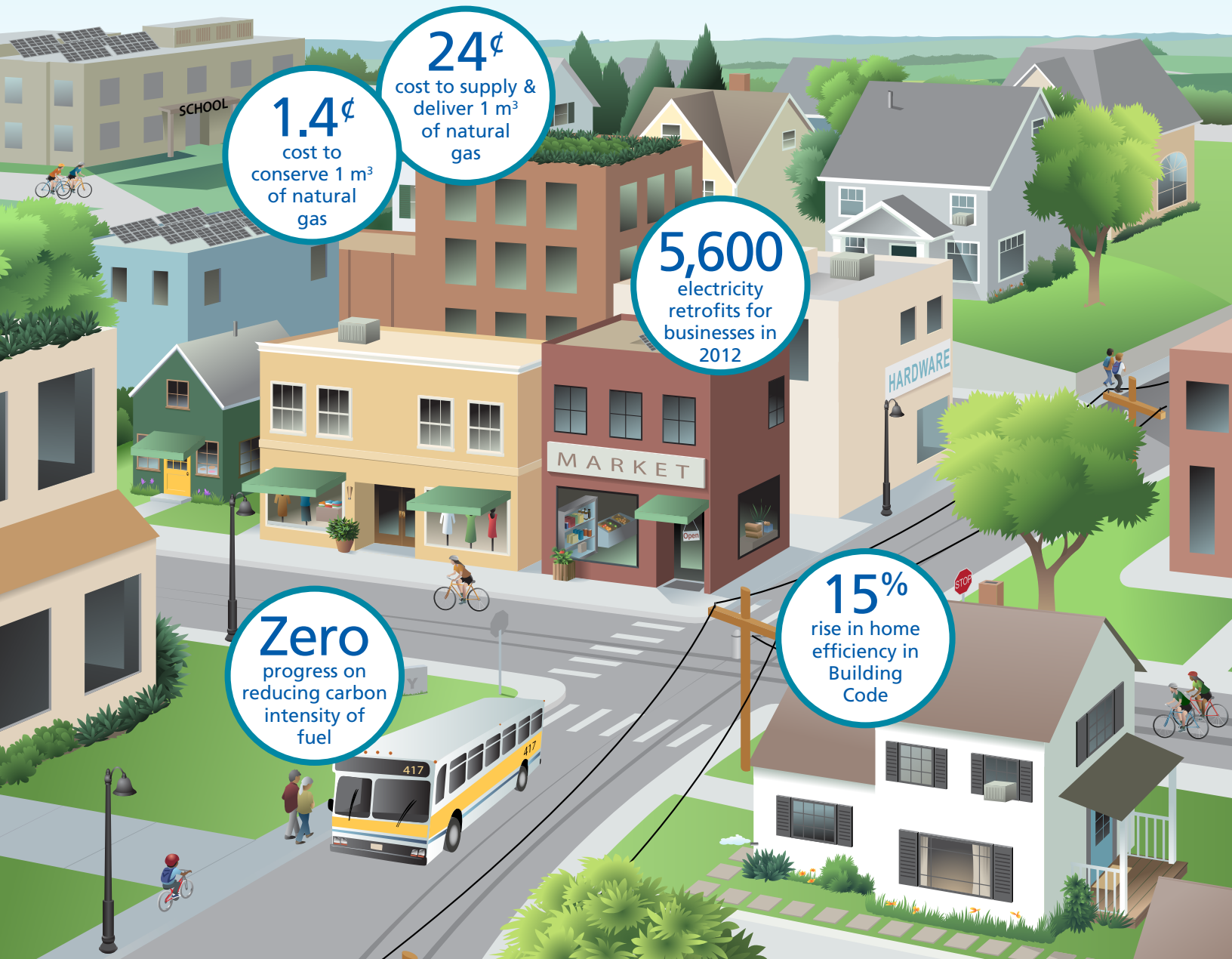
Environmental Commissioner of Ontario

ANNUAL ENERGY CONSERVATION PROGRESS REPORT – 2012 (VOLUME TWO)

Building Momentum Results

504 million kWh of electricity saved in 2012 by utilities



LIST OF ACRONYMS

CDM	Conservation and Demand Management
COF	Council of the Federation
DR	Demand Response
DSM	Demand-Side Management
EBR	*Environmental Bill of Rights, 1993*
ECO	Environmental Commissioner of Ontario
EDA	Electricity Distributors Association
EMP	Energy Management Plan
EV	Electric Vehicle
GEA	*Green Energy Act, 2009*
GHG	Greenhouse gas
GJ/m^2	Gigajoules per square metre
GW	Gigawatt (one billion or 10^9 watts)
GWh	Gigawatt-hour (one billion or 10^9 watt-hours)
HOEP	Hourly Ontario Energy Price
IEI	Industrial Electricity Incentive
IESO	Independent Electricity System Operator
kW	Kilowatt
kWh	Kilowatt-hour
LCFS	Low Carbon Fuel Standard
LDC	Local Distribution Company
LTEP	Long-Term Energy Plan
MMAH	Ministry of Municipal Affairs and Housing
MOI	Ministry of Infrastructure
MOU	Memorandum of Understanding
MTO	Ministry of Transportation
MW	Megawatt (one million or 10^6 watts)
MWh	Megawatt-hour (one million or 10^6 watt-hours)
OBC	Ontario Building Code
OEB	Ontario Energy Board
OPA	Ontario Power Authority
PJ	Petajoules
RESD	Report on Energy Supply and Demand in Canada
SIP	Sustainability Implementation Plan
SOP	Standard Offer Program
TOU	Time-of-Use
TW	Terawatt (one trillion or 10^{12} watts)
TWh	Terawatt-hour (one trillion or 10^{12} watt-hours)
UCD	Utility Consumption Database

Environmental
Commissioner
of Ontario

Commissaire à
l'environnement
de l'Ontario

Gord Miller, B.Sc., M.Sc.
Commissioner

Gord Miller, B.Sc., M.Sc.
Commissaire

December 2013

The Honourable Dave Levac
Speaker of the Legislative Assembly of Ontario

Room 180, Legislative Building
Legislative Assembly
Province of Ontario
Queen's Park

Dear Speaker:

In accordance with section 58.1 of the *Environmental Bill of Rights, 1993,* I am pleased to present to you Volume Two of the Annual Energy Conservation Progress Report – 2012 of the Environmental Commissioner of Ontario for your submission to the Legislative Assembly of Ontario.

The Annual Energy Conservation Progress Report – 2012 is my independent review of the Ontario government's progress in conserving energy and is issued in two separate documents. The first volume, released earlier this year, covered the broader policy framework affecting energy conservation in Ontario. This second volume describes initiatives underway, assesses energy savings derived from these initiatives and measures progress on meeting targets.

Sincerely,

Gord Miller
Environmental Commissioner of Ontario

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COST TO SAVE 1 kWh OF ELECTRICITY WITH ENERGY EFFICIENCY PROGRAMS

UNDER THE *ENVIRONMENTAL BILL OF RIGHTS, 1993,* THE ENVIRONMENTAL COMMISSIONER OF ONTARIO (ECO) REPORTS ANNUALLY TO THE LEGISLATIVE ASSEMBLY OF ONTARIO ON THE GOVERNMENT'S PROGRESS IN ENERGY CONSERVATION.

This report is Volume Two of the 2012 Annual Energy Conservation Progress report. The report is data-focused and provides a resource for Ontarians who want to monitor the pace and scope of the progress made in conserving energy in this province. It analyses conservation programs, reviews initiatives and measures progress towards targets.

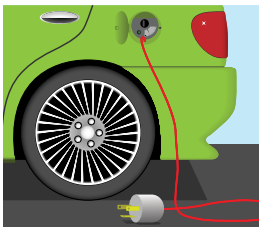
Progress on Energy Conservation Targets

The Long-Term Energy Plan's Province-Wide Electricity Conservation Targets

The first of the **Long-Term Energy Plan's** three interim targets occurs in 2015 (4,550 megawatts (MW) peak demand, and 13 terawatt-hours (TWh) energy from a 2005 baseline). As of 2012, progress of 2,445 MW and 7.6 TWh is nominally encouraging (indicating 54 per cent and 59 per cent of targets, respectively, has been achieved). However, a large portion of the savings claimed – about one-third of peak demand and two-thirds of energy – are attributed to codes and standards. The ECO cautions against accepting these results at face value. Despite requests from the ECO, the Ontario Power Authority has not provided persuasive information that explains how the savings attributed to codes and standards are calculated to support the claimed amounts.

Low Carbon Fuel Standard

Little progress was made in 2012 to reduce greenhouse gas (GHG) emissions from the transportation sector. In 2007, Ontario **committed to** implementing a Low Carbon Fuel Standard (LCFS) to reduce the carbon intensity of transportation fuels by 10 per cent by 2020. Other jurisdictions have used an LCFS to discourage the use of conventional petroleum products, but the Ministry of Energy has made no progress since its original commitment. Since the Ministry of the Environment is responsible for regulating transportation fuel qualities (e.g., vapour pressure) to control emissions, it may be appropriate that it lead implementation of the government's LCFS commitment.



The ECO recommends that responsibility for implementing the government's commitment to a low carbon fuel standard be assigned to the Ministry of the Environment.

Electricity Distributor Conservation and Demand Management Targets

Noteworthy trends in year two of the 2011 – 2014 Local Distribution Company (LDC) **Conservation and Demand Management (CDM) target** were: administrative improvements in the working relationship of the OPA and LDCs though obstacles to program delivery remain; strong performance of the **saveONenergy business program**, but continued weak performance in the **consumer program** confirming saturation of these residential initiatives; and, a much wider roll-out in 2012 of several programs that had late or spotty launches in 2011.

At this half-way mark, LDC performance toward the aggregate target (1,300 MW peak demand reduction in 2014 and 6,000 gigawatt-hours (GWh) of energy savings accumulated over the 4 years) mirrored 2011 trends: 379 MW and 3,906 GWh, or 29 per cent and 65 per cent respectively, of the targets achieved to date. If this continues, the collective effort of LDCs will fall well short of the aggregate demand target and just shy of the energy target.

No programs designed and delivered exclusively by LDCs (without OPA involvement) were introduced in 2012, although one was approved in 2013. At this late date, it seems certain that such programs will not meaningfully impact province-wide results. Cost effectiveness of programs diminished slightly compared to 2011 but they remain highly cost-effective. The cost of the energy efficiency programs was 4 cents per kilowatt-hour compared to an average cost of generated power (market price and global adjustment) of about 8 cents in 2012; for demand response programs, the cost was $9,855 per megawatt-month compared to roughly $15,000 per megawatt-month for recently added natural gas peaker plants.

Natural Gas Distributor Demand-Side Management Targets

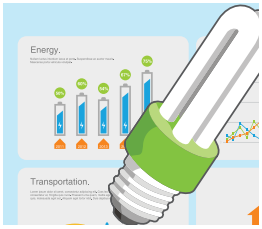
Results of natural gas savings show that Enbridge Gas and Union Gas achieved commendable savings in 2012, this first year of the **updated three-year (2012 – 2014) demand-side management policy framework** which emphasizes deep (or long-term) savings and market transformation. On the key measurement of gas saved, Enbridge exceeded its newly-established metric of 820 million lifetime cubic metres of gas acquired from 2012 programs, and achieved slightly over a billion cubic metres. Enbridge had strong performance on other metrics that measure market transformation. However, these metrics carry much less weight than gas savings.

Union Gas exceeded its newly-established metric of 826 million lifetime cubic metres of gas acquired from 2012 programs. It also exceeded its new metric of 1 billion lifetime cubic metres of natural gas saved by large industrial users. Union had solid performance on other metrics that measure market transformation, meeting and exceeding targets for working with homebuilders. However, these metrics carry much less weight than gas savings.

Ontario Government Operations Electricity Reduction Target

The government made a two-part commitment to reduce its own **electricity use by 20 per cent by 2012**. First, in 2004, the province pledged to reduce its electricity use by 10 per cent by 2007. Second, in 2007, it renewed its commitment and pledged to reduce electricity consumption by an additional 10 per cent by 2012. The government did not meet its 2007 target. Preliminary results from the Ministry of Infrastructure (MOI) indicate that the government met its 20 per cent electricity reduction target and saved 98 GWh of electricity in 2012. A third party is currently reviewing the government's estimated electricity savings; the verified, final results were unavailable at the time of writing this report.

MOI has completed commendable work to establish baselines, incorporate data from all ministries in its database for monitoring energy, and bring most ministry facilities under the requirements of a Minister's directive that specifies reporting and planning of energy conservation in facilities owned by the Ontario government (facilities that are leased and some other facilities are exempt from the directive). Momentum will be maintained with two ongoing targets: a 19 per cent reduction in GHG emissions by 2014 and a 27 per cent reduction by 2020 compared against 2006 GHG emissions. Tracking energy used in government-leased facilities and greater transparency of government direction are two outstanding issues that should be addressed.



The ECO recommends that the Ministry of Infrastructure amend the Ontario Facilities Energy Reporting Directive to include leased facilities.

Codes and Standards

Product Energy Efficiency Standards

In February 2012, **O. Reg. 82/95** was amended to include a ban on inefficient incandescent lighting. The ban comes into effect by December 2014. (The original commitment was to ban such light bulbs by 2012 but was delayed to harmonize with a revised federal timetable). In December 2012, **O. Reg. 404/12** was passed and replaced O. Reg. 82/95. It came into effect shortly after passage in January 2013. The new regulation's format makes it easier to compare old and new efficiency standards, and includes products that use energy and affect energy use (e.g., windows). Ontario Regulation 404/12 set 19 new minimum energy performance standards, and revised 24 existing standards.

These actions are commendable but occurred after delay and multiple attempts to update the standards and amend the regulation (several revised proposals seeking comment were posted on the Environmental Registry). To avoid such delays for future standards setting, and considering federal reviews that are regularly required, as well as the periodic review process used for amending energy provisions of the Ontario Building Code, the ECO believes that a cyclical mechanism is needed to ensure priority is given to updating standards.

The ECO recommends that the Ministry of Energy develop a regular update cycle for product standards, which identifies Ontario's best opportunities to improve energy efficiency.

2012 Ontario Building Code

The Ontario Building Code (OBC) sets energy efficiency and other requirements for new buildings in Ontario and is updated on a five-year cycle. In November 2012, the Ministry of Municipal Affairs and Housing (MMAH) finalized the next version of the OBC (the "2012 Code"), through **O. Reg. 332/12**, building on energy efficiency requirements contained in the last version of the OBC.

The new energy requirements in the 2012 Code include higher general levels of building energy performance, relative to the **2006 Code**, including a 15 per cent improvement in overall energy efficiency for houses and a 13 per cent improvement for large buildings. These requirements will come into force on January 1, 2017. Builders typically meet such performance standards by installing a combination of technologies which are bundled together in approved packages of technical standards. Some, like insulation, improve the performance of the building's "envelope" and others, like high-efficiency furnaces or heat pumps, affect the mechanical performance of the building. Typically, the performance of certain technologies are weighed against – or traded off – others to meet the overall efficiency performance level required by the code. A recent technical standard amendment enabled builders to trade off envelope performance for drain water heat recovery.

New requirements for programmable thermostats and low-flow showerheads were also introduced in the 2012 Code and take effect earlier than 2017. The OBC now also contains a stated objective to limit the release of GHGs and to limit peak electrical demand. One proposal, to include in the code a requirement that houses be built "solar-ready", (i.e., constructed so as to easily incorporate future connection of solar hot water or solar electricity systems), was not adopted in the 2012 Code because further technical study was deemed necessary.

The ECO recommends that the Ministry of Municipal Affairs and Housing modify the 2012 Ontario Building Code's technical standards to restrict the use of trade-offs that reduce the level of energy performance of the building envelope.

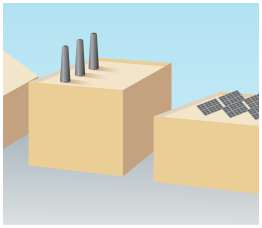
Industrial Electricity Incentive Program

In 2012, the Ministry of Energy introduced an **Industrial Electricity Incentive** (IEI) program. It provides a reduced electricity price for industries in exchange for them investing in and thereby creating jobs in Ontario. The IEI program is designed to make use of the surplus supply of power that Ontario is currently experiencing, particularly at certain hours of the day. No price contracts have yet been awarded by the OPA, which was directed by the Minister of Energy to design a procurement process and negotiate contracts for electricity.

Following a directive from the Minister of Energy, the IEI program rules and details created separate procurements for stream 1 applicants (e.g., characteristics such as, brand new facilities, peak demand of 25 megawatts or greater, price cap of 5.5 cents per kilowatt-hour) and stream 2 applicants (e.g., currently located in Ontario, expected peak demand increase of 1 megawatt, will receive various rebates of current price components).

The OPA included certain restrictions to ensure the IEI procurement produced benefits for the electricity system. A weighted point method for awarding contracts is intended to favour projects where only truly surplus electricity is consumed (i.e., consumed during hours that a surplus exists and not creating additional demand in non-surplus hours). Also, participants of both streams must submit an energy management plan to the OPA showing how their operations are energy efficient. And finally, IEI participants cannot partake of OPA conservation programs because of government concern for the amount of cross-subsidy from other classes of rate payers.

The ECO's preferred solution is to address demand-supply imbalances through clear price signals that reflect the hourly cost of generating electricity, conserve electricity in peak hours, and minimize cross-subsidies that favour inefficient over efficient consumers. Nevertheless, the ECO finds that the stream 2 IEI program design with its firm end date of 2019, to coincide with the estimated end of surplus baseload generation, is an acceptable approach to address the near-term surplus of electricity in off-peak hours. The ECO believes that the stream 1 program design is a bad deal for consumers and may harm the environment. The stream 1 program could build load across all hours resulting in higher levels of GHG emissions and could result in decades-long contracts offering subsidized cheap prices. Over these long timelines, other options like electricity storage for renewable power, smart grid-enabled load reductions, and building load in non-surplus off-peak hours, for example with electric vehicles, are equally viable options.



The ECO recommends that the Ontario Power Authority provide Industrial Electricity Incentive price discounts only for projects that predominantly use surplus electricity.

1 Introduction

$231 MILLION

SPENT ON ELECTRICITY CONSERVATION PROGRAMS IN 2012, DOWN $39 MILLION FROM 2011

THIS REPORT PROVIDES A RESOURCE FOR ONTARIANS WHO WANT TO MONITOR THE PACE AND SCOPE OF PROGRESS TO CONSERVE ENERGY.

Ontario's energy policy contains measurable quantitative targets for conservation. We pay most attention to electricity and natural gas conservation since this is where hard targets exist and nearly all provincial effort is directed. The report also notes areas where policy and action is conspicuous by its absence, which we frequently observe with conservation of oil and transportation fuels.

Our report describes what is actually being achieved towards these targets by the organizations designated to supply energy savings. It provides the only comprehensive summary of the conservation of all sources of energy, available to Ontarians. Use the at-a-glance roll-up of results, along with the report's detailed focus on selected programs, consider our analyses and comments, and then make your assessment of Ontario's annual progress.

1.1 THE ECO'S MANDATE AND REPORTING APPROACH

The Environmental Commissioner of Ontario (ECO) is required under the *Environmental Bill of Rights, 1993* (*EBR*) to report annually to the Speaker of the Legislative Assembly of Ontario on the province's progress in energy conservation. Our reporting mandate is to: review progress in reducing or making more efficient use of oil, propane, natural gas, transportation fuels and electricity; measure the achievement of government-established energy conservation targets; and assess barriers to conservation and efficiency. We issue our reports bi-annually as volume one and two, each focused on distinct aspects of the reporting mandate.[1] Our Volume One reports examine government policies; by contrast, Volume Two reports focus on data and outcomes.

This report, the Annual Energy Conservation Progress Report – 2012 (Volume Two), analyses provincial conservation programs and actions, and measures progress towards energy conservation targets.

Linking the 2012 Volume One and Two Reports

The **first volume** of the 2012 report,released in September 2013, examined the intersection of provincial and municipal responsibilities on energy conservation, and highlighted opportunities for the provincial government to remove barriers to local action. We focused on municipalities for two reasons: the relative lack of new provincial energy conservation policy developed in 2012, and the growing ability of municipalities to reduce energy use within their jurisdictions demonstrated both indirectly through their planning role and directly by affecting the use of energy in their own operations. Our Volume One report also explicitly tied energy conservation, particularly conservation of fossil fuels, with Ontario's commitment to reduce greenhouse gases because of our growing concern that provincial energy conservation and greenhouse gas policies are not integrated.

Since **Volume One** concentrated on municipal activities and Volume Two gives attention to savings results at the provincial level, there is not a strong linkage this year between the reports. This may change in coming years if action by both levels of government becomes more integrated compared to previous years. There are promising signs that the province is beginning to involve municipalities in energy planning. The province is introducing tools, such as: a regional electricity planning process; regulatory requirements that municipalities produce energy conservation plans; and, program support for municipalities to develop municipal energy plans that integrate energy, infrastructure, growth and land use planning.

1.2 CONTEXT AND ORGANIZATION OF THE REPORT

Progress in 2012

The government developed some new energy conservation policy in 2012. It introduced minor electricity policy changes in the reporting year, and a few regulations that impact longer term energy use, particularly heating fuels. These included updated energy requirements in the new **2012 Ontario Building Code** (OBC) and two regulation updates (**O. Reg. 82/95** and **O. Reg. 404/12**) that set stricter minimum energy performance standards and new test methods for lighting, appliances and equipment. These are analyzed in Sections 4.1 and 4.2. Gas utilities made substantial effort to design, develop and launch new natural gas demand-side management programs. Conservation activity for other fuels, on which the ECO is mandated to report, was almost completely dormant.

Electricity

Progress towards the **Long-Term Energy Plan's** 2015 province-wide electricity reduction target and other longer term electricity conservation targets is questionable. Although the recorded savings appear encouraging with 2012 results showing achievement is more than half-way towards the peak demand and energy targets, a large portion of the savings claimed are attributed to codes and standards or non-OPA programs. There is little useful information on how these savings were estimated or the attribution of savings to specific programs, codes and standards.

In 2012, the combined efforts of the Ontario Power Authority (OPA) and Local Distribution Companies (LDCs) continued to deliver Conservation and Demand Management (CDM) programs into the second year of the 2011-2014 period. These are Tier 1 programs, defined as OPA-designed and LDC-delivered. Progress towards the 2014 peak demand and energy targets is tracking at a similar pace as reported last year for 2011. The demand target (a reduction of 1,330 megawatts of peak demand in 2014) will almost certainly not be achieved while Ontario is poised to come close to meeting the energy target (6,000 gigawatt-hours of savings accumulated over the four-year period), but may fall slightly short. Results are summarized in Section 3.2.

We provide an update on the partial resolution of program design and administrative barriers related to Tier 1 programs, **reviewed last year** in our Annual Energy Conservation Progