appreciable changes have occurred.

Figure 3-17 below shows the locations the appliance pickup locations throughout 2011. It can be seen that 17% of the total number of appliances were picked up from the three (3) municipal EnviroDepots. It isn't clear why customers would choose dropping an appliance off at a municipal EnviroDepot over the convenience of a contractor coming directly to the customer's home, but nonetheless this expanded option proved successful.

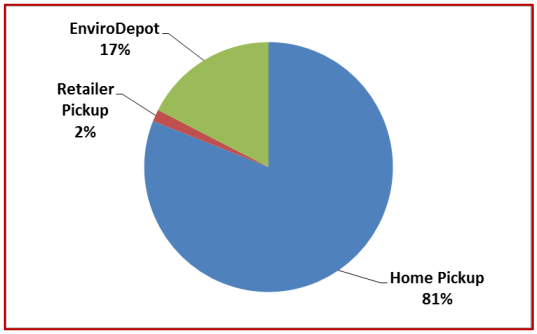

Figure 3-17, Appliance Pickup Locations for 2011

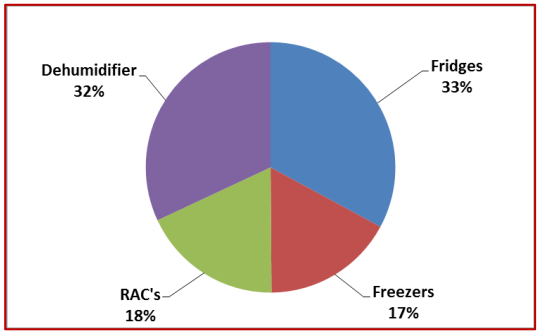

Figure 3-18, Appliances Dropped-Off at Municipal EnviroDepots

Figure 3-18 above shows the distribution of retired appliances that customer's dropped off at the EnviroDepots. It was originally thought that customers would be

[8] E-mail dated June 3, 2011 to Mayuran Srikantha (Ontario Power Authority) from Hans Scheff (London Hydro); re: *London Hydro's Fridge Municipality Plan*.

[9] E-mail dated July 6, 2011 to Hans Schreff (London Hydro) from Katherine Sparkes (Ontario Power Authority); re: *London Hydro's Fridge Municipality Plan*.

most likely to take the smaller appliances (e.g. room air conditioners and dehumidifiers) to the EnviroDepots and arrange for the provincial contractor to pick up the larger appliances (e.g. fridges and freezers) at the home. This is evidently not the case as there are as many big appliances being dropped off at the municipal EnviroDepots as small appliances.

Finally, Figure 3-19 shows the month over month distribution of appliance pickups. It is not clear why there would be a steady increase from January to November. Since the provision for appliance drop-offs at the municipal EnviroDepots didn't start until mid-2011, this may explain the increase in overall activity in the latter half of the year. It is not surprising however that the volumes are low in December.

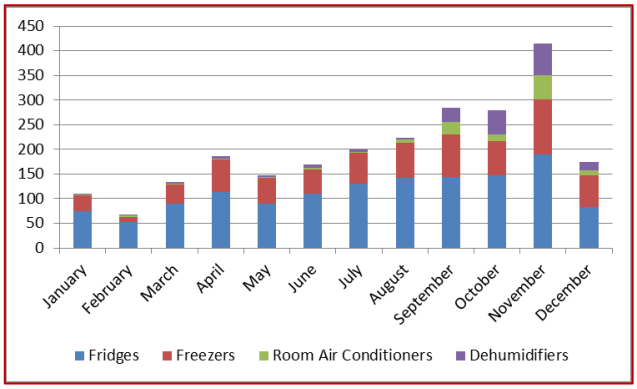

Figure 3-19, Monthly Appliance Pickup Volumes

3.3.1.3 saveONenergy HEATING & COOLING INCENTIVE Participation Insight

London Hydro attempted to obtain 2012 information from the OPA to update this section. Unfortunately, unlike last year when the requested information was provided in a matter of hours, this year there was no response to e-mails or phone calls. As such the following is 2011 data, but anecdotal evidence suggests no appreciable changes have occurred.

The overall participation in the saveONenergy HEATING & COOLING INCENTIVE program (as previously listed in Table 3-2) has been subdivided into customers that elected to install an energy-efficient ECM blower motor in their new furnace, and customers that elected to upgrade their central air conditioning system to an ENERGY STAR qualified unit. This information is depicted in Figure 3-20. It will be observed that the customer uptake for energy-efficient furnace blower motors is 50% greater than the number of customers that elected an ENERGY STAR qualified central air conditioner.

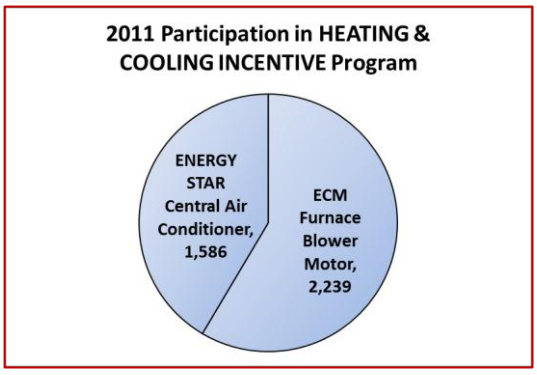

Figure 3-20, 2011 Participation in HEATING & COOLING INCENTIVE Program

The month by month participation levels for each type of energy-efficiency upgrade is depicted in Figure 3-21.

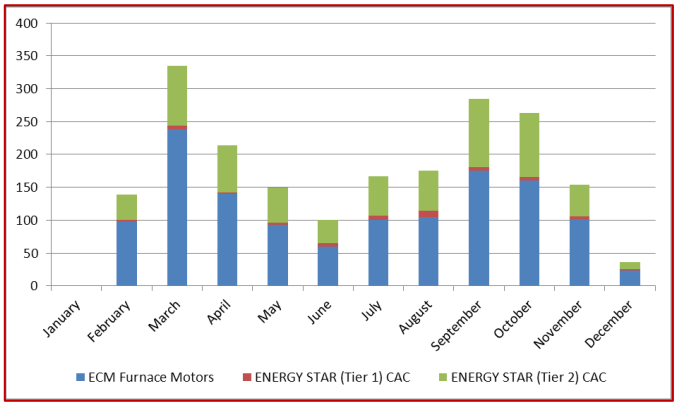

Figure 3-21, Month by Month Participation Levels

In the bar chart, no participants are shown for January as the initiative had yet to launch. Even though the chart reflects the HVAC contractor's submission approval date (as opposed to the date of installation), the greatest volume of HVAC upgrades occurs at the beginning and end of the heating season, and the least amount of central air conditioner upgrades occurs during the summer cooling months of June, July and August. This situation isn't entirely intuitive, but it may suggest that significant numbers of participants are having their central air conditioner upgraded at the same time that they are replacing their forced air furnace.

And finally, the net annual energy savings and demand reduction attributable to participation in this program is illustrated in Figure 3-22 and Figure 3-23 respectively.

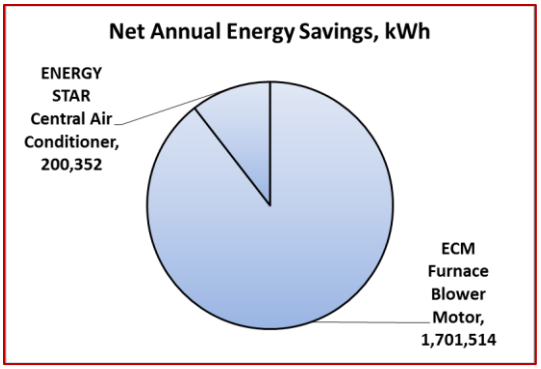

Figure 3-22, Net 2011 Annual Energy Savings Attributable to Program

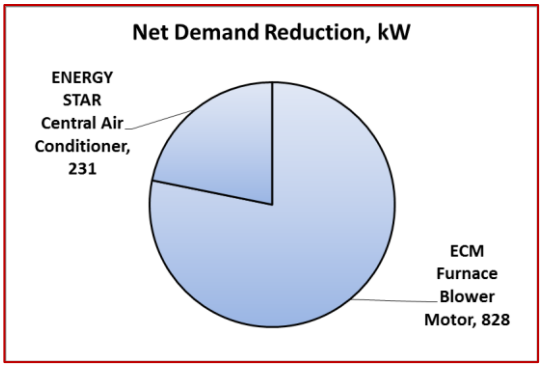

Figure 3-23, Net Demand Reduction Attributable to Program

As noted in a published Natural Resources Canada study on the subject,[10] electricity consumption by a furnace blower is significant, and is comparable to the annual electricity consumption of a major appliance. Since the same blower unit is also used during the summer to circulate cooled air in centrally air conditioned homes, electricity savings occur year round.

[10] Natural Resources Canada report: *Final Report on the Effects of ECM Furnace Motors on Electricity and Gas Use: Results from the CCHT Research Facility and Projections*; John Gustorf, Skip Hayden, Evgueniy Enchev, Mike Swinton, Craig Simpson and Bill Castellan; August 2003.

Whereas there are 104 listings for HVAC contractors found in the local Yellow Pages, the Ontario Power Authority's on-line listing of participating contractors[11] has 47 entries for London. Although this appears as only a 45% HVAC contractor participation rate, this number may not relate to the overall percentage of sales offerings as all of the larger more well established HVAC contractors are participants. A more useful parameter would be insight into program uptake (i.e. the number of consumers that participate in the HEATING & COOLING INCENTIVE program) in comparison to the overall number of purchased furnaces and central air conditioning systems. Unfortunately the manufacturers tend to consider local sales information confidential in nature.

3.3.2 Participation in saveONenergy FOR BUSINESS Programs

3.3.2.1 Participation Synopsis

The participation level in the saveONenergy FOR BUSINESS portfolio of CDM programs by customers within London Hydro's franchise service territory is given in Table 3-3 below.

[11] See URL:: http://www.hraiheatingcoolingincentive.ca/pages/search.php?act=post

Table 3-3, Participation in saveONenergy FOR BUSINESS Programs

Marketplace Name of CDM Initiative	Program Description	Activity Unit	Program Uptake / Participation Units	
DEMAND RESPONSE -	Page 19			
• DEMAND RESPONSE VOLUNTARY DRI	"	Facilities	0	
• DEMAND RESPONSE CONTRACTUAL DR3	"	Facilities	10	
SMALL BUSINESS LIGHTING	Page 19	Projects	74	
RETROFIT PROGRAM	Page 20	Projects	261	
AUDIT FUNDING	Page 21	Audits	0	*
EXISTING BUILDING COMMISSIONING	Page 22	Buildings	0	
HIGH PERFORMANCE NEW CONSTRUCTION	Page 22	Buildings	2	
PROCESS & SYSTEMS	Page 23			
• Preliminary Eng. Study	"		0	*
• Detailed Engineering Study	"		0	*
• Project Incentive	"	Projects	0	*
• Monitoring & Targeting	"	Projects	0	
• Embedded Energy Manager	"	Projects	6	*
NEW HOME CONSTRUCTION	Page 25	Homes	0	

***** The "0" entries are not technically correct, but participants are only counted when payments have been made by the OPA. Refer to the relevant "*Participation Insight*" subsections for further detail.

The DEMAND RESPONSE information was provided to London Hydro by the Ontario Power Authority. There is no mechanism for London Hydro to verify these participation numbers.

3.3.2.2 saveONenergy SMALL BUSINESS LIGHTING Participation Insight

The saveONenergy SMALL BUSINESS LIGHTING program is essentially a re-branded version of the former *Power Savings Blitz* initiative. London Hydro was very aggressive with the *Power Savings Blitz* program and, with the exception of the small businesses with certain types of lighting, program uptake was significant, meaning that the residual opportunity for the saveONenergy SMALL BUSINESS LIGHTING program is very limited.

Certainly one of the challenges with the *Power Savings Blitz* program was the prevalence of parabolic aluminized reflector (PAR) sealed beam lamps, as depicted in Figure 3-24, in retail stores such as clothing stores, art galleries, etc. These are usually installed in ceiling-mounted track lighting fixtures, and provide accent lighting for the merchandise. For such accent lighting applications, one would normally select a PAR lamp with a narrow beam angle. Unfortunately, at the time, the CFL lamps with a PAR form inherently had a "wide" beam angle and weren't dimmable, thereby making them unsuitable for most retail accent lighting applications.

Figure 3-24, Typical PAR-38 Lamp

Another common lamp used in retail spaces was the 2-pin multifaceted reflector (MR) light bulb as depicted in Figure 3-25. Such lamps are commonly used in pendant fixtures in restaurants, recessed ceiling lights, retail display lighting in jewelry shops, in recessed ceiling lights, and also in ceiling-mounted track lighting fixtures for directional accent lighting.

Figure 3-25, Typical MR-16 Lamp

LED technology is rapidly maturing and PAR-38 and MR-16 lamps that use LED technology are becoming available in the marketplace with declining costs and increasing reliability. These attributes, combined with the ability to dim the lamp, narrow beam patterns, and increased lumen outputs together mean that there is an emerging energy-efficient alternative to the traditional incandescent and halogen sealed beam PAR-38 and MR-16 lamps.

Due to London Hydro's aggressive pursuit of this program in prior years and because of the technology limitations described above, London Hydro's approach to the saveONenergy SMALL BUSINESS LIGHTING program throughout 2011 was reactive as opposed to proactive, i.e. London Hydro responded to customer requests but did not go out knocking on doors.

For 2012, London Hydro contracted for another resource with an aggressive plan to approach all small business customers that had not previously participated in the *Power Savings Blitz* or its successor saveONenergy SMALL BUSINESS LIGHTING programs. These plans were thwarted by an OPA webinar on February 22, 2012 that effectively confused the eligibility requirements for participating small business customers. London Hydro immediately followed up with a letter, complete with example scenarios, to obtain clarification.[12] As is far too common, no response was forthcoming from the OPA until a very frank e-mail was sent to the OPA several

[12] Letter dated February 29, 2012 to Kyle O'Hearn (OPA) from Gary Rains (London Hydro), re: *saveONenergy SMALL BUSINESS LIGHTING Program – Request for Clarification for Strip Malls with Tenant Metering*.

months later.[13] The subsequent reply[14] only resulted in continued confusion – the fundamental problem for LDC's is that within the various Codes, the definition of a customer is quite clear (basically if one has a revenue meter, then they are a customer and if a single business occupies three non-adjacent units in a strip mall, with each unit having its own revenue meter, then those units are considered to be occupied by distinct customers), but the OPA seems to have its own confusing definition of an eligible participant.

This matter was eventually referred to the joint OPA / EDA Commercial CDM Working Group for clarification and to make other program improvements and reforms. In the meantime, London Hydro elected to pursue the SMALL BUSINESS LIGHTING program only on a reactive basis only (i.e. London Hydro would respond to customer requests, but chose not to go out "*knocking on doors*" to drive up program participation).

Note: As was previously mentioned London Hydro enjoyed considerable success with the earlier *Power Saving Blitz* direct install program. However, near the end of that program, the OPA seemingly re-interpreted their own rules and currently London Hydro has 671 projects in limbo for which reimbursement has not been received for more than two years. Once the outstanding ERIP reimbursements (as outlined in Section 3.6.3 herein) have been made, London Hydro will proceed to arbitration for the outstanding Power Savings Blitz monies owed.

As an active participant in the EDA's Commercial CDM Working Group, many program improvements were negotiated with the OPA in a very timely fashion. Specifically:

- Eligibility criteria. LDCs were seeking a better understanding of customer eligibility, particularly those with multiple accounts in a multi-tenant commercial building with a tenant metering arrangement. The OPA could not express a succinct rule or even define the spirit of what they were trying to achieve. In the end, the Working Group proposed a resolution that was finally accepted.

  Note: Unfortunately, and for reasons unknown, the definition of an eligible participant in a multi-metered strip mall is different than the LDC definition of a customer within its core business. This simply injects unnecessary confusion into the program and is bound to lead to more problems down the road.

- Increase in incentive amount from $1,000 to $1,500. An increase in amount was necessary to acquire the final customers and motivate the contractors to participate. Although this change was tabled by the OPA and agreed to by the Working Group quickly, the implementation of this change would take more than a year!

- Bulk metered buildings where many small businesses reside. In this circumstance a small business typically pays their share of a bulk electric bill based on an allocation methodology (e.g. percentage of floor space, or similar). Even though

[13] E-mail dated May 4, 2012 to Andrew Pride (OPA) from Gary Rains (London Hydro), re: *saveONenergy SMALL BUSINESS LIGHTING …*

[14] E-mail dated May 11, 2012 to Gary Rains (London Hydro) from Andrew Pride (OPA); re: *Direct Install Lighting*.

such small businesses aren't direct customers of the LDC, they still pay a portion of the facility's overall electricity bill. The prevailing program rules preclude such small business from participating and the landlord is not motivated to assist such tenants in energy-efficiency upgrades. This is another item that was under discussion for more than a year before implementation.

As is typical with many required changes to CDM programs, even though there may be quick agreement amongst the members of the Commercial CDM Working Group and the OPA representatives, the actual implementation of such changes routinely takes more than a year.

While London Hydro intends to continue its aggressive plan of pursuing eligible small business customers that have not participated to date in either the Power Savings Blitz or saveONenergy SMALL BUSINESS LIGHTING initiatives, unfortunately 2012 and 2013 have been write-offs largely on account of OPA confusion, indecision, and finally the delay in getting the needed changes finally implemented.

3.3.2.3 saveONenergy RETROFIT PROGRAM Participation Insight

The overall number of saveONenergy RETROFIT PROGRAM projects carried out in 2012, as identified in Table 3-3 above, can be divided into lighting upgrades and non-lighting upgrades (e.g. upgrades to HVAC systems, compressed air systems, motors, fan and pump, variable frequency drives, and other energy-efficient non-lighting technologies). This distribution is illustrated in Figure 3-26 to the right where it is seen that currently lighting retrofits provide 90% of the gross demand reduction associated with the saveONenergy RETROFIT PROGRAM. Lighting upgrades represent about 80% of the energy-efficiency projects.

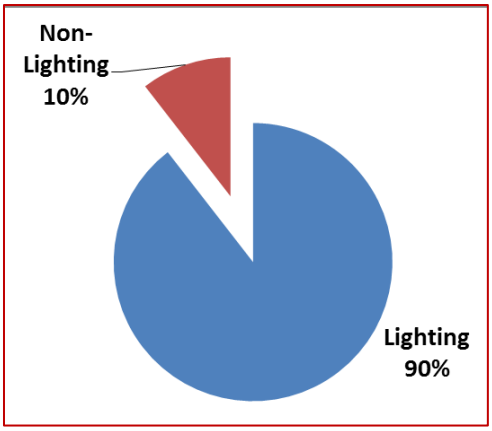

Figure 3-26, Classifications of 2012 Retrofit Projects

Note: In London Hydro's annual report of 2011 CDM activities and achievements, "*lighting*" projects provided 98% of the gross demand reduction associated with the saveONenergy RETROFIT PROGRAM within London Hydro's franchise service territory. The shift to a greater attribution from "*non-lighting*" projects is reflective both of lighting projects being smaller scale than previously combined with greater success with HVAC and VFD projects.

It should not be inferred from Figure 3-26 that lighting retrofits are more valuable than the implementation of other types of energy-efficiency technologies. Rather, in London Hydro's franchise service territory, the lighting supply chain has been trained and effectively uses the RETROFIT PROGRAM as an integral part of its sales strategy. More effort needs to be expended to expand participation amongst the

supply chain for other energy-efficiency technologies such as HVAC systems, VFD technology, etc.

It should be noted that in the near future, the most common types of lighting retrofits (e.g. conversion of T12 fluorescent lamps with magnetic ballasts to T8 fluorescent fixtures with electronic ballasts, and replacement of incandescent bulbs with compact fluorescent lamps) will become less and less valuable within a CDM portfolio on account of impending changes to Canadian energy efficiency regulations covering fluorescent and incandescent lighting.

Note: Since early 2007 almost all governments that hold membership in Organization for Economic Co-operation and Development (30 countries that are high-income, and considered developed) have announced policies aimed at phasing-out incandescent lighting within their jurisdictions. The intention of the regulations already adopted or under preparation is to encourage the usage of higher efficiency lamps and most notably CFLs in place of standard incandescent lamps and thereby eliminate a major source of energy waste.[15]

Amendment 12 to Canada's Energy Efficiency Regulations was published on November 9, 2011 in the Canada Gazette, Part II. The minimum energy efficiency performance standard (i.e. the effective phase-out) for 100 and 75 watt light bulbs will apply as of January 1, 2014 and for 60 and 40 watt light bulbs on December 31, 2014.

Under the same energy efficiency regulations, magnetic ballasts for T12 linear fluorescent fixtures were no longer available as replacement ballasts as of April 1, 2010.

As the phase-out date for the older inefficiency lighting technologies approaches, LDC's should anticipate that the free-ridership rates (arising from the program EM&V exercise) will skyrocket, i.e. participants no longer need an incentive to encourage such lighting retrofits – replacement lamps and ballasts will no longer be readily available in the marketplace, and customers will have little choice but to retrofit their installed base of lighting fixtures.

3.3.2.4 saveONenergy AUDIT FUNDING Participation Insight

Although Table 3-3 indicates that no AUDIT FUNDING applications were processed, London Hydro approved 13 applications covering 65 facilities. Since no incentive payments were made on these audits in 2012, the attribution to London Hydro will be included in the annual report for 2013 activities.

With the aim of protecting the customer's interest, London Hydro thoroughly reviews the audit reports for accuracy and completeness. The quality of the submitted audits is highly variable, and of the twenty-one audit reports submitted in 2012, all were returned to the audit firm for rework and resubmission at least once. One firm re-worked and resubmitted their audit report four times before it was accepted!

Presently, by the time the audit report is submitted to the LDC, the audit firm has been paid in full by the customer and the customer is seeking reimbursement from the OPA via the LDC. If this trend of deficient or marginal-quality audit reports

[15] International Energy Agency publication: *Phase out of incandescent lamps - Implications for international supply and demand for regulatory compliant lamps*; Paul Waide; April 2010.

continues, London Hydro may start advising applicants to only pay their audit firm an initial 50% with the final 50% payable when London Hydro has deemed the audit report to be complete and accurate.

3.3.2.5 saveONenergy EXISTING BUILDING COMMISSIONING Participation Insight

London Hydro uses a classical sales approach in all its CDM endeavors. This process consists of four steps, namely:

- Prospecting – the development of leads and beginning relationships that lead to uptake in CDM initiatives;
- Qualifying prospective participants – determining the interest and viability of a CDM initiative;
- Presenting – pitching a CDM initiative in a way that meets a participant's needs or adds value; and
- The Close – initiating the application process for a CDM initiative.

Participation throughout 2012 in this initiative in London matches the provincial uptake throughout 2012 – zero – because it is not readily possible to get to even the first step in the sales model.

The saveONenergy EXISTING BUILDING COMMISSIONING program is by definition limited to *commercial and institutional buildings that use chilled water systems for space cooling*. One of the challenges that London Hydro has discovered with this initiative is at the initial "*prospecting*" step. To date, no convenient method has been found to identify buildings that meet the eligibility requirements, and in the limited conversations at various local venues (e.g. LEDC trade shows), the decision-makers for various commercial and institutional buildings don't seem to know exactly what technology is used for space cooling in their respective buildings.

Clearly the LDC community needs to find an effective method of targeting prospective customers with this energy-efficiency opportunity.

In November 2012, London Hydro commenced discussions with CEM Engineering concerning methods that could be used to target prospective buildings. This led to a formal engagement in March 2013 and the delivery of their final report[16] in August 2013. This subject will be further discussed in next year's annual report of CDM activities and achievements.

3.3.2.6 HIGH PERFORMANCE NEW CONSTRUCTION Participation Insight

Throughout 2012, the uptake within London for the saveONenergy HIGH PERFORMANCE NEW CONSTRUCTION program was two (2) buildings, whereas the entire provincial uptake was only sixty-nine (69) buildings.

[16] CEM Engineering Report #2337-RPT-01, *Prequalifying Buildings in Downtown London for HVAC Recommissioning Potential*; August 21, 2013.

Note: Given that London's population is roughly 3% of the provincial population,[17] the local program uptake is on par with the provincial uptake rate (even though there is significantly more new building construction occurring in the Greater Toronto Area (GTA) and Ottawa.

In London Hydro's annual report of 2011 CDM activities and achievements,[18] it was noted that Supplementary Standard SB-10, *Energy Efficiency Supplement*, that amends the Ontario Building Code, came into effect for all buildings constructed after December 31, 2011. In essence, the energy-efficiency performance that was formerly associated with an ENERGY STAR qualified building or dwelling unit has become the baseline requirement of the Ontario Building Code.

The limited feedback that London Hydro has received is that the program is considered unduly administratively cumbersome and the available incentives are considered insufficient to greatly exceed the newer more stringent building code requirements.

3.3.2.7 saveONenergy PROCESS & SYSTEMS Participation Insight

Recall from the program description in Section 3.2.2.7 (starting on page 23 herein) that the saveONenergy PROCESS & SYSTEMS initiative is an umbrella program that encompasses a number of sub-programs, namely funding (or partially funding) Preliminary Engineering Studies, Detailed Engineering Studies, and Embedded Energy Managers. It also provides incentives for energy-efficiency projects and the installation of Monitoring & Targeting systems.

London Hydro's commentary is therefore divided into several topic areas as follows:

- Embedded Energy Managers –

  In 2012, three (3) of London Hydro's customers (1 industrial and 2 institutional customers) had funded Embedded Energy Managers in place. Another institutional customer received approval to employ an Embedded Energy Manager but has not yet been successful finding in finding a suitable candidate.

  The terms for the three Embedded Energy Managers are shown pictorially in Table 3-11 (on page 54 herein). Based on their successes, all three agreements were actually extended for a second year.

- Monitoring & Targeting Systems –

  In-plant Monitoring & Targeting Systems (also referred to in the literature as "*Energy Management Information Systems*") are not well understood by decision-makers and represent a significant investment. The fact that the provincial uptake has been zero is perhaps not surprising.

[17] Source: Ontario Ministry of Finance publication: *Ontario Fact Sheet September 2013*. See URL:: http://www.fin.gov.on.ca/en/economy/ecupdates/factsheet.html

[18] London Hydro Report EM-12-04, *Energy Conservation and Demand Management – Annual Report of London Hydro's 2011 Activities and Achievements*; September 2012; Section 3.6.7, *Energy Efficiency Supplement to the Ontario Building Code*; pg 52 – 53.

In the Fall of 2012, London Hydro prepared a business case[19] for presentation to the joint EDA/OPA Industrial CDM Working Group suggesting a variant of the present M&T program whereby the OPA would mitigate perceived risk to potential participants by advancing a portion of the overall incentive funding threshold for preparation of a value proposition for M&T Systems. Unfortunately, London Hydro was not able to obtain any traction from the OPA for this suggested program improvement.

Nonetheless, London Hydro understands that CDM is largely a sales exercise and success comes from eliminating participation barriers. As a consequence, London Hydro proceeded with a scheme whereby it would risk its own money to finance the preparation of M&T System Feasibility Studies (with predefined content requirements) by consultants. The participant would then reimburse London Hydro from the first incentive payment associated with their M&T System.[20]

It would appear that this approach is removing a very real participation barrier in the marketplace as London Hydro now has two (2) manufacturing sector customers that are deploying in-plant M&T Systems with in-service dates in 2013.

- Preliminary & Detailed Engineering Studies –

  Although Table 3-3 (on page 33 herein) indicates no activity with respect to Preliminary and Detailed Engineering Studies, one of each type were initiated. Specifically:

  - One (1) Preliminary Engineering Study (PES) for a large commercial refrigeration system was carried out in 2012, but reimbursement wasn't made until 2013. In this case, the participant elected to proceed expediently with their energy-efficiency opportunities as RETROFIT PROGRAM projects (as opposed to the contractually cumbersome PROCESS & SYSTEMS projects).
  - One (1) Detailed Engineering Study (DES) for a municipal wastewater treatment plant was started in 2012, but not completed and paid until 2013.

  Since, in both cases, payment wasn't made until 2013, and as such, neither will be classified as 2012 undertakings.

- Providing Incentives for Energy-Efficiency Projects –

  As noted in London Hydro's annual report of 2011 CDM activities and achievements,[21] several industrial customers that initially expressed great interest in the PROCESS & SYSTEMS abandoned further pursuit of the opportunities due

[19] London Hydro document: *saveONenergy PROCESS & SYSTEMS: Business Case to Adjust the Monitoring & Targeting Initiative*; 5 pages.

[20] Memorandum of August 30, 2012 to Vinay Sharma from Gary Rains, re: *saveONenergy PROCESS & SYSTEMS – Monitoring & Targeting Sub-Program; Advanced Funding of M&T Feasibility Study*.

[21] London Hydro Report EM-12-04, *Energy Conservation and Demand Management – Annual Report of London Hydro's 2011 Activities and Achievements*; September 2012; Section 3.3.2.7, *saveONenergy PROCESS & SYSTEMS Participation Insight*; pg 34 - 35.

to a variety of documented (and totally unnecessary) program barriers, e.g. solvency certificate, term of agreement, etc.

Although Table 3-3 indicates no capital incentive projects underway for 2012, there were two projects underway (one for an industrial compressed air system and the second for a plastics extrusion process) for which the participant won't receive incentives until 2013.

3.3.2.8 saveONenergy NEW HOME CONSTRUCTION Participation Insight

There was virtually no uptake on this program throughout the province during 2011 and 2012 (i.e. 7 homes province-wide in 2011 and 19 homes province-wide in 2012) for a number of reasons as identified a year ago in London Hydro's annual report of 2011 CDM activities and achievements.[22]

The OPA's flawed and cumbersome web-based user interface (where applications are entered by the homebuilder) was eventually replaced by a couple of Excel spreadsheets (i.e. New Home Construction *Preliminary Application* and *Final Application* Worksheets). Whereas it was understood by the LDC community in the Fall of 2011 that the requisite improvements to the participant interface would be implemented summarily, the replacement worksheets weren't introduced to the LDC community until March 2013! [23]

Given this late date, the outlook for program participation in 2013 is equally gloomy.

3.3.3 Participation in Pre-2011 Programs Completed in 2012

The participation level in pre-2011 CDM programs completed in 2012 by customers within London Hydro's franchise service territory is given in Table 3-4 below.

Table 3-4, Participation in Pre-2011 Programs Completed in 2012

Marketplace Name of CDM Initiative	Program Description	Activity Unit	Program Uptake / Participation Units
Electricity Retrofit Incentive Program (ERIP)	n/a	Projects	--
High Performance New Construction	n/a	Projects	3

London Hydro managed a considerable number of ERIP projects within multi-unit residential buildings (MURBs) both inside and outside of London on behalf of property managers and building owners that are either based in London or have a significant presence in London. These energy-efficiency upgrades were mostly the

[22] London Hydro Report EM-12-04, *Energy Conservation and Demand Management – Annual Report of London Hydro's 2011 Activities and Achievements*; September 2012; Section 3.3.2.8, *saveONenergy NEW HOME CONSTRUCTION Participation Insight*; pg 35.

[23] OPA saveONenergy LDC E-BLAST of March 11, 2013; re *Program News - New Home Construction Applications — Easier Than Ever*.

retrofit of hallway and suite lighting to ENERGY STAR qualified lighting fixtures. For the energy-efficiency project outside of London, the actual credit (in terms of both participation and demand/energy savings) would accrue to other LDC's.

3.3.4 Participation in Low-Income Programs

3.3.4.1 Participation Synopsis

The participation level in the saveONenergy HOME ASSISTANCE program by customers within London Hydro's franchise service territory is given in Table 3-5 below.

Table 3-5, Participation in saveONenergy HOME ASSISTANCE Program

Marketplace Name of CDM Initiative	Program Description	Activity Unit	Program Uptake / Participation Units
HOME ASSISTANCE	Page 27	Units	330

As earlier noted in Section 3.2.3 (starting on page 26 herein), not all social and assisted housing meets the eligibility requirements for the saveONenergy HOME ASSISTANCE program, but instead can realize energy-efficiency opportunities under the saveONenergy RETROFIT PROGRAM.

Although the saveONenergy HOME ASSISTANCE program was theoretically available to LDCs in Q2 of 2011, London Hydro couldn't see how the program could be executed with any degree of effectiveness, didn't subscribe to the program until August, and didn't roll out the program to eligible customers during the remaining months of the year. In hindsight, this was a wise choice as a core element of the program (i.e. the Ontario Power Authority's *Field Audit Support Tool*) was flawed and wasn't properly corrected until late summer 2012.[24] Furthermore, there was no payment process in place for LDC's to recoup their incurred costs for installation contractors and energy-efficient product again until late summer of 2012.

London Hydro has a philosophy of in-house program management for all CDM programs. This allows the utility to maintain a high quality and superior engagement with its customer base.

Note: London Hydro has partnered with Parachute Software to develop iPad-based work management software that will revolutionize the execution effectiveness of this CDM program by all parties (by significantly overcoming the administrative overhead that the OPA incorporated into the design of the initiative).

Roll-out of the saveONenergy HOME ASSISTANCE program within London Hydro's service territory was delayed until the Fall 2012 (for reasons stated above), starting off slowly with "*friendly*" customers to field test and validate the complete

[24] Ontario Power Authority E-Blast dated August 24, 2012.

end-to-end work management software, procedures, contractor knowledge, and any other glitches before program ramp up.

3.3.4.2 saveONenergy HOME ASSISTANCE Participation Insight

To overcome many of the numerous program design shortcomings of the saveONenergy HOME ASSISTANCE program that were identified in London Hydro's annual report of 2011 CDM activities and achievements,[25] and to execute the program in an effective manner, London Hydro partnered with Parachute Software to develop iPad-based work management software (with the working title "DRAGON") that revolutionizes the execution effectiveness of this CDM program by all parties (by significantly overcoming the administrative overhead that the OPA incorporated into the design of the initiative).

To maximize the value to participating customers, London Hydro partnered with:

- London Fire Department – to replace expired or faulty smoke detectors, replace the batteries in units with depleted batteries, and to provide fire safety information; and

  Note: The data collected to date shows that 90% of low-income dwellings are under-protected from a fire safety perspective.

- City of London – to install water conservation measures (e.g. low-flow toilets, faucet aerators, etc.) and carry out minor plumbing repairs (e.g. fixing leaking toilets and faucets)

London Hydro's contractor also performs a basic electrical safety check of the premise and repairs broken lighting fixtures, replaces broken covers on receptacles and switches, etc.

London Hydro has also engaged a number of social agencies (e.g. Salvation Army, Ontario Works, etc.) to identify eligible customers.

Towards the end of 2013, London Hydro intends to publish a case study for this CDM program so that LDC's in other jurisdictions can benefit from London Hydro's approach, findings, lessons learned, accomplishments, etc.

3.4 Spending

There are various funding streams available to support the provincial Tier 1 CDM programs. Some monies are available to London Hydro to support its administrative and marketing efforts, some monies are channeled through London Hydro to its designated contractors that provide for example direct install services, and finally significant monies are routed through London Hydro to customers as incentive payments for deploying energy-efficient technologies.

[25] London Hydro Report EM-12-04, *Energy Conservation and Demand Management – Annual Report of London Hydro's 2011 Activities and Achievements*; September 2012; Section 3.3.4.2, *saveONenergy HOME ASSISTANCE Participation Insight*; pg 37 – 38.

The various funding / spending streams are individually described in the following subsections.

3.4.1 Program Administration Budget (PAB) Spending

LDC's such as London Hydro receive annual funding from the Ontario Power Authority for the administration of the various provincial CDM programs in accordance with a formula that considers the numbers of customers within each tariff classification within the LDC's service territory. This funding is to cover LDC expenses directly related to the execution of the various provincial CDM programs, e.g. program management labour costs, marketing and promotion, legal, procurement, reporting and information technology costs, etc.

Table 3-6 below shows London Hydro's expenditures incurred throughout 2011 and 2012 to operate the provincial CDM programs. Column 2 shows the available funding threshold and Column 4 shows London Hydro's actual 2012 expenditures.

Table 3-6, CDM Program Expenditures

Target Customer Sector	Available 2012 PAB Funding	Annual Expenditures				Cumul've Spending
		2011	2012	2013	2014	
(Col 1)	(Col 2)	(Col 3)	(Col 4)	(Col 5)	(Col 6)	(Col 7)
Residential	$985,631	$140,841	$227,380			$368,221
Commercial	$1,075,790	$797,212	$810,444			$1,607,656
Industrial	$156,400	$60,294	$141,159			$201,453
Low-Income	$105,710	$37,652	$184,368			$222,020
Total:	$2,323,531	$1,035,999	$1,363,351			$2,399,350

In Column 4 of Table 3-6, it will be seen that expenditures for the "*low-income*" customer sector exceeded the "*available 2012 PAB funding*" allocation. This was largely due to the one-time cost associated with development of iPad-based work management software for the saveONenergy HOME ASSISTANCE program. Under the prevailing agreement with Parachute Software (the developer of the product), other LDC's can deploy this same product, but will pay a "per transaction" fee that will be shared by London Hydro and Parachute. As such, as more and more LDC's and their services providers use this software, it is expected that offsetting credits will be posted in 2013 and 2014.

A more comprehensive tabulation of expenses was provided to the Ontario Power Authority pursuant to Article 8.1, *LDC Reporting Requirements*, of the *2011 – 2014 Master CDM Program Agreement*.

PAB is based on actual expenditures, rather than approved budget. As such, any unspent budget will be returned to the OPA.

3.4.2 Participant Based Funding (PBF) Spending

Participant Based Funding (PBF) is to cover the costs of program delivery which are directly related to the actual number of participants in a CDM program (e.g. building audits, equipment and installation for '*direct install*' initiatives, operation and maintenance {O&M} costs for load control devices), excluding customer incentives.

London Hydro's 2012 PBF spending is given in Table 3-7 below.

Table 3-7, Breakdown of Participant-Based Funding Expenditures

CDM Initiative	Annual Expenditures			
	2011	2012	2014	2014
saveONerergy FOR HOME Programs:				
• peaksaver PLUS	--	--		
saveONenergy FOR BUSINESS Programs:				
• SMALL BUSINESS LIGHTING	$2,900	$700		
Low-Income Programs:				
• HOME ASSISTANCE	--	--		
Other CDM Programs:				
Total Annual Incentives:	$2,900	$700		

In London, the *peaksaver* PLUS program was not in market (for reasons identified in Section 3.2.1.3 herein). As such, there was no 2012 participant-based spending.

For the saveONenergy SMALL BUSINESS LIGHTING initiative, the auditor assessment charges were categorized as a PBF expenditure in 2011 and partway through 2012. For the remainder of 2012, since the small amounts weren't deserving of special accounting treatment, the auditor assessment charges were considered an element of "*PI*".

3.4.3 Participant Incentives (PI)

Participant Incentives (PI) is to cover the cost of reimbursing LDCs for any cash incentives provided to program participants. This funding is essentially a flow-through from the OPA to program participants, through the LDCs.

The accumulated incentive amounts provided to customers that participated in the various CDM programs is presented in Table 3-8 by CDM program name.

Table 3-8, Breakdown of Incentives Paid to Customers

CDM Initiative	Participant Incentives			
	2011	2012	2014	2014
saveONerergy FOR HOME Programs:				
	--	--		
saveONenergy FOR BUSINESS Programs:				
• SMALL BUSINESS LIGHTING	$27,384	$75,624		
• RETROFIT PROGRAM	$395,834	$1,777,403		
• AUDIT FUNDING	$0	$21,812		
• EXISTING BUILDING COMMISSIONING	$0	$0		
• HIGH PERFORMANCE NEW CONSTRUCTION	$0	$4,048		
• PROCESS & SYSTEMS	$0	$0		
• NEW HOME CONSTRUCTION	$0	$0		
Low-Income Programs:				
	--	$23,752		
Other CDM Programs:				
• 2010 ERIP Carry-Over	$3,217,118	$132,536		
Total Annual Incentives:	$3,640,336	$2,035,175		

Note: The monies shown in the above tabulation relate only to energy-efficiency projects completed and paid for in 2012. If, for example, a project was completed in December 2012 but the incentive wasn't paid until early January 2013, then the "*participant incentive*" will not be included in the above tabulation. Also, for reasons outlined in Section 3.6.2, participant incentives related to some *2010 ERIP Carry-Over* projects won't be listed until 2012 or later.

The monetary amounts given in Table 3-8 do not include the Harmonized Sales Tax (HST).

For some mass-market CDM programs, such as the saveONenergy HEATING & COOLING INCENTIVE initiative, the participating customer does receive a monetary incentive from London Hydro for having their chosen HVAC contractor install an ENERGY STAR qualified central air conditioner or a furnace equipped with an energy-efficient ECM blower motor. However, such incentives are provided to the participating customer directly from the Ontario Power Authority (or their agent) and as such are not included in the tabulation above.

3.4.4 Capability Building Funding (CBF)

Capability Building Funding (CBF) is to cover the costs of accessing and/or delivering enabling initiatives (e.g. account manager funding; building operator

training) which support and increase program participation and which are not included in PAB.

London Hydro's 2011 CBF spending is given in Table 3-9 below.

Table 3-9, Breakdown of Capability Building Funding Expenditures

CDM Initiative	Participant Incentives			
	2011	2012	2014	2014
saveONerergy FOR HOME Programs:				
	--			
saveONenergy FOR BUSINESS Programs:				
• PROCESS & SYSTEMS	$0	$116,294		
• SMALL BUS. LIGHTING	$6,732	$9,999		
Low-Income Programs:				
	--			
Other CDM Programs:				
	--			
Total Annual Incentives:	$6,732	$126,293		

Note: The dollars associated with the saveONenergy SMALL BUSINESS LIGHTING initiative relates to incentive monies paid to the assessor / installation contractor in instances where the participating customer elects to undertake energy-efficiency upgrades beyond the $1,000 threshold. In future annual reports, this amount may be relocated to another table if such direction is received.

3.4.5 Summarized CDM Spending for 2012

The expenses incurred by London Hydro and the monies channeled through London Hydro to participating contractors for direct install programs and to participating customers in the form of incentive monies are summarized in Table 3-10 below:

Table 3-10, Overall 2012 Spending for Provincial CDM Programs

Initiative	Program Administrative Budget	Participant Based Funding	Participant Incentives	Capability Building Funding	Total
(Col 1)	(Col 2)	(Col 3)	(Col 4)	(Col 5)	(Col 6)
saveONenergy FOR HOME Programs:					
	$227,380	--	--	--	$227,380
saveONenergy FOR BUSINESS Programs:					
	$951,603	$700	$1,878,887	$126,293	$2,957,483
Low-Income Programs:					
	$184,368	--	$23,752	--	$208,120
Other CDM Programs:					
	$0	--	$132,536	--	$132,536
					$3,525,519

The above costs are insufficient to carry out any type of economic assessment (e.g. Ratepayer Impact Measure Test) of the CDM programs delivered by London Hydro. The costs borne by the OPA for the contractors associated with several of the consumer programs (e.g. saveONenergy FRIDGE & FREEZER PICKUP, saveONenergy HEATING & COOLING INCENTIVE, saveONenergy COUPON EVENT, etc.), the firms that carry out the CDM program evaluation (i.e. EM&V) work, and the provincial advertising of programs are unknown to London Hydro.

3.5 Evaluation

The Ontario Power Authority has retained a number of program evaluation contractors to assess the 2012 performance of each of the provincial CDM programs. The key evaluation findings included as Appendix D herein have been provided by the Ontario Power Authority to the community of LDCs. It is understood that the actual reports prepared by the various EM&V contractors will not be available until after September 30th, 2013.

3.6 Additional Comments

A number of challenges have arisen, all outside of London Hydro's control, which will certainly negatively affect London Hydro's ability to fulfill its obligations with respect to CDM performance. These matters are outlined below.

3.6.1 Challenges with the CDM Delivery Model

As noted in London Hydro's annual report of 2011 CDM activities and achievements,[26] there was emerging evidence of a fundamental flaw with the current CDM delivery framework. These early warning signs became more significant

[26] London Hydro Report EM-12-04, *Energy Conservation and Demand Management – Annual Report of London Hydro's 2011 Activities and Achievements*; September 2012; Section 3.6.1, *Emerging Challenges with the CDM Delivery Model*; pg 44 -46.

throughout 2012 and it is now abundantly clear that the prevailing CDM delivery model doesn't work (just like classical organizational theory suggests).

The underlying structural problem with the CDM delivery framework is repeated below for convenience of reference.

From the perspective of organizational effectiveness (i.e. the ability to get things done), authority, responsibility, accountability and resources are inter-related.

- Authority is the right or power assigned to an executive or a manager in order to achieve certain organizational objectives.
- Responsibility is the duties assigned to a position or executive. The person accepting responsibility is accountable for the performance of assigned duties.
- Accountability is the answerability for performance of assigned duties to discharge the responsibility.

An effective organization will have these fundamental elements, as depicted in Figure 3-27 below, within the corporation's management framework. For example, in London Hydro's case, the CDM Department needs to be staffed with the appropriate resources to accept accountability and responsibility for fulfilling its CDM targets. Should issues arise involving other departments, the CEO who has a shared responsibility to meet the regulated CDM targets has the authority to remedy the matter in a timely fashion.

Figure 3-27, Optimal Organizational Relationships

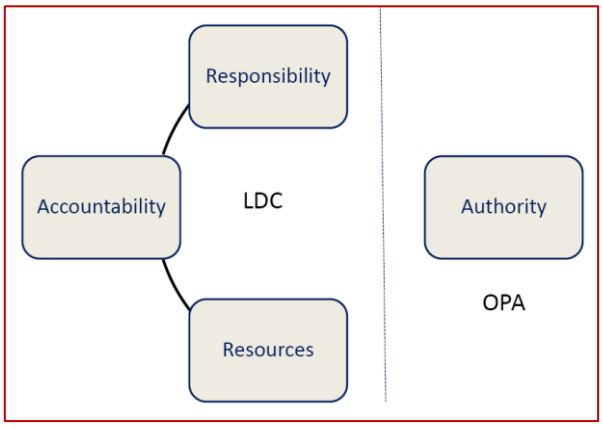

Figure 3-28, Present CDM Delivery Model

Unfortunately the CDM delivery model in effect is more aptly represented by Figure 3-28 above. The LDC has responsibility and accountability for applying sufficient resources to deliver CDM programs and meeting its respective CDM targets, but the LDC has no authority whatsoever to remedy significant shortcomings with the OPA-contracted province-wide CDM programs.

London Hydro has done all that it can to improve the CDM programs via active participation in the EDA's CDM Caucus, and the Industrial Working Group, the

Commercial Working Group, the Residential Working Group, and the Low-Income Working Group. These endeavors continue to this day.

3.6.2 The Non-Responsive Change Management Protocol

As noted in London Hydro's annual report of 2011 CDM activities and achievements,[27] London Hydro has enjoyed various successes in the CDM marketplace in recent years because the organization recognizes that energy conservation is primarily a "*sales*" activity (as opposed to a "*technical*" or "*legal*" undertaking). There are many facets to the sales activity, including but not limited to "*removing all barriers to customer participation*", "*promoting opportunities using language and concepts that the target customer understands*", "*cross-pollinating one program with another*", etc. Unfortunately, too many of the CDM programs developed by the Ontario Power Authority fail to appreciate and put effective sales concepts at the forefront of program design.

With any new endeavor that is launched to the marketplace, whether it is a new CDM program, a new corporate website, or a new service offering, no one really expects perfection "*out of the gate*". However, when an unexpected participation barrier is discovered, or an operational shortcoming is encountered, successful organizations are those that are very nimble and address such issues in a most expedient manner.

Unfortunately, the OPA's overly-legalistic approach to CDM program administration at the outset became the foundation for their change management process as depicted in Figure 3-29 below.[28]

[27] London Hydro Report EM-12-04, *Energy Conservation and Demand Management - Annual Report of London Hydro's 2011 Activities and Achievements*; September 2012; Section 3.6.8, *Fundamental Sales Tactics – The Overlooked Element in Program Design*; pg 53 – 55.

[28] OPA webinar presentation of December 12, 2012, *Overview of V3 LDC/OPA Agreement*; Slide #3, *Review of the Change Management Process*.

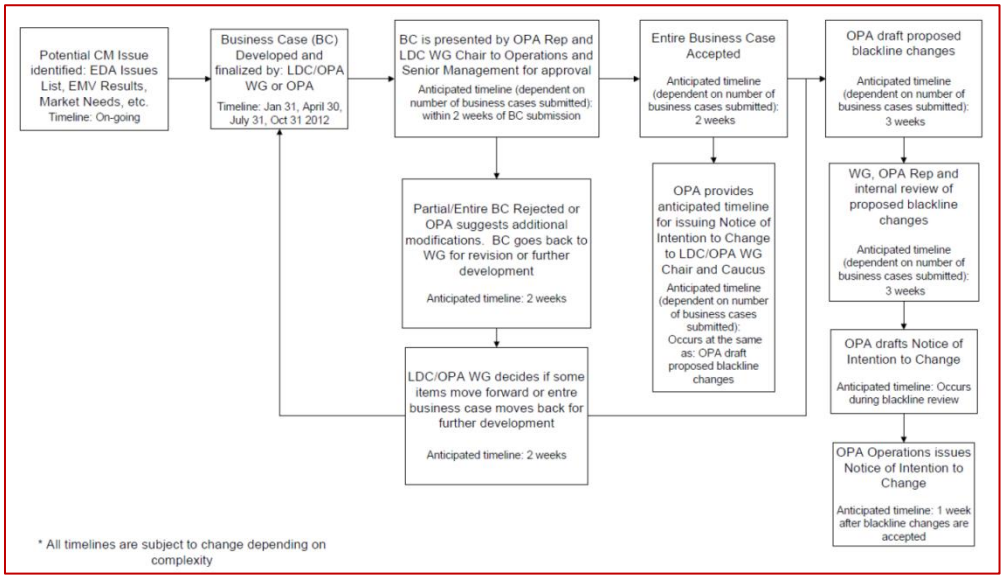

Figure 3-29, Flowchart for the OPA's Change Management Process

It will be seen from the flowchart that there are only four windows each year when business cases can be submitted, and the minimum elapsed time from submission of a business case to OPA issuing a *Notice of Intention to Change* is 10 weeks or greater.

The flowchart presents the most optimistic case and there will be several instances where needed program changes took more than a year to be implemented! This is hardly the hallmark of a "*nimble*" organization.

The non-responsive change management process is yet another in a continuum of examples of LDCs capability to achieve their full CDM potential being stymied by overly-bureaucratic and ill-conceived program administration requirements that add cost and delay, dissuade participation and provide no apparent benefit in terms of risk management.

3.6.3 The 2010 ERIP Carryover Projects Payment Hangover

From the outset of the commercial CDM programs, London Hydro has elected to pay incentives and contractors up-front (as oppose to waiting until the reimbursement monies were received from the Ontario Power Authority). Quick payment would demonstrate to customers that normal participation barriers, namely surety and timeliness of payments, do not exist in London. London Hydro accepted that there would be (in theory) immaterial carrying costs for the pre-payments. However our experience has been much different.

In the early years and up until recent electronic payment process associated with the saveONenergy RETROFIT PROGRAM, payments were handled seemingly haphazardly and with not enough attention. Insufficient processes and under-trained and inexperienced staff seemed to be the challenges, combined with high turnover of temporary staff. There was not a resource where the LDCs could seek assistance with invoicing materials and poor processes with which to follow for prompt and efficient

payments. Had there been a robust process, minor errors and poor interpretation could have been avoided. It has been London Hydro's (and other LDC's) experience that payments have been months and in some cases years in arrears. It has up until recently a topic of much discussion at the EDA's CDM Caucus. It is obvious based on conversations with payment clerks that wholly insignificant resources were directed to payments. In most cases hundreds of thousands, and in London Hydro's (and others) case, millions were left outstanding for a year or longer.

London Hydro has a reputation in the LDC industry for executing large multi-jurisdiction projects. Figure 3-30 to the right illustrates the supporting documentation associated with one such project.

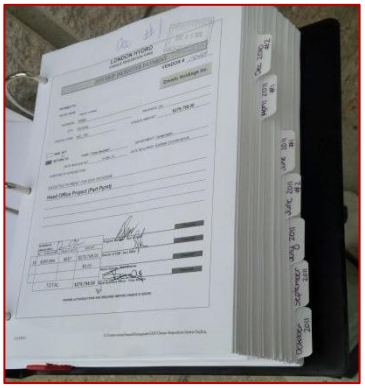

Figure 3-30, Documentation for Major ENERGY STAR Lighting Fixture Retrofit Project

The delinquent payments became so acute that London Hydro undertook two distinct actions, namely:

- On May 4, 2012, London Hydro formally issued thirty (30) *Notices of Default* (NOD) to the Ontario Power Authority representing approximately $6.5M in outstanding reimbursements (with outstanding invoices dating as far back as May 5, 2010).
- Cease paying participants until the monies were received from the OPA.

The following is provided as a status update on these Notices of Default:

- Payments associated with these NOD's totaling about $5M was subsequently received from the OPA throughout the second half of 2012. During the first half of 2013, a further $776K was received after the associated issues were satisfactory resolved, and London Hydro formally retracted eleven (11) NOD's.
- Of the remaining nineteen (19) NOD's, some have been partially resolved and paid, and work / issue resolution continues to clear these remaining NOD's. The outstanding balance is $675K, representing $510K in customer incentives and $165K in reimbursement of taxes.

With respect to London Hydro's temporary change in payments philosophy, London Hydro ended up (through no fault of its own) damaging its relationship with motivated customers that will take much time to repair. At the time, the OPA wanted to create a marketing and communication piece for the province-wide RETROFIT PROGRAM based on a hugely successful project at over 50 buildings (in this case the Drewlo Holding project, that is profiled in London Hydro's annual report of 2011 CDM achievements and activities). London Hydro presumed that OPA would reimburse faster if Drewlo Holdings was used to cajole the OPA's finance department. The utilities were competing for attention with the common thought that

the squeakiest wheel would get the grease. It was a sound theory but in the end only served to damage London Hydro's reputation.[29]

It is worth knowing that if London Hydro had applied its regulated late payment charges to the delinquent accounts at the time the Notices of Default were issued, the financial penalty to the OPA would have been $580K. In essence, London Hydro's customers are subsidizing the operation of the Ontario Power Authority.

To hold LDC's harmless against the negative impacts of future delinquent payments, London Hydro contacted the chair of the EDA's CDM Caucus with a formal request to amend the Master CDM Program Agreement to apply the LDC's regulated late payment charges in cases whereby the OPA fails to make payment pursuant to the terms of the Master CDM Program Agreement.[30] The informal reply indicated that the EDA had sought such remedy at the outset, but such a notion was rejected outright by the OPA.

This is yet another flaw in the prevailing CDM delivery framework. Fairness needs to be reciprocal. In a normal owner / contractor arrangement, the contractor can negotiate balanced terms or walk away from unfavorable terms. In this case, since the government has imposed CDM targets, LDC's are effectively unable to walk away from the provincial CDM programs.

3.6.4 PROCESS & SYSTEMS – Another Non-Robust Business Process

As was previously described in Section 3.2.2.7 (starting on page 23 herein), the saveONenergy PROCESS & SYSTEMS initiative provides funding for on-site full-time Embedded Energy Managers within eligible customer facilities. Such Embedded Energy Managers basically have a performance contract wherein they are required to achieve a defined minimum level of annual demand reduction and annual energy savings; however 30% of savings must be achieved without third party incentives.

London Hydro engaged the first Embedded Energy Manager in the province. Being pioneers, London Hydro had to work with both the industrial customer and the Ontario Power Authority to establish a template for reporting the "*non-incented*" demand reductions and energy savings in a manner and format that would not be burdensome for the customer but yet would be valuable to the Ontario Power Authority. This endeavor was quite successful and resultant template was distributed to the LDC community to be used as a reference document by all other Embedded Energy Managers throughout the province.[31]

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[29] Letter of November 9, 2012 to Hans Schreff (London Hydro) from Allan Drewlo (Drewlo Holdings); re: *Retrofit of Suite Lighting with ENERGY STAR Lighting Fixtures; Outstanding Incentive Payments for Completed Work*.

[30] Letter dated May 16, 2012 to Eileen Campbell (Chair – EDA CDM Caucus) from Gary Rains (London Hydro); re: *Proposed Change to Master CDM Agreement – Late Payment Charges for "OPA Event of Default"*.

[31] Refer to OPA's E-Blast of February 22, 2013 announcing a webinar on February 27th entitled: *saveONenergy Update Webinar: Spillover – Documenting Non-Incentivized Savings*.

However, it is becoming abundantly clear that the manner in which the data is stored and manipulated within the Ontario Power Authority isn't robust. In spite of expending significant effort throughout 2012 to ensure that the quarterly reports issued by OPA were correct, the OPA's "*Final 2012 Report of Verified Results for London Hydro*" is completely divorced from reality (as is the Q1 – 2013 preliminary results report). Specifically:

- Table 3A within the Q4 – 2012 report shows the following preliminary results: 267 kW of net annual peak demand savings and 8,432,735 kWh of net cumulative energy savings;
- Table 1 of the "*Final 2012 Report of Verified Results for London Hydro*" shows the following results: 1 kW of net annual peak demand savings and 91,335 kWh of net cumulative energy savings; and
- Table 3A within the Q1 – 2013 report shows the following 2012 achievements (which are the starting point for defining the preliminary 2013 results): 40 kW of net annual peak demand savings and (358,340 kWh x 3 years =) 1,075,020 kWh of net cumulative energy savings.

London Hydro has three (3) Embedded Energy Managers, one whose facilities are entirely within London Hydro's franchise service territory, and the other two with facilities both within and external to London Hydro's service territory. The period of their respective Agreements and the non-incented energy savings / demand reductions that should have been attributable to London Hydro are depicted in Table 3-11 below.

Table 3-11, Non-Incented Savings for Embedded Energy Managers

Contract Periods and Non-Incented Savings (in London)																		
Year:	2011			2012												2013		
Month:	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M
EEM #1:	83.7 kW / 887,945 kWh														388 kW / 4.03 GWh			
EEM #2:										148 kW / 493,471 kWh								
EEM #3:										87 kW / 1,150,307 kWh								

Note: For EEM #1, the non-incented savings are being quantified now and will occur in final quarter of the renewed contract, i.e. in 2013. As such, the values shown above are approximations at this time.

Embedded Energy Managers are contracted on a one-year basis with renewal provisions provided there are more opportunities and the Embedded Energy Manager is meeting the defined performance metrics. Since, as depicted in Table 3-11 above, the contract durations for Embedded Energy Managers don't conveniently align with the calendar year, it becomes necessary to attribute non-incented savings that usually span two calendar years to a particular reporting year. For example, in Table 3-11

above, the initial contract for EEM #1 was in effect from November 4, 2011 to November 3, 2012, after which it was renewed for another year. For reporting 2012 non-incented savings, therefore, one would have to extract the actual 2012 achievements that occurred during the lifetime of the first agreement and the actual 2012 achievements that occurred during the lifetime of the renewed or second agreement.

London Hydro would peg the overall 2012 non-incented demand reductions and energy savings obtained by the three (3) Embedded Energy Managers as 214.7 kW and 1,255,251 kWh (the latter translating into 3,765,753 kWh of net cumulative energy savings). Consequently, London Hydro has been short-changed by (214.7 kW – 1 kW =) 213.7 kW in non-incented demand reduction and (1,255,251 kWh – 30,445 kWh =) 1,224,806 kWh in 2012 energy savings, or 3,674,418 kWh of cumulative energy savings in the OPA's *Final 2012 Report of Verified Results for London Hydro.*

From London Hydro's perspective, the OPA's erratic reporting of "*non-incented*" demand reductions and energy savings for London Hydro's Embedded Energy Managers suggests a serious robustness problem with the OPA's data systems that is especially disconcerting since achievement of CDM targets is a condition of each LDC's license.

3.6.5 Demand Response – The Outcome of a Significant Landscape Change

In London Hydro's annual report of 2011 CDM activities and achievements, it was noted that once south-western Ontario was declared a "*discount zone*" for demand response, interest by both customers and demand response aggregators dried up.[32] This situation has been further aggravated by the elimination of the "*Option B (200 h)*" participation option in January 2013.[33]

As can be seen in Figure 3-31 below that participation (as depicted by the blue line) initially increased at an acceptable rate until September 2011 after which participation interest abruptly stalled. The average contracted demand response capacity will be seen to be about 200 kW per participant.

[32] London Hydro Report EM-12-04, *Energy Conservation and Demand Management – Annual Report of London Hydro's 2011 Activities and Achievements*; September 2012; Section 3.6.4, *Declaration of Discount Zone for Demand Response*; pages 48 – 50.

[33] Refer to saveONenergy E-BLAST: January 25, 2013; re: *Demand Response aggregators update*.

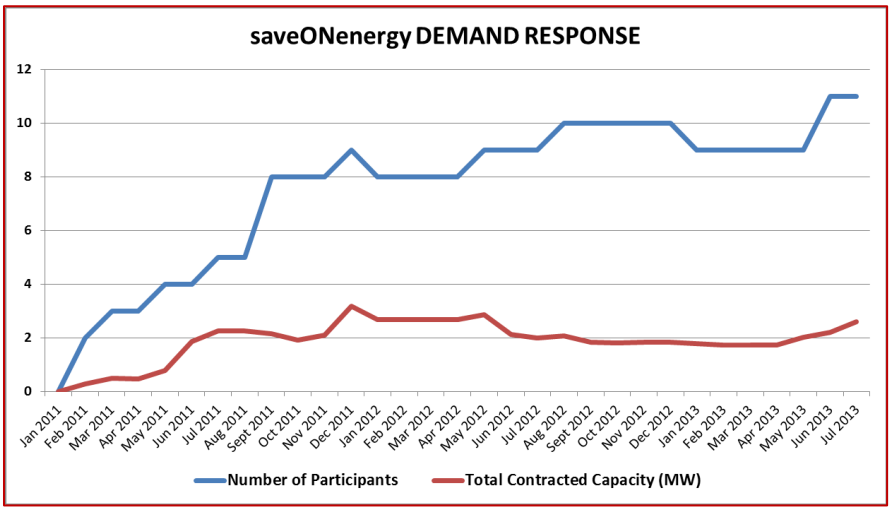

Figure 3-31, DEMAND RESPONSE Activity in London

Up until the Fall of 2011 several demand response aggregators seemed to be actively pursuing customers in the London area and there were frequent meetings with London Hydro. Nowadays communications with the aggregators are very infrequent and framed more as courtesy calls than to discuss a potential customer. The marketplace is sending a very clear signal that there aren't sufficient incentive monies to attract customer interest, there isn't a sufficient revenue opportunity for aggregators to justify the expended effort for little or no uptake, or both.

Note: It will be recalled from Section 3.2.2.1 herein that, with respect to the saveONenergy DEMAND RESPONSE program, the three (3) demand response aggregators authorized by Ontario Power Authority have primary responsibility for qualifying and enrolling customers; an LDC's role is limited to providing support to the Aggregators.

In August and September of 2012, London Hydro was approached by representatives of Negawatt Business Solutions, a US-based provider of various demand response programs. It was understood that this company had conditionally enrolled three (3) unnamed businesses within London Hydro's franchise service territory and were both introducing themselves and inquiring about London Hydro's policies concerning interval-style revenue meters. The condition was that Negawatt would have to be authorized by the Ontario Power Authority to provide demand response aggregation services. The Negawatt representative was under the impression that they would be receiving such authorization imminently.[34]

When the subject of authorizing Negawatt Business Solutions was raised within joint EDA/OPA Industrial CDM Working Group meetings in late 2012 and early 2013, it was understood that firstly the OPA wouldn't simply authorize Negawatt – rather, in the interest of fairness, an RFP call would have to be issued – and secondly, there was no remaining DR capacity within existing Ministry directives to offer to the successful RFP respondent. A year has now elapsed and there has been no RFP

[34] E-mail of September 7, 2012 to Gary Rains (London Hydro) from Cecil Shewchuk (Negawatt); Re: *Demand Response*.

issued. It is highly likely that Negawatt has given up on the Ontario demand response aggregation marketplace.

3.6.6 The Behind-the-Meter Load-Displacement Generation Debacle

Many food processing and other industrial consumers have significant thermal requirements, whether it be in the form of steam energy systems, or natural gas-fired boilers associated with pasteurizing beer, separating corn and other grains into its component parts to create a myriad of value-added products. Other industrial customers create substantial quantities of waste heat.

The Association of Major Power Consumers in Ontario (AMPCO) frequently makes the claim that: *Industrial customers in Ontario pay the highest cost of delivered power among all the manufacturing jurisdictions in Canada and the United States*.[35] Certainly one method by which some manufacturing sector customers can improve their energy efficiency (and hence their overall competitiveness) is via in-plant cogeneration systems (to produce both thermal and electrical power from their natural gas consumption) and waste heat generation systems (that convert low grade waste heat into electrical energy). Such an approach would certainly also be embraced by the Environmental Commissioner of Ontario.[36]

Item 6(h) of the Minister of Energy & Infrastructure's directive of March 31st, 2010 to the Ontario Energy Board recognized a variety of load reduction techniques as contributing towards an LDC's targets. The specific exclusion is generation projects that are associated with the Ontario Power Authority's Feed-In Tariff (FIT) program for renewable energy.[37]

For LDC's with customers that wished to pursue load displacement generation projects, the unfortunate story that follows is one of LDC's stymied by OPA indecision and inaction and consequently customers left in the dark regarding the status of their proposed generation project. Specifically:

- Schedule E, *Eligibility Criteria*, within Exhibits A, B, and C of Schedule D-1 to the Master CDM Program Agreement, *Process and System Upgrades Initiatives 2011 – 2014*, stipulates that fuel-switching projects and generation projects must be approved in writing by the LDC, but no guidance is provided to the LDC concerning acceptance parameters (e.g. if an LDC could technically interconnect a 30 MW cogeneration system to its distribution system, would this be an eligible project?).

[35] Source: AMPCO's Response to IESO Consultation SE-106 Considering Second Draft Report by Navigant Consulting.

[36] Environmental Commissioner of Ontario annual report: *A Question of Commitment: Review of the Ontario Government's Climate Change Action Plan Results*; December 2012; pg 76.

[37] Minister of Energy & Infrastructure directive of March 31, 2010 posted electronically on Ontario Power Authority website at URL: http://www.powerauthority.on.ca/sites/default/files/page/17069_minister_directive_20100423.pdf

- In February 2012, the Ontario Power Authority released policy guidelines for the acceptance of load displacement generation projects under the saveONenergy PROCESS & SYSTEMS initiative.[38] Because there is a limited budget available for capital incentives in the PROCESS & SYSTEMS initiative and these projects are expected to be very large and capital intensive, the OPA intended to limit the amount of generation accepted to 25 MW.

- In July 2012, the Chair of the Electricity Distributors Association's *Industrial CDM Working Group* wrote to the OPA seeking clarification on a number of items related to load-displacement generation applications.[39] It was the general understanding that the applications for natural gas-fired load displacement generation projects (representing 27 MW of capacity) remained in an indeterminate state within the OPA, i.e. they weren't being released to the OPA's designated Technical Reviewer for processing. It was suggested that, perhaps on a go-forward basis, industrial consumers and LDC's could be advised that no further applications for load displacement generation projects would be accepted (due to the reported surplus base-load generation issue in the province) but those applications already in the queue should be processed.

- Again, as is quite typical, no response was received from the OPA. This situation simply strained relationships between certain customers and their LDC's – the customers were reasonably expecting status updates concerning their load displacement generation project. Unfortunately there was nothing that the LDC could say due to a complete information vacuum from the OPA.

- In November 2012, OPA officials advised attendees of an OPA Management Teleconference that the agency has put a pause on natural gas-fired combined heat & power (CHP) projects in order to consider their impact on conservation and the saveONenergy PROCESS & SYSTEMS program.[40]

- Finally, in July 2013 (i.e. a full year later, and 2½ years into a 4 year program), the OPA electronically notified the LDC community[41] that:

  All pending and future applications for customer-based generation natural gas projects under PSUI will be subject to the following terms:

  - *OPA will consider the project's value to the electrical system, at a provincial and/or regional level*
  - ***:***

[38] Attachment to OPA E-Blast of February 8, 2012; *OPA Policy Guidelines for Acceptance of Generation Projects under PSUI*.

[39] Letter of July 6, 2012 to Andrew Pride (OPA's Vice President – Conservation) from Jerry Van Ooteghem (Chair, Industrial Working Group).

[40] Environmental Commissioner of Ontario report: *Restoring balance – Results; Annual Energy Conservation Progress Report – 2011 (Volume Two)*; January 2013; Section 3.1.4.1, *Cogeneration Funding Through Conservation Programs*; pg 32.

[41] Ontario Power Authority E-Blast dated July 11, 2013

- By this time, London Hydro had three (3) customers pursuing behind-the-meter load displacement generation projects. London Hydro certainly did not want any of its customers to expend more internal resources and consulting dollars developing a proposal for a behind-the-meter load displacement generation project and then going through the charade of submitting a saveONenergy PROCESS & SYSTEMS application if it is known at the outset that there is no reasonable prospect of achieving OPA approval for the proposed project. As such the following question was posed to OPA:[42]

  > *Can you provide a simple "Yes" or "No" answer to the following question?*
  >
  > > *Is there anywhere within London Hydro's franchise service territory (or even within south-western Ontario) where behind-the-meter natural gas-fired generation would be deemed by OPA to provide value to the interconnected provincial electricity system?*

  As is typical, there has been no response to this letter nor to a reminder e-mail.

In spite of the vague proviso, there is considerable administrative and engineering time and effort (by the customer, the customer's consultant and contractors, the LDC, the ESA, and the provincial transmitter) associated with the interconnection of a generator to electricity distribution system (pursuant to Appendix F, *Process and Technical Requirements for Connecting Embedded Generation Facilities*, of Ontario Energy Board publication *Distribution System Code*). Specifically:

- It is firstly necessary to carry out a Connection Impact Assessment (CIA) to ensure that the additional generation won't (a) cause short-circuit conditions beyond the short-circuit withstand and interrupting ratings of the protective equipment used on the distribution system or within the supply transformer station, and (b) won't give rise to system stability issues on the provincial transmission grid.
- Pending a favourable outcome of the CIA phase, the parties usually then turn their attention to a number of interconnection design matters, e.g. often necessary revisions to the customer's revenue metering system, revisions to the protective relays in the supply transformer station, the design of a teleprotection system, the provision of SCADA equipment, and the development of generator commissioning plan and Operating Agreements.

Only with the CIA completed and much of the design phase completed, can the customer proceed with procurement, installation and commissioning of their generation facilities which usually include many long lead-time elements.

From a practical perspective, given that the OPA has effectively stalled the processing of behind-the-meter load-displacement generation until the summer of 2013 (and perhaps even later), and the timeframe for these types of projects is

[42] Letter of July 15, 2013 to Sean Brady from Gary Rains, re: *saveONenergy PROCESS & SYSTEMS; Behind-the-Meter Natural Gas-fired Generation*.

lengthy, it is highly inconceivable that any generation projects can be interconnected with the distribution grid by the December 2014 deadline for inclusion as a contributor towards an LDC's CDM targets.

3.6.7 PROCESS & SYSTEMS – The Ongoing Quest for Mediocrity

An essential element of the sales process is overcoming or eliminating perceived barriers to "*closing the deal*". Unfortunately the entire saveONenergy PROCESS & SYSTEMS initiative is plagued with unnecessary participation barriers. As but one example, participants that progress to the point where their energy-efficiency project is ready to proceed are obligated to sign a mind-numbing 93+ page incentive agreement (consisting of a 43-page body and a 11 separate schedules consuming at least 50 more pages) laden with complex legal language.

By contrast, BC Hydro operates a similar industrial CDM program (under the Power Smart brand) and has successfully crafted a 10-page agreement (consisting of a 7-page body and 3 single-page attached schedules) that is both comprehensive and written in plain English.

In late June 2012, a Business Case was prepared advocating a much simplified incentive agreement, modeled after the BC Hydro agreement, was prepared and submitted to the OPA via the EDA's Industrial CDM Working Group.[43] The only real difference between the two jurisdictions is the subject of environmental attributes and the designated party responsible for the technical review process. The proposed form of incentive agreement[44] that accompanied the Business Case was a mere 15 pages of plain English text.

Unfortunately (but in a typical fashion) it would take the OPA more than a year to review the proposed incentive agreement template and issue a replacement agreement to the LDC community.[45]

The OPA's revised Incentive Agreement is twenty (20) pages of much smaller font text than the proposed template included with the original business case (i.e. 33% more voluminous). Once again, rather than strive for an Incentive Agreement that as good or preferably even better than the BC Hydro template, the OPA apparently set their goal on "*mediocrity*" and took a year to get there. This outcome is very symptomatic of a leadership failing.

[43] London Hydro document: *saveONenergy PROCESS & SYSTEMS: Business Case to Rewrite Energy-Efficiency Project Incentive Agreement*.

[44] London Hydro template document: *saveONenergy PROCESS & SYSTEMS: Energy-Efficiency Project Incentive Agreemen*t.

[45] OPA saveONenergy LDC E-Blast of August 15, 2013; announcement of August 21st webinar for V4 Change Management.

3.6.8 The Meter Lending Library – A Failure to Launch

For some energy-efficiency projects, such as lighting upgrades, the associated demand reduction and energy savings are quite straightforward to mathematically quantify. For example, the replacement of a 60 W incandescent bulb with a 15 W CFL results in a demand reduction of (60 W – 15 W =) 45 W. The resultant energy savings would depend only upon the typical duty cycle (i.e. the ON time) of the lighting fixture. For example, if the fixture was ON for 4,000 hours throughout the year, then the energy savings would be (45 W x 4,000 h =) 180,000 Wh or 180 kWh per annum.

For more complex electrical apparatus, such as HVAC and process cooling systems, public elevators, booster pumps, compressed air systems, and manufacturing process (e.g. plastic extrusion machines, bottling lines, conveyor and packaging systems, etc.), the approach is more complex. While mathematical models are still used, one will generally want to install one or more recording-style instruments to measure electrical power consumption patterns and perhaps other relevant parameters such as temperatures, flow rates, etc. With such "*baseline*" data, one can "*calibrate*" the mathematical model (i.e. verify that the electrical consumption pattern predicted by the mathematical model is consistent with the "*observed*" electrical consumption patterns as measured by one or more portable recording-style power measurement instruments), and then use this insight to develop the value proposition (i.e. predicted energy savings, demand reduction, and consequent recurring operating cost reduction associated with the implementation of one or more energy-efficiency measures).

Following installation of the energy-efficiency measures, it is common practice to re-install the recording-style instruments to verify both that (a) the energy-efficiency measure was commissioned properly, and (b) that the energy-efficiency measure is delivering the promised demand reduction and energy savings to the customer.

As such, if one wants to progress beyond the "*low-hanging fruit*" of lighting upgrades into deeper energy savings associated with energy-efficiency improvements to complex processes and systems, then portable recording-style power measurement instruments are a very important tool.

Figure 3-32, Candura Recording-Style Portable Power Measurement Instrument

To this end, the OPA's Technical Reviewer (under contract to the OPA) was to create and operate a central province-wide metering and instrumentation library wherein LDC's and their customers would have access to a range of instrumentation to more accurately characterize the energy use

of fans, pumps, compressors, processes, etc.[46]

Although twenty-three (23) Candura portable recording-style power measurement instruments (as depicted in Figure 3-32 above) were procured and the "*Meter Lending Library*" was promoted on the OPA's website, it is understood that the OPA's legal staff ascertained that some insurmountable liability risk was associated with loaning instrumentation to the LDC community, and the program was never launched.

London Hydro didn't share that particular viewpoint and in May 2012 London Hydro offered to both purchase the entire inventory to Candura power measurement instruments and to operate a lending library for the benefit of the LDC community throughout southwestern Ontario.[47]

While London Hydro already possessed several Dranetz type *Power Platform® 4300* handheld, multi-function power analyzers and a number of AEMC Instruments' clamp-on current logging probes, its specific emphasis on manufacturing-sector customers created an unfortunate situation whereby there wasn't nearly enough instrumentation to fulfill the emerging need. Further appeals were made to the OPA to procure the surplus Candura power measurement instruments.[48] [49]

Finally in August 2013 – more than 14 months after the initial offer – London Hydro finally was able to purchase the inventory of surplus Candura power measurement instruments. In hindsight, trying to do the right thing for the ratepayers of Ontario very much restricted the inroads London Hydro was endeavoring to achieve with its manufacturing sector customers.

The foregoing simply chronicles yet another instance of the conservation division of the Ontario Power Authority as an ineffective and dysfunctional organization that, in spite of its mandate, is continuously hampering excellence on the CDM front in this province.

3.6.9 HOME ASSISTANCE – A Disconnect with the Ministry Directive

One of several screening techniques to define the effectiveness of an energy conservation program is the Total Resource Cost (TRC). This is essentially a cost-benefit analysis that examines the present value of upstream benefits to society of an energy-efficiency measure over the anticipated lifetime of that measure against the societal cost of deploying the measure. Programs that have a TRC greater than 1 are

[46] Ontario Power Authority document: *2011 – 2014 OPA-Contracted Province-Wide CDM Program; Industrial Program Summary Guide*: October 2010. Document available in electronic format on OPA website at URL:: http://icon.powerauthority.on.ca/report/templates/2011-2014%20Industrial%20Program%20Guide.pdf

[47] Letter of May 24, 2012 to Andrew Pride (Vice President – Conservation) from Gary Rains, re: *saveONenergy PROCESS & SYSTEMS Initiative; Meter Lending Library – Procurement of Surplus Equipment*.

[48] E-mail of September 24, 2012 to Andrew Pride from Gary Rains; re: *Meter Lending Library ….*

[49] E-mail of May 24, 2013 to Andrew Pride from Gary Rains; re: *Ongoing OPA Ineffectiveness - Meter Lending Library - Procurement of Surplus Equipment….*

deemed to provide a greater long-term benefit to society than their cost, whereas programs with a TRC of less than 1 are considered to have a greater cost than their long-term benefit.

The Minister of Energy and Infrastructure's directive of July 5th, 2010 (re: MC-2010-2261) to the Ontario Power Authority to commence the design, implementation and funding of an electricity CDM program for low-income residential consumers as part of its suite of OPA-Contracted Province-Wide CDM Programs for the 2011-2014 period specifically stipulates:

- *The conservation initiatives need not pass the standard Total Resource Cost test, but would be evaluated for other metrics, as the OEB considers appropriate, and*

The OPA business case for the saveONenergy HOME ASSISTANCE program has a Total Resource Cost (TRC) criterion of 0.7. The relevant passage has been replicated below again for convenience of reference:

> *Based on a review of the modified cost tests used in other jurisdictions and the recommendations made in the Concentric report, a TRC of 0.7 has been established as the cost-effectiveness threshold for the LISFH program. The Program results exceed the minimum cost-effectiveness threshold of 0.7 established for the program by the OPA.*

Note: Measures and programs that have a TRC ratio less than 1.0 are routinely adopted in other jurisdictions throughout North America because they have value for other reasons (e.g. reduced collection costs, low or bad-debt expense, improved customer service effectiveness) or address equity issues for energy efficiency.

As it turns out, the Ontario Power Authority failed to heed the Minister's directive and their own business case in developing the agreement and supporting tools. Specifically:

- Article 4.1 (d) (vii) of Schedule E-1, *Low Income Initiative 2011 – 2014*, to the Master CDM Program Agreement is reproduce following for convenience of reference.

> ***4.1 Payment of Direct Install Eligible Costs Payment and Participant Based Funding by OPA to LDC***
>
> ***:***
>
> *(d) The OPA shall pay the Installable Measures Costs and Participant Based Funding Amounts to the LDC for a Completed Participant Application only where:*
>
> ***:***
>
> *(vii) the total resource cost as set out in the Field Audit Support Tool for each Completed Participant Application is equal to or greater than 1.0; and*

- For the saveONenergy HOME ASSISTANCE program, the Ontario Power Authority created a Field Audit Support Tool (FAST) that is basically a Microsoft

Excel® spreadsheet that dynamically carries out a TRC analysis as more energy-efficiency measures are added. The FAST user sees a rectangular shape in the lower part of the display that is Green if the combination of proposed energy-efficiency measures exceeds the TRC criterion and RED if the measures are below the TRC threshold value. The TRC threshold value that is built into the OPA's FAST product is 1.0.

London Hydro didn't start ramping up its HOME ASSISTANCE program until late summer of 2012. While this TRC matter wasn't an issue for London Hydro throughout 2012, it would become an issue in early 2013 and, as such, the issues will be more fully described in next year's annual CDM report.

3.6.10 Compressed Air Worksheets – Another (Non-Comedic) Farce

Many manufacturing sector customers have extensive in-plant compressed air systems that are expensive to operate and for which there are generally an abundance of energy-efficiency and optimization opportunities. However, in the first year that the saveONenergy RETROFIT PROGRAM was available, uptake by manufacturing sector customers was virtually non-existent. Feedback from several compressed air system suppliers suggested that the underlying problem was with the engineered worksheets for compressed air systems, namely the measures included on the engineered worksheets weren't reflective of the measures being promoted to manufacturing-sector customers.

Note: While participants could have elected the "*custom*" track within the saveONenergy RETROFIT PROGRAM, it is more difficult and the marketplace is sending a very clear message that this option is not worth the perceived effort.

To address this shortcoming, London Hydro and Toronto Hydro jointly contracted LeapFrog Energy Technologies Inc. to expand the energy-efficiency measures on the engineered worksheet (e.g. VFD's on trim compressors, and various air dryer technologies). The software was calibrated using data from a number of Toronto Hydro projects. The software and associated comprehensive *User Guide* were delivered to the OPA in October 2012.

After months of no updates, an OPA representative in attendance at a meeting of the joint OPA/EDA Industrial CDM Working Group announced that the OPA had concerns with the sequencing control in multiple-compressor systems – there can be situations where the sequencing control isn't properly configured and consequently the system can use more energy. London Hydro didn't concur that this was a valid concern – incorrect sequencing would certainly be something that is detected as part of the post-project M&V process. Rather that incur further delays, it was agreed that the sequencing control would be blocked – thereby giving OPA more time to study this feature – but the engineered worksheet would be issued as soon as possible with the other energy-efficiency measures. The OPA would deal directly with LeapFrog Energy Technologies Inc. to block the compressor sequencing control option in the revised engineered worksheet.

After the project left Toronto Hydro / London Hydro's hands, the inaction by the OPA is chronicled below:

- In a May 8th, 2013 status update inquiry to LeapFrog Energy Technologies Inc, it was learned that Leapfrog had submitted a proposal to OPA on January 29th and was still awaiting a purchase order from OPA.
- On May 9th, London Hydro issued an e-mail to the OPA and membership of the Industrial CDM Working Group offering to issue Leapfrog a purchase order immediately – all that was needed is a definition of the scope of work.
- On May 30th, LeapFrog Energy Technologies Inc. indicated that the purchase order from OPA was finally received and work could start.
- As of September 2013 (i.e. a year later!!), neither the Industrial CDM Working Group nor the LDC community have received any update whatsoever as to the status of the improved engineered worksheet for compressed air systems

Unfortunately, the foregoing is simply yet another sad example of the Ontario Power Authority as a dysfunctional and ineffective agency.

3.6.11 Ongoing Issues with the Aptitude of OPA Technical Auditors

In London Hydro's annual report of 2011 CDM activities and achievements,[50] it was noted that London Hydro has raised ongoing concerns about the competency of contractors used by the Ontario Power Authority for carrying out random quality assurance assessments and program EM&V assessments.

This occurred again with a London Hydro project wherein roughly 17,000 incandescent lighting fixtures were converted to ENERGY STAR qualified lighting fixtures (that use the special GU-24 2-pin interface) across the CLV Group's portfolio of 93 apartment buildings. Although London Hydro wasn't permitted to speak directly with the auditor, it would seem from the excerpt of the audit report that we were shown that the auditor was unaware what an ENERGY STAR lighting fixture was and offered the most bizarre opinion that London Hydro's applications were incorrect and the participant should only have received a $1 per bulb incentive (which would have been correct if incandescent bulbs were being retrofitted with CFL's) as opposed to a $25 per fixture incentive that is associated with retrofitting an entire lighting fixture. London Hydro formally questioned the aptitude of the OPA's technical auditor[51] and was quite prepared to take the matter to arbitration.

Note: To ensure that London Hydro's interpretation was indeed correct, London Hydro solicited opinions from past OPA engineering staff and consultants who concurred wholeheartedly with London Hydro.

[50] London Hydro Report EM-12-04, *Energy Conservation and Demand Management – Annual Report of London Hydro's 2011 Activities and Achievements*; September 2012; Section 3.6.10.3, *The Need for Greater Transparency in the EM&V Phase*; pages 60 – 61.

[51] Letter dated April 26, 2012 to Andrew Pride (OPA) from Gary Rains (London Hydro); re: *Electricity Retrofit Incentive Program (ERIP); Ongoing Issues with Competency of OPA Auditors*.

The OPA senior management refused to counter or override their auditor, and offered a solution that although not correct would seemingly speed up the payment. However this again was not the case and the payment remains outstanding.

Ironically upgrading to ENERGY STAR lighting fixtures in multi-unit residential buildings is one of the most successful elements of the RETROFIT PROGRAM to date. The Drewlo Holdings project that was profiled in Appendix B, *Local Promotion of CDM Successes*, of London Hydro's annual report of 2011 CDM activities and achievements used identical lighting fixtures and was not singled out in the audit as faulty or non-compliant. In fact, the OPA chose to use the Drewlo Holdings project as one of the premier marketable success stories in Ontario!

3.6.12 Yet Another Glaring Example of Misdirected Resources

As noted in Section 3.4.1 (starting on page 44 herein) the LDC community receives Program Administration funding to administer the portfolio within their respective franchise service territories. It will be seen from Table 3-6 (on page 44 herein) that London Hydro is very frugal with its spending, typically spending only 50% to 60% of its annual allocation. However, as Figure 4-4 (on page 70 herein) will show, London Hydro is achieving significant results with this level of spending, i.e. the monies are being spent effectively.

Even though all aspects of an LDC's operations are subject to an external financial audit on a regular basis, every year the OPA requests (via instructions on the cover sheet of their reporting template) that along with the high-level expense reporting (as set forth in Schedule A-6, *Reporting Requirements*, of the Master CDM Agreement), that LDC's provide copies of all supporting receipts, purchase orders, marketing materials, etc. This would be trivial for an LDC that contracted all aspects of their CDM activities to a third party – the LDC would only have to provide copies of perhaps four quarterly invoices as received from their respective contractor. But for LDC's like London Hydro that can most effectively operate CDM programs internally, we would be spending days and days photocopying hundreds of receipts, time-sheets, invoices, purchase requisitions, etc.

London Hydro has deliberately not complied with the OPA request for mountains of receipts, etc. for no real purpose. Complaints have been made to the Ministry of Energy[52] that the OPA should instead direct their energy and resources to fixing the numerous problems with the various CDM programs as opposed to fishing expeditions for no defined purpose that waste everyone's time.

It is often noted that the OPA has no knowledge of how the utility business is regulated and therefore inflicts non-standard and wasteful procedures on the LDCs. The detailed examination of PAB expenditures is duplicative in many respects to the financial and procedural audits that all utilities are subjected to on a regular basis.

[52] Letter of June 5, 2012 to Paul Kersman (Ministry of Energy) from Gary Rains (London Hydro); re: *Reporting of 2011 PAB Funding Expenditures; Yet Another Glaring Example of Misdirected Resources*.

4 COMBINED CDM REPORTING ELEMENTS

4.1 Progress Towards CDM Targets

4.1.1 London Hydro's CDM Achievements in 2012

As will be recalled from Section 1.1 herein, LDC's have two (2) distinct CDM targets, namely a "*2014 net peak demand savings*" target and a "*2011 – 2014 net cumulative energy savings*" target.

Table 4-1 below indicates London Hydro's 2012 progress towards its demand savings target.

Table 4-1, Net Peak Demand Savings at End-User Level (MW)

Implementation Period	Annual Peak Demand Savings (MW)			
	2011	2012	2013	2014
2011 - Verified	6.68	4.05	4.05	4.02
2012 - Verified		4.7	3.1	3.1
2013				
2014				
Verified Net Annual Peak Demand Savings in 2014 (MW):				7.1
London Hydro's 2014 Annual CDM Capacity Target (MW):				41.440
Verified Portion of Peak Demand Savings Target Achieved (%):				17.1%

There are two (2) distinct methods for achieving the peak demand reduction targets, namely (i) energy efficiency, which achieves both energy savings and a demand reduction, and (ii) demand response, which affects the peak load during a DR activation. These concepts are illustrated in Figure 4-1and Figure 4-2 below:[53]

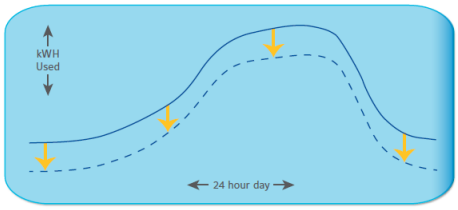

Figure 4-1, Effect of Energy-Efficiency

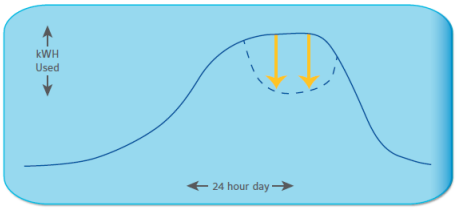

Figure 4-2, Effect of Demand Response

It can be implied from Table 4-1:

[53] Johnson Controls publication: *Energy Efficiency and Demand Response: Working Together in an Integrated Approach to Managing Energy*; Kelly Smith and Katrina Managan, Johnson Controls; February 2012; pg 3.

- London Hydro's net peak demand savings for 2012 is a combination of 3.1 MW of net demand reduction achieved from energy-efficiency projects and 1.6 MW from customer participation in the demand response marketplace.
- Where peak demand reduction is achieved by customer participation in one of the demand response programs, LDC's only receive credit for one-year measure persistence (i.e. the credit is assigned for 2012 only). If the customer's contractual arrangements with the demand response aggregator extends past December 31st, 2014, London Hydro's true attribution would be 21% (as opposed to the 17.1% shown in the above tabulation).
- With respect to the first line (labeled "2011 – Verified") the slight drop-off to 4.02 MW in 2014 from the 4.05 MW of net demand reduction in 2012 and 2013 is likely attributable to some of the implemented energy-efficiency measures having a persistence of only 3 years (meaning that they contribute in 2011, 2012 and 2013, but are considered at the end of their useful life by 2014).

London Hydro's submitted CDM strategy [Ref 3 & 4] didn't provide a year-by-year breakdown of expected net peak demand reductions. If equal achievements in each of the four years is assumed, then the annual target would be (41.44 MW / 4 years =) 10.36 MW. With a 2012 achievement of (7.1 + 1.6 =) 8.7 MW of peak demand reduction, then London Hydro has only achieved 84% of this peak demand reduction objective.

Table 4-2 below indicates London Hydro's 2012 progress towards its energy savings target.

Table 4-2, Net Energy Savings at the End-User Level (GWh)

Implementation Period	Annual Energy Savings (GWh)				Cumulative Savings (GWh)
	2011	2012	2013	2014	
2011 - Verified	21.13	20.99	20.99	20.92	84.04
2012 - Verified		14.4	14.1	13.9	42.7
2013					
2014					
Verified Net Cumulative Energy Savings, 2011 – 2014 (GWh):					126.8
London Hydro's 2011 – 2014 Cumulative CDM Energy Target (GWh):					156.640
Verified Portion of Cumulative Energy Target Achieved (%):					80.9%

Again, London Hydro's submitted CDM strategy [Ref 3 & 4] didn't provide a year-by-year breakdown of expected net accumulated energy savings. Nonetheless, if one assumes that London Hydro would have pursued a balanced approach (i.e. equal energy savings in each of the four years), then the expectations for 2012 would have been 15.664 GWh, resulting in a 2011 – 2014 accumulated net energy savings of (3 x 15.664 GWh =) 46.992 GWh. With a verified net cumulative energy savings of 42.7

GWh, then London Hydro can be said to have achieved 90% of its 2012 performance objective.

Note: With proper attribution of the energy savings achieved by the Embedded Energy Managers – refer to Section 3.6.4 herein – the performance target will have been achieved.

4.1.2 Quantifying the Outstanding 2011 CDM Achievements

It will be recalled from Section 3.6.2 (starting on page 50 herein) that London Hydro has not yet received full payment and hence credit for a significant number of 2010 ERIP carry-over projects. There has been ongoing resolution to some of these issues, however most of the significant ones (with respect to scope of project) remain partially or fully outstanding

The projects in question include:

- The installation of almost 17,000 ENERGY STAR qualified lighting fixtures both inside and outside of London Hydro's franchise service territory; and
- A significant electric chiller upgrade for one of London Hydro's institutional customers.

For the electric chiller and portion of the ENERGY STAR lighting fixtures that were installed in MURB's in London Hydro's franchise service territory, the estimated gross demand reduction is 522 kW and the estimated gross energy savings is 1,347,000 kWh.

There are also 671 lighting retrofit projects, installed under the *Power Savings Blitz* small business direct install program that are in dispute and for which payment remains outstanding. If one assumes 0.75 kW demand reduction per project, then the consequent demand reduction is on the order of 500 kW.

4.1.3 Comparison of London Hydro's CDM Achievements to Other LDC's

Figure 4-3 shows London Hydro's *2012 net demand reduction* achievements in comparison to the achievements of all other LDC's throughout the province. Although London Hydro's 2012 achievement with respect to peak demand reduction is less than the organization's internal target, the chart indicates that meeting the demand reduction targets may be a provincial challenge. On a positive note, London Hydro's 2012 net demand reduction achievement is consistent with the median performance of the LDC community.

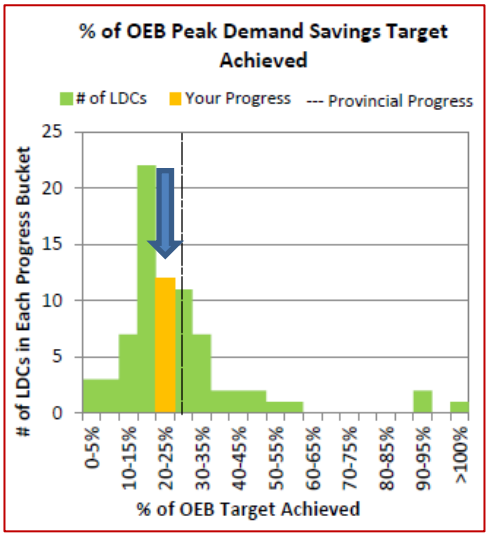

Figure 4-3, London Hydro's 2012 Demand Reduction Achievements

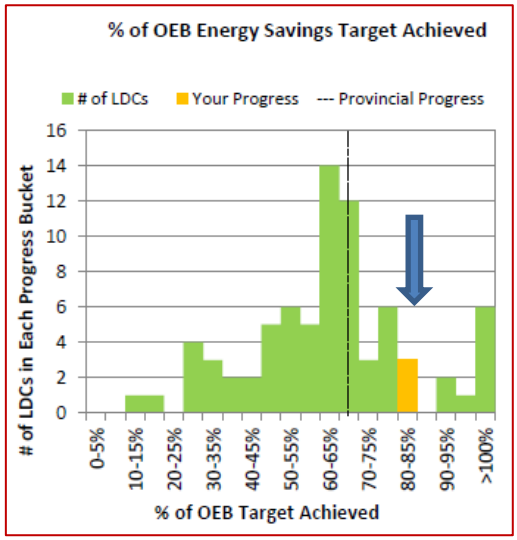

Figure 4-4, London Hydro's 2012 Energy Savings Achievements

Figure 4-4 shows London Hydro's *2012 net energy savings* achievements in comparison to the achievements of all other LDC's throughout the province. It is clear from the graph that London Hydro's 2012 net energy savings achievement was remarkable - not only did it greatly exceed the organization's internal target; there are only a few (unnamed) LDC's in the entire province that had a greater success.

4.1.4 Discussion of London Hydro's 2012 CDM Achievements

London Hydro's CDM Strategy [Ref 3 & 4] was predicated on the expectation that the Ontario Power Authority's provincial CDM programs wouldn't be plagued with participation barriers (most of which were earlier outlined in Section 3.6 herein). Reality was quite different than expectations.

The OPA's change management process, as illustrated in Figure 3-29 (on page 51 herein), was so elongated and cumbersome that virtually none of the needed program changes came into effect in 2012. In fact the outlook certainly for the first half of 2013 won't be much better.

4.2 CDM Strategy Modifications

When London Hydro prepared its CDM strategy [Ref 3 & 4] there was certainly an unstated assumption and expectation that the provincial Tier 1 CDM programs would be available in late Q3 / early Q4 of 2010. Furthermore, there was no expectation that the Ontario Power Authority would be dissuading demand response throughout southwestern Ontario by declaring it a "*discount zone*" subsequent to the CDM target-setting process, which by themselves are very aggressive with respect to demand reduction.

London Hydro's CDM Strategy [Ref: 3 & 4] anticipated the need for Board-approved Tier 2 or Tier 3 CDM programs and this remains the intention.

The discussions below are better classified as "*minor refinements*" to London Hydro's previously submitted CDM strategy as opposed to being a significant revision to the strategy.

4.2.1 saveONenergy FOR HOME Portfolio

Based on the participation levels in each of the CDM programs within the saveONenergy FOR HOME portfolio (as given in Table 3-2 on page 28 herein) and the overall net demand and net energy savings reported for each program, the per-participant demand savings and per-participant energy savings were assessed to determine which programs provided the greatest value to London Hydro in meeting its CDM targets. The findings are presented in Figure 4-5 and Figure 4-6 below.

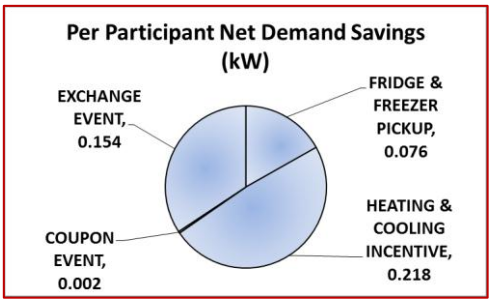

Figure 4-5, Comparison of Net Demand Savings - FOR HOME Programs

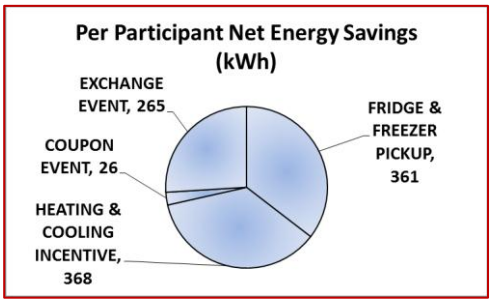

Figure 4-6, Comparison of Net Energy Savings - FOR HOME Programs

It will be seen from both charts that saveONenergy HEATING & COOLING INCENTIVE offers the greatest value to London Hydro with respect to both demand and energy savings. It will be seen from the charts above that, for this program, the "*net per participant demand savings*" is 218 W and "*net per participant energy savings*" is 368 kWh.

Although there is limited opportunity to influence this program, London Hydro will certainly increase its efforts at promoting this program and increasing customer awareness of the benefits offered by the program. Skilled trade workers (e.g. HVAC contractors) aren't necessarily proficient with sales techniques, so if London Hydro instills a value proposition in the customer's mind (via billing inserts or other innovative techniques), then it should be easier for the HVAC contractor to sell the most energy-efficient products. The success of this endeavor (if any) will be reported in future annual reports.

It was shown in Section 3.3.1.2 (starting on page 28 herein) that expanding the customer's access options within the saveONenergy FRIDGE & FREEZER PICKUP program to permit appliance drop-offs at community enviro-depots proved successful. There may be an opportunity to further increase program participation (but likely by only a small percentage) in future years by working with refrigerated appliance

retailers. The success of this endeavor (if any) will be reported in future annual reports.

It is clear from Figure 4-5 and Figure 4-6 that the saveONenergy COUPON EVENT program contributes very little to the regulated CDM targets. Nonetheless, the program has value to underscore the underlying objective of creating and sustaining a '*conservation culture*" in Ontario. As such, London Hydro will continue its efforts to support this initiative.

4.2.2 saveONenergy FOR BUSINESS Portfolio

4.2.2.1 Review of Portfolio Performance and Future Outlook

The 2012 net demand and net energy savings for each of the programs within the saveONenergy FOR BUSINESS portfolio are presented in Figure 4-7 and Figure 4-8 below.

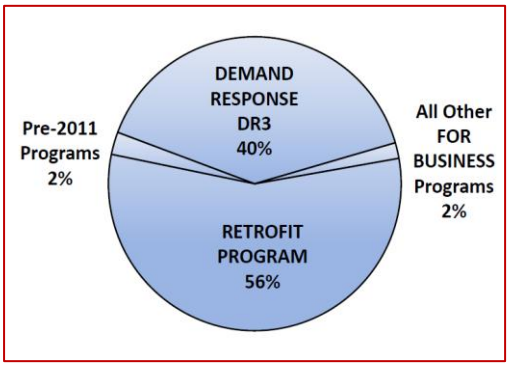

Figure 4-7, Net 2011 Demand Savings - FOR BUSINESS Programs

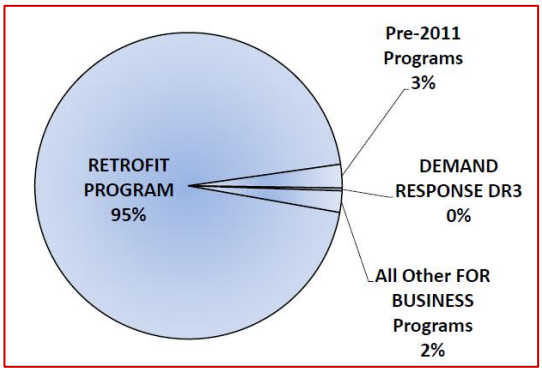

Figure 4-8, Net 2011 Energy Savings - FOR BUSINESS Programs

It can be seen from Figure 4-8 that the saveONenergy RETROFIT PROGRAM is the so-called "*workhorse*" program for achieving the energy savings targets. Figure 4-7 shows that the combination of DEMAND RESPONSE and RETROFIT PROGRAM are the workhorse programs for achieving the demand reduction targets.

An estimate of the overall net demand reduction and accumulated net energy savings that are likely to be achieved under the RETROFIT PROGRAM in the remaining years of the 2011 – 2014 programs follows:

- The net annual peak demand reduction and net annual energy savings achieved under the RETROFIT PROGRAM throughout 2012 was 2,148 kW and 10,443,795 kWh.
- Since there is defined hard stop date of December 31, 2014 (i.e. projects must be in-service by this date to count towards an LDC's targets), applications will likely stop in mid-2014.

The anticipated accumulated net energy savings associated with the saveONenergy RETROFIT PROGRAM is calculated in Table 4-3 below as being 26.1 GWh.

Table 4-3, Predicted Future RETROFIT PROGRAM Savings

Conservation Measures Implemented	Accumulated Energy Savings at End of Year			Accumulated Net Energy Savings, kWh
	2012	2013	2014	
2013 Projects		10,443,795	10,443,795	20,887,590
2014 Projects			5,221,897	5,221,897
		10,443,795	15,665,692	**26,109,487**

The predicted net peak demand reduction associated with these energy-efficiency projects is (2,148 + 1,074 =) 3,222 kW.

The 126.8 GWh of accumulated net energy savings that has already been credited to London Hydro (for 2011 and 2012 activities) plus the net energy savings associated with 2010 ERIP carry-over projects that has yet to be credited plus the 26 GWh shown above in Table 4-3 means that London Hydro is likely to achieve (and likely exceed) its regulated 156.64 GWh accumulated net energy savings target (provided the organization maintains its aggressive approach to the saveONenergy RETROFIT PROGRAM).

4.2.2.2 Engaging the Non-Lighting Supply Chain

It can be readily seen from Figure 3-26 (on page 36 herein) that the majority of saveONenergy RETROFIT PROGRAM projects are some form of lighting upgrade. This basically means that (in the London area at least), London Hydro has been successful in its endeavors to teach the lighting supply chain (i.e. manufacturers, wholesalers, contractors) to provide a compelling value proposition for end-use customers and to use the saveONenergy RETROFIT PROGRAM as a valuable sales tool.

In anticipation of greater discount factors (due to increasing free ridership) that are likely to be associated with future lighting retrofit projects, it is imperative to significantly increase the number of non-lighting energy-efficiency projects carried out under the saveONenergy RETROFIT PROGRAM.

London Hydro is cognizant that although energy-efficiency improvements on compressed air systems represent a significant opportunity, there are issues associated with the "*compressed air engineering worksheet*", i.e. the energy-efficiency measures that the compressed air suppliers typically promote aren't included, thereby forcing the customer into the more challenging "*custom*" track. In 2012, London Hydro and Toronto Hydro jointly funded significant improvements to the "*compressed air engineering worksheet*" but due to the circumstances described in Section 3.6.10 (starting on page 64 herein) the opportunities arising from this endeavor won't be realized until 2014.

Nonetheless, there are other opportunities that London Hydro is continuing to exploit, namely domestic water pumps and hot water recirculation pumps in high-rise buildings.

Successes in this endeavor will be reported in next year's annual CDM report.

4.2.2.3 Expanding the "*Feet On The Street*"

In London Hydro's annual report of 2011 CDM activities and achievements,[54] it was noted that London Hydro intended to further expand the number of "*feet of the street*" by harnessing its own staff from other departments.

This idea (i.e. "lunch and learn" sessions whereby staff are provided with instruction and materials to familiarize themselves with a number of CDM programs) has generated a few leads for the saveONenergy HIGH PERFORMANCE NEW CONSTRUCTION, RETROFIT PROGRAM, and HOME ASSISTANCE programs. It will be repeated at such time that there is a turn-over of staff and an orientation session is warranted.

[54] London Hydro Report EM-12-04, *Energy Conservation and Demand Management – Annual Report of London Hydro's 2011 Activities & Achievements*; Sept 2012; Section 4.2.2.3, *Expanding the "Feet On The Street*; pg 70.

5 CONCLUSIONS

Over the course of 2012, London Hydro has achieved another 3.1 MW in net peak demand reduction and 42.7 MWh in net energy savings, which together with its 2011 achievements represents 20.7% and 80.9% respectively of London Hydro's 2014 target. These verified 2012 results have been understated for two reasons, namely:

- The pre-2011 projects, as described in Section 4.1.2 (starting on page 69 herein) for which reimbursement by OPA remains outstanding; and
- The understated non-incented energy-efficiency projects carried out by the three (3) Embedded Energy Managers, as described in Section 3.6.4 (starting on page 53 herein).

Whilst these results are representative of a considerable effort expended by London Hydro in cooperation with other LDC's, customers, channel partners, and active participation in the EDA's three CDM working groups, the unfortunate reality is that the LDC community could do much better but is significantly hampered in its endeavors by the combination of:

- A CDM delivery framework that can't and doesn't work effectively for reasons as described in Section 3.6.1 (starting on page 48 herein); and
- A provincial agency at the helm that is best described as "*ineffective and dysfunctional with significant leadership shortcomings*". There is an abundance of examples throughout this report to support this conclusion.

None of the observations contained herein will come as a surprise to the Ministry of Energy. Ministry staffs have "*observer*" status at the various EDA CDM Working Group meetings and see first-hand the challenges with the prevailing CDM delivery framework. Furthermore, Ministry staffs generally receive courtesy copies of all the correspondence referenced in this report.

Not surprisingly perhaps is London Hydro's judgment that none of the provincial CDM programs would be considered "*best of breed*" by peer utilities and agencies throughout North America.

The Canadian Manufacturers & Exporters (CME) and the Association of Major Power Consumers in Ontario (AMPCO) often remind us of the importance of the manufacturing sector both to the economic health of the province and in providing high-value, high-paying jobs. And it is this very sector that has been left behind with respect to participation in energy-efficiency programs. Specifically:

- saveONenergy PROCESS & SYSTEMS has been an abysmal failure – at the end of two years, not a single kilowatt-hour of energy savings attributable to incented energy-efficiency projects has occurred throughout the entire province (refer to Sections 3.3.2.7 and 3.6.7 herein);

- this sector can't make any headway with behind-the-meter load displacement generation projects (refer to Section 3.6.6 herein) or with heat recovery generation projects, both of which would improve their plant's overall energy efficiency (and hence their competitiveness in the marketplace in which they compete);
- due to southwestern Ontario being considered a "*discount zone*" for the DR3 emergency demand response program, the diminished financial reward for participating in DR3 no longer attracts customer interest; and
- this sector has a considerable number of expensive in-plant compressed air systems, but to date it has not been possible to get an engineered worksheet issued that meets their needs (refer to Section 3.6.10 herein).

Not only does the manufacturing sector deserve better, but all consumers deserve better especially if the end goal is to develop a "*culture of conservation*" in this province.

Looking ahead, London Hydro is confident that it will exceed its regulated accumulated net energy savings target. The reasoning to support this prediction is given in Section 4.2.2.1 (starting on page 72 herein).

However, as noted in Section 3.6.5 (starting on page 55 herein), the emergency demand response landscape has changed since the inception of the 2011 – 2014 CDM programs and London Hydro (along with many other LDC's) expects a shortfall in its regulated net demand reduction target.

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Appendix A, Promotional Materials for saveONenergy FRIDGE & FREEZER PICKUP

The saveONenergy FRIDGE & FREEZER PICKUP initiative is promoted within the City of London publication entitled *Waste Reduction & Conservation Calendar*, which is distributed to all households in the city.

Selected excerpts from the *Waste Reduction & Conservation Calendar* are included below:

London Hydro also promotes the saveONenergy FRIDGE & FREEZER PICKUP program via messaging printed on the outer reverse side of the monthly billing envelope received by residential customers.

Appendix B, Local Promotion of CDM Successes

The CO-OPERATIVE HOUSING FEDERATION of Canada

Co-ops benefiting from energy retrofit grants

By Marni Norwich

The Home Assistance Program (HAP) funded by the Ontario Power Authority is providing free energy upgrades for income-eligible co-op housing households throughout Ontario.

HAP is operated in each municipality by the local electricity distribution company (LDC). London Hydro has provided seven London-area housing co-ops with free energy upgrades since September.

"We started with co-op housing because we had a good relationship with them and they were keen to participate," says **Lisa Charteris**, a program co-ordinator for London Hydro. "The early adopters really helped us get our program off the ground and working for which we are grateful."

HAP comes from the Green Energy Act which mandates that all LDCs in Ontario reduce demand off the grid across their customer base. HAP and the Retrofit programs are available throughout Ontario.

Suzanne Wright, Senior Program Manager for McCormick and Zock, manages 16 properties in Southwestern Ontario, half of them co-ops. She says HAP provided energy-efficient light bulbs for four of the co-ops she manages and replaced older fridges, freezers, air conditioners and dehumidifiers with new Energy Star appliances for those who qualified. Wright estimates that members are saving 10 percent on their Hydro bills, and the co-ops have saved tens of thousands of dollars in new fridges.

"This is a priceless opportunity for co-ops to save money and support environmental initiatives," says **Denise McGahan**, Program Manager, Member Services, for CHF Canada's Southwestern Ontario office. "The program does have income eligibility requirements, but they are high enough that all of the members at one co-op qualified, even those paying market housing charges. So we urge all co-ops to apply!"

Charteris says that the key to maximizing incentives is to talk to the local LDC conservation officer and get some advice as to what would work best. London Hydro tries to provide program options and guidance to each co-op.

Some co-ops have chosen the HAP route and several are performing complete facility upgrades which offer even deeper energy use reductions.

Above: *Suzanne Wright, senior program manager for McCormick and Zock, has helped clients such as The Oaklands Housing Co-operative participate in the Home Assistance Program (HAP).*

Right: *London Hydro's Lisa Charteris works with Wright on the paperwork to secure HAP funding for one of the co-ops Suzanne manages.*

Appendix B.2, Local Promotion of CDM Successes

MSEC Energy Saver Recognition Program

3M Canada Company Streamlines Operations and Energy Consumption with Chiller VFD Retrofit

History of Conservation

3M Canada Company has a long history of sustainability and conservation. The abrasives and adhesives company, set up in London, Ontario in 1951, began a cardboard recycling program in 1972, with an energy conservation program being launched the following year. 3M's commitment to sustainability resulted in the London Chamber of Commerce presenting 3M Canada with the Industrial Environmental Award in 1974 for their commitment to the environment. The combination of their previous conservation initiatives led to 3M reducing over 590 million tonnes of pollution from its manufacturing operations over the next few decades.

3M continues with its corporate social responsibility to both the city of London and the environment as the company recently worked with London Hydro to complete several energy-efficient upgrades at their 300 Tartan Drive location, including a large retrofit of their heating, ventilation, and air conditioning (HVAC) system in October 2012.

To maintain business for a large company, it takes more electricity to keep the building and processes inside running than it does for the average small business or family home. Large-

scale motors, fans, and even industrial lighting that keep sites going, consume enough energy to significantly impact the bottom-line and the environment. More than this, increased consumption by large administrative buildings puts a strain on the electrical grid, leading to more energy plants being built. With the help of London Hydro, 3M is doing its part to curb the energy demand of its Head Office location, at 300 Tartan Drive.

Since last fall, the company has steadily been upgrading their buildings and processes through the saveONenergy RETROFIT PROGRAM that London Hydro offers via its Conservation and Demand Management Department. This program helps organizations modernize their buildings' operating and energy systems to achieve energy efficiency by offering back-end support and monetary incentives to cover part of the cost of the project. The RETROFIT PROGRAM is made available to utilities like London Hydro by the Ontario Power Authority (OPA) in an effort to reduce energy consumption and operating costs by large facilities.

To date, at 300 Tartan Drive, 3M has:

- Modernized the administrative building's three elevators with variable frequency drives to reduce idling power consumption used by the original system.
  - The energy savings of this project was 341,202 kWh
- Received funding to hire an Embedded Energy Manager (EEM) through the OPA and London Hydro's saveONenergy PROCESS & SYSTEMS initiative.
  - The EEM is tasked with identifying energy-efficiency opportunities in several of 3M's facilities within the province, including 300 Tartan Drive, and aiding in the implementation and maintenance of applicable sustainability initiatives.
- Saved 56,250 kWh of energy by reducing the energy consumption of the office area lighting by 50% through the use of a "day-lighted" office design.
- Installed a Power Contactor to switch off 6.6 kW of equipment connected to workstation power outlets, with an "on/off schedule" set for nights, weekends, and holidays.
  - 20,889 kWh of energy savings were saved with this installation.
  - The equipment was turned off automatically for a total of 3,165 hours in a year- time and energy that would otherwise have been wasted.

The continuum of 3M's recent conservation upgrades, as well as the most significant in terms of efficiency, is the retrofit of its HVAC system at Tartan Drive.

The Project

The original Chiller, which is a component of a company's HVAC system, was installed at the Tartan Drive location in 1990. In 2011, 3M upgraded the controls, and in 2012, the variable frequency drive (VFD) on the Chiller was installed.

The company's Chiller cools water which is piped throughout the building to provide air conditioning in the summer. The HVAC system is made up of multiple air handlers, with chilled water coils. The system operates as a variable air volume system with zone reheat. Waste-heat from the chiller provides the reheat in the summer, which helps 3M's operations operate more efficiently with both a lower cost and decreased energy demand.

To streamline operations, the Chiller VFD retrofit was of special focus for London Hydro, as a facility's chiller is typically the single largest consumer of energy in a building. With 3M's completion of the VFD upgrade on the air conditioning motor, the company is projected to save 36,000 kWh. These savings are the equivalent of eliminating the greenhouse gas emissions of approximately 9.5 tonnes of landfill waste.

The saveONenergy RETROFIT PROGRAM, as operated by London Hydro, was able to provide 3M with over $47,000.00 to assist with some of the overall project costs.

Impact

An important aspect of the RETROFIT PROGRAM that London Hydro worked with 3M Canada Company to demonstrate to other large companies in the city, is that it is a misconception that there are few energy-efficient opportunities in new buildings. While the Tartan Drive complex is relatively recent, having only been built around 1990, the chiller retrofit at 3M, as well as the previous and future conservation projects of the company, show that there are always opportunities to save energy- even in new buildings.

According to 3M, since the retrofit of 3M's Tartan Drive Chiller VFD in October, the building has used over $4,300.00 less electricity. As well, the Chiller upgrade has contributed to 3M's predictions of exceeding their conservation targets by 43% in demand reduction and by 22% in energy savings.

London Hydro's Hans Schreff, and CEO, Vinay Sharma, pose on location at 3M with 3M Canada's President, Paul Madden, in front of one of the company's "Energy" murals.

The company is committed to their sustainability goals. To engage all employees in continuing to support and implement the company's conservation priorities, 3M's facilities showcase murals that are visible to staff at all levels in the organization. The inclusion of murals and open discussions about all that 3M is doing to modernize their operations, demonstrates how the company has taken their history of conservation efforts and made it into a legacy.

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Appendix B.3, Local Promotion of CDM Successes

MSEC Energy Saver Recognition Program

London Hydro helps YMCA Centre Branch Improve Health of Community with Pool's New Lighting Technology Retrofit

The YMCA Centre Branch (YMCA CB) on Waterloo Street in London, Ontario helps support over 100 000 YMCA members in the area each year. With a corporate social responsibility and mandate to support and provide opportunities that will create "healthy kids, healthy families, and healthy communities," YMCA CB offers facilities that benefit those who may otherwise not have access to such programming.

One of the most important and heavily utilized programs that the Centre Branch offers is swimming lessons in one of their two pools. Available for children from three months to thirteen years of age, the swim programs ensure that children learn water awareness, increase strength, and acquire safety skills. YMCA Centre Branch also promotes a unique swim program that teaches children and youth with behavioral or learning barriers how to swim in a manner that is carefully-designed to accommodate different rates of learning. These programs are essential in our community as the foundation of health and safety that is instilled in our children will serve them well into adulthood.

The YMCA is able to operate important programs, such as swim lessons, for our community through paid memberships and fees. In order to keep the fees down for the downtown facility's disadvantaged members, YMCA looked to decreasing their operational costs in the pool area with help from London Hydro and new lighting technology.

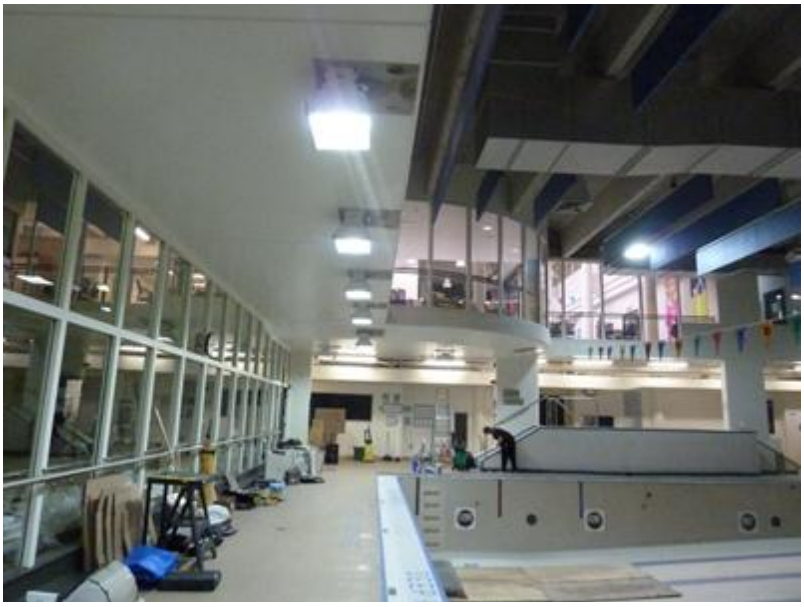
The Project

In June of 2012, the Conservation and Demand Management Department at London Hydro assisted YMCA in their goals of making the pool area in their facility better lit and more energy efficient. The project had a tight timeline as aquatic programs would be starting again for the school year in September. Leveraging the popular saveONenergy RETROFIT PROGRAM, the YMCA Centre Branch sought a retrofit for their existing lighting.

The RETROFIT PROGRAM, operated out of London Hydro's Conservation and Demand Management Department, is an incentive program made available to utilities by the Ontario Power Authority (OPA). The program provides monetary incentives to aid project costs for organizations that replace outdated, inefficient equipment with energy-efficient technology that will reduce electrical consumption and a building's operating costs. Through the program, the YMCA retrofitted:

- Thirty four 2-lamp fluorescent T12 fixtures in their pool change rooms to T8's.
    - By replacing the older fixtures and bulbs with new, high-efficiency ones, both direct and indirect energy savings were realized through the lighting and the savings associated with the reduced air conditioning needs as the high-efficiency lighting generates less heat.

- Replacing metal halides around the pool itself through the "*Engineered*" track of the RETROFIT PROGRAM was the most significant part of the project. With this program, forty two 250 Watt metal halide lamps were replaced with a combination of thirty 250 Watt and 100 Watt Induction Light Luminaires.
    - Fewer fixtures were installed, but greater light output and energy efficiency were achieved for the charity organization's facility.



Once a popular choice for recreational facilities, metal halide lamps are now outdated and inefficient compared to the current technology on the market. Known for a slow start-up and decrease in colour, quality of light, and general performance as the fixture ages, the metal halide fixtures within the pool area at YMCA Centre Branch were replaced with induction lighting to improve the quality of pool activities and programs area children and families participate in. The improvement to YMCA CB was the result of the provision of consistent, energy-efficient light and reduced maintenance of their lighting portfolio. Reduced costs and maintenance mean that more time and money can be funneled back to the members of the YMCA throughout the year.

Induction lighting is rather new, but its applications and proven performance made it the right choice for this project. Induction lighting is ideal for sports facilities as they are durable and high quality fixtures that deliver safe, attractive, and reliable white light with an "instant-on" and hot restrike that provides light immediately upon activation. The fixtures installed for this project sport an impressive lamp life of 60,000 to 100,000 hours- compared to the 6000 to 15 000 hours of a metal halide- with overall reduced costs due to minimal upkeep requirements. The combination of reduced maintenance and cost savings ensure a rapid payback for the organization as aquatic programs continue in a high-quality, energy-efficient space.

Impact

The project generated a demand savings of 8 kW and 45 619 kWh of energy saved, which is the equivalent of the carbon sequestered annually by 26.4 acres of trees.

Before the project, the light level was poor by public facility standards, at a base measurement of only about 19 foot-candles. The lighting project doubled the light and improved the quality of output, as well as the colour of the light for the swimming area, to 38 footcandles. The upgrade ensured that the lighting is much more correct for such a facility and its activities. As well, the installation of induction lights reduced the overall lighting portfolio of the pool area

by approximately half, thus resulting on less electricity being required and reduced operating costs for the YMCA.

The RETROFIT PROGRAM, deployed by London Hydro, provided an incentive amount of $3,727.^{00}$ toward the total project cost of labour and materials, which also helped the community recreation centre keep costs to a minimum.

The environmental and social benefits to reducing the energy demand at the YMCA extend to increasing the quality of their programming by improving the operations and quality of their Waterloo Street facility. The obvious change in the quality of lighting in the change rooms and pool area spark conversations and comments by members and staff of the Centre Branch in regard to conservation and the commitment to the community the YMCA is making. By improving their services as they work to make their goal of "healthy families" one that goes beyond providing a facility for recreation, the YMCA Centre Branch is providing a centre for social responsibility and conservation.

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Appendix B.4, Local Promotion of CDM Successes

MSEC Energy Saver Recognition Program

Co-op Housing Works with London Hydro to make Homes More Comfortable and Energy-Efficient for Low-Income Families

Co-operative Housing Projects, also known as social and assisted housing, were started as a way to offer subsidized townhouses and apartments for families and seniors who would otherwise not be able to afford to buy or rent a home to call their own. Co-op's are an important element in creating and maintaining communities. Many low-income families, seniors, and adults are offered the chance to have a home through such projects that make such a pleasure and necessity- that many take for granted- possible by offering low rent and programming to assist living expenses for certain groups within the city.

To take the support one step further, the Provincial Co-operative (PCO) housing projects in London, Ontario, recently worked with London Hydro through the saveONenergy RETROFIT PROGRAM to improve the energy efficiency of their units in seven of their townhouse complexes and apartment buildings across the city. The RETROFIT PROGRAM, operated out of London Hydro's Conservation and Demand Management Department, is an incentive program made available by the Ontario Power Authority (OPA). The program provides monetary incentives to aid project costs for organizations that replace outdated, inefficient equipment with energy-efficient technology that will reduce electrical consumption and a building's operating costs.

Within the PCO portfolio of co-operative non-profit complexes in London, the program offered by London Hydro was leveraged to update the PCO homes to make them more energy-efficient, cost-effective, and comfortable for residents. The RETROFIT PROGRAM's incentives helped PCO manage the project costs as their portfolio of seven buildings across London was modernized.

The Project

Seven co-op buildings, located throughout the city, participated in the RETROFIT PROGRAM. These co-ops were constructed between 1989 and 1991 and include:

- Country Spirit Co-operative Homes
- Tolpuddle Housing Co-operative
- Artisan Co-operative Homes
- Windy Woods Co-operative Homes
- Delta Place Co-operative Homes of London
- London Town Co-operative Homes
- Phoenix Housing Co-operative

While the housing is subsidized for low-income individuals and families, all residents of the co-op must cover their own utilities. The retrofit facilitated by London Hydro modernized the aging buildings, while educating residents on conservation and helping them reduce costs.

The major element of this project was the replacement of 2,772 traditional incandescent lighting fixtures with ENERGY STAR qualified lighting fixtures. These lighting fixtures are designed with a special base - referred to as a GU-24 interface as depicted to the right - that only accepts energy-efficient bulbs with a 2-pin base design.

The project also encompassed other lighting measures, such as retrofitting T-12 fluorescent lamps and electromagnetic ballasts with energy-efficient T-8 fluorescent lamps and electronic ballasts, retrofitting EXIT lamps with long-life and energy-efficient LED lamps, and in some cases simply replacing traditional screw-in incandescent bulbs with CFL's.

The ENERGY STAR lighting fixtures that were selected and installed throughout the co-ops, are ones that London Hydro has promoted in all participating apartment buildings in London to both improve residents' comfort in their homes, and to keep costs low for those on a fixed budget. Not only are the ENERGY STAR lighting fixtures attractive, but there are significant maintenance benefits. The light output levels generally exceed the output levels associated with the incandescent fixtures, and the residents enjoy the lower energy bill associated with energy-efficient lighting fixtures.

It should be noted that a number of other cooperative townhouse developments within the PCO portfolio, namely Bonaventure Place Housing Co-operative, Oaklands Housing Co-operative, St. Martin's Co-operative Homes of London, and Tanglewood Orchard Co-operative Homes, fulfilled the income eligibility requirements to participate in the saveONenergy HOME ASSISTANCE PROGRAM and energy-efficiency retrofits have been completed in these

developments. Two other apartment buildings in the portfolio are expected to undergo energy-efficiency upgrades in 2013 under the saveONenergy RETROFIT PROGRAM.

Impact

The lighting retrofit, overall, resulted in 265.5 kW of demand saved, and 695,439 kWh of energy saved across the 479 townhouse and apartment units that were retrofitted for residents. The reduction in wasteful energy consumption is equal to that of the annual greenhouse gas emissions of 102 passenger vehicles. Another way to quantify the benefits of updating something as simple as fixtures and light bulbs is to consider that the kWh of energy saved through this project is the equivalent of the carbon sequestered by 12,581 trees!

The RETROFIT PROGRAM that was applied to by PCO, and administered by London Hydro, supported the project with a substantial incentive of $114,225.00. The incentive was an essential part of the project, as less cost to the organization means that there is more funding available for the low-income families and seniors who depend on the program. As well, the long-term savings is to the benefit of the residents as nearly every light in and outside of their homes has been updated for optimal savings and comfort. The result is lower energy bills and a renewed pride in their homes.

London Hydro is especially proud of this project as they work hard every day to support the families and quality of life in London, Ontario.

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Appendix C, Cross-Reference Between Program Marketing Names and Master Agreement Schedule Identifiers

The marketing or customer-facing names of the various provincial (Tier1) CDM programs are quite different from the CDM program identifiers used within the Master CDM Program Agreement between the Ontario Power Authority and community of Local Distribution Companies (LDC's).

The following tabulation provides a cross-reference between the customer-facing CDM program names (Column 1) and the identifiers used in legal agreements (Columns 2 and 3). Column 4 indicates the date when the various schedules were posted for acceptance by the LDC community. Column 5 indicates the date when London Hydro's subscription to each provincial CDM program was recognized on their iCon web portal interface.

Customer-Facing (Marketing) Name of Initiative	Name of Initiative within OPA's Master CDM Agreement	Schedule within OPA's Master CDM Agreement	Date Schedule Posted	Date London Hydro Subscribed
(Col 1)	(Col 2)	(Col 3)	(Col 4)	(Col 5)
saveONenergy FOR HOME Portfolio:				
saveONenergy FRIDGE & FREEZER PICKUP	Appliance Retirement	Schedule B-1, Exhibit D	January 26, 2011	February 22, 2011
saveONenergy HEATING & COOLING INCENTIVE	HVAC Incentives	Schedule B-1, Exhibit B	January 26, 2011	February 22, 2011
saveONenergy *peaksaver* PLUS	Residential Demand Response	Schedule B-3	August 22, 2011	
saveONenergy COUPON EVENT	Conservation Instant Coupon Booklet	Schedule B-1, Exhibit A	January 26, 2011	February 22, 2011
saveONenergy EXCHANGE EVENT	Appliance Exchange	Schedule B-1, Exhibit E	January 26, 2011	February 22, 2011
--	Bi-Annual Retailer Event	Schedule B-1, Exhibit C	January 26, 2011	February 22, 2011
	Home Energy Assessment Tool			
	Midstream Electronics			
	Midstream Pool Equipment			
saveONenergy FOR BUSINESS Portfolio:				

Customer-Facing (Marketing) Name of Initiative	Name of Initiative within OPA's Master CDM Agreement	Schedule within OPA's Master CDM Agreement	Date Schedule Posted	Date London Hydro Subscribed
(Col 1)	(Col 2)	(Col 3)	(Col 4)	(Col 5)
saveONenergy DEMAND RESPONSE VOLUNTARY DR1	Demand Response 1	Schedule D-5		February 22, 2011
saveONenergy DEMAND RESPONSE CONTRACTUAL DR3	Demand Response 3	Schedule D-6	May 31, 2011	February 22, 2011
saveONenergy SMALL BUSINESS LIGHTING	Direct Install Lighting and Water Heating	Schedule C-3	January 26, 2011	February 22, 2011
saveONenergy SMALL BUSINESS A/C	Direct Service Space Cooling	Schedule C-5	January 26, 2011	February 22, 2011
saveONenergy RETROFIT PROGRAM	Efficiency: Equipment Replacement Incentive	Schedule C-2	January 26, 2011	February 22, 2011
saveONenergy AUDIT FUNDING	Energy Audit	Schedule C-1	January 26, 2011	February 22, 2011
saveONenergy EXISING BUILDING COMMISSIONING	Building Commissioning	Schedule C-6		February 22, 2011
saveONenergy HIGH PERFORMANCE NEW CONSTRUCTION	New Construction and Major Renovation	Schedule C-4	February xx, 2011	February 22, 2011
saveONenergy PROCESS & SYSTEMS	Process & Systems Upgrades	Schedule D-1	May 31, 2011	April 11, 2011
"	Monitoring & Targeting	Schedule D-2	May 31, 2011	April 11, 2011
"	Energy Manager	Schedule D-3	May 31, 2011	April 11, 2011
"	Key Account Manager	Schedule C-4	May 31, 2011	April 11, 2011
saveONenergy NEW HOME CONSTRUCTION	New Construction Program	Schedule B-2	January 26, 2011	April 11, 2011
Low-Income Programs:				
saveONenergy HOME ASSISTANCE	Home Assistance Program	Schedule E-1	May 9, 2011	August 18, 2011

Notes:

1. Although the saveONenergy *peaksaver* PLUS initiative is primarily targeted to residential customers with central air conditioning systems, small business customers can also participate (although the latter won't receive an in-home display), the initiative has been categorized in the above tabulation under the saveONenergy FOR HOME portfolio.
2. The saveONenergy NEW HOME CONSTRUCTION is marketed to both residential customers (for the purposes of awareness) and new home builders. Since London Hydro primary interactions are with new home builders, this program has been categories herein as a "*business*" program. Other LDC's may well categorize it differently in their respective Annual CDM Report.
3. The information is column 4 (date posted) can be somewhat misleading. For example, Schedule E-1 for the saveONenergy HOME ASSISTANCE program shows a posted date of May 9th, 2011 implying that the program was ready for delivery to eligible customers on that date. The unfortunate reality is that it wasn't' until late summer of 2012 (i.e. well more than a year later) that there was a payment process in place and the calculation tool used by assessors (i.e. the so-called Field Audit Support Tool) was finally corrected to a satisfactory state – refer to announcement in OPA E-Blast dated August 24th, 2012.

Appendix D, Summarized Province-Wide EM&V Findings

The Ontario Power Authority has retained a number of program evaluation contractors to assess the 2012 performance of each of the provincial CDM programs. The key evaluation findings given below have been provided by the Ontario Power Authority to the community of LDCs. It is understood that the actual reports prepared by the various EM&V contractors won't be available until after September 30th, 2012.

Customer-Facing Name of CDM Initiative	**Province-Wide Key Evaluation Findings**
(Col 1)	**(Col 2)**
saveONenergy FOR HOME Portfolio:	

saveONenergy FRIDGE & FREEZER PICKUP	• Decrease in 2012 participation by 39% compared to 2011.
	• In-site metering provided updated per unit assumptions:
	  ○ Small decrease (3.5%) in savings for refrigerators; and
	  ○ Sizeable increase (17.5%) in savings for freezers

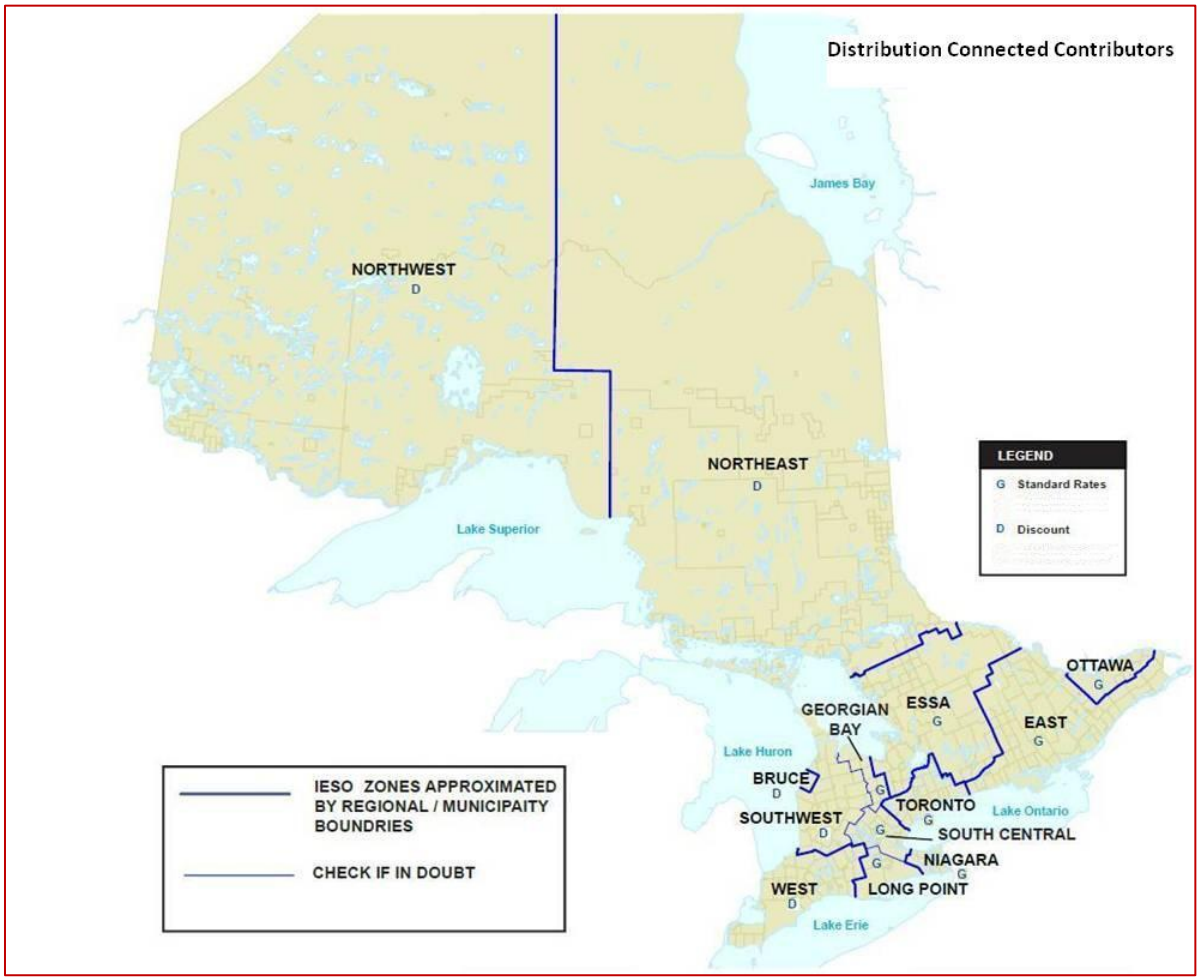
saveONenergy HEATING & COOLING INCENTIVE	• Small decrease (10%) in per unit savings assumptions for furnace with ECM due to change in 2012 customer mix and furnace fan usage. • Small increase (10%) in free-ridership related to the furnace with ECM measure. • Participation remains relatively steady once 2011 true-up values are included.
saveONenergy peaksaver PLUS	• Province-wide per-unit ex ante estimates for a 1-in-10 August peak day were determined to be 0.50 kW for residential CACs and 0.64 kW for small commercial CACs. • Evaluation to date has indicated savings from in-home displays (IHDs) are not statistically significant (in and around zero). ○ However, since 2012 evaluation did not include full year analysis (specifically the summer months), these results have been deemed inconclusive. • The IHD offer had a positive influence on enrollment and re-enrollment with between 20 to 35% of new enrollees said they wouldn't have enrolled without the IHD offer.
saveONenergy COUPON EVENT	Bi-Annual Retailer Event: • 15% lower net savings due to a 15% lower net savings due to a change in the net-to gross factors (increased free-ridership, less participant behavior spillover, and less non-participant like spillover). • Majority of participation, energy, & demand savings are from standard CFLs.

Customer-Facing Name of CDM Initiative	Province-Wide Key Evaluation Findings
(Col 1)	(Col 2)
	• 15% of net savings due to ~73,000 coupons for new LED measures. Annual Coupons: • The number of coupons associated with the redemption of 2012 Annual Coupons was 90% lower than 2011 Instant Coupon Booklet. Key factors for the decrease include: o Shorter duration of available coupons (September 2012 – December 2012) o In 2012, only online coupons were available • 2011 had both online coupons AND coupon mailing booklets.
saveONenergy EXCHANGE EVENT	• Increase of 30% for exchanged dehumidifiers over 2011, leading to an increase of 4% in overall participation. • Higher per unit savings for dehumidifiers drove the overall increase in 2012 savings.
saveONenergy FOR BUSINESS Portfolio:	
saveONenergy DEMAND RESPONSE VOLUNTARY DR1	Initiative was not evaluated – no participation to date in this program which will be withdrawn from the marketplace..
saveONenergy DEMAND RESPONSE CONTRACTUAL DR3	• 2012 saw improvements in the performance of DR-3 participants resulting higher ex ante realization rates, particularly for the industrial participants.
saveONenergy SMALL BUSINESS LIGHTING	• Reported hours of usage continue to be inaccurate - only 12% of site visits had verified annual hours of use within +/-10% of the assumed value. • The saturation of eligible customers and preferred business types are resulting in participation from building types that may not fully operate during the summer peak period. o This trend contributes to lower realization rates for demand savings in 2012. • Due to changing regulations in lighting measures, the assumed baseline technology will eventually be phased out. This regulation impacts the persistence of savings over the lifetime of lighting measures.
saveONenergy RETROFIT PROGRAM	• Reported savings for prescriptive lighting projects continue to be overstated: o Verified wattage reductions were 15% higher than assumed; and o Verified operating hours were 11% higher than assumed. • A lower realization rate in the engineered measure track can be partially explained by overstated lighting operation hour assumptions reported on the application. • Net-to-gross ratios for the initiatives were above 75% in 2012, which is consistent with 2011.

Customer-Facing Name of CDM Initiative	Province-Wide Key Evaluation Findings
(Col 1)	(Col 2)
saveONenergy AUDIT FUNDING	• Through Audit Funding, 280 projects were completed in 2012 based on recommendations from the auditors, resulting in1.4 MW and 7 GWh of Program Enabled Savings. • Office buildings represented the largest portion of applicants for 2012.
saveONenergy EXISING BUILDING COMMISSIONING	• There were no applications in 2012. • Market feedback suggests that EBC's focus on chilled-water space-cooling systems may be too narrow, and participation could be expanded by incenting a wider range of measures.
saveONenergy HIGH PERFORMANCE NEW CONSTRUCTION	• Custom projects account for 66% of program savings, with the remainder coming from the prescriptive track
saveONenergy PROCESS & SYSTEMS	• Energy managers are seen as important drivers of Program Enabled savings projects. o 88% of survey respondents indicated that the assistance provided by energy managers was "somewhat" or "very" important to implementing projects. • Energy Managers indicated that additional support (additional training and guides) may further help influence the adoption of energy efficiency measures by the participants. • Documentation for Program Enabled Savings projects varied substantially by LDC. More guidance on documentation requirements would be beneficial to all parties.
saveONenergy NEW HOME CONSTRUCTION	• All projects are opting for the prescriptive or performance path - there have been no custom project applications to date.
Low-Income Programs:	
saveONenergy HOME ASSISTANCE	• Participation in the initiative ramped up in 2012, with over 5,000 homes participating in the initiative. • Majority of energy savings (62%) comes from lighting measures, while 21% of energy savings resulting from refrigerator and freezer replacements.
Other CDM Programs:	
None.	•

Appendix E, Map of Settlement Zones for Demand Response

This map shows the demand response settlement zones throughout the Province. London is located in the "West" settlement zone.



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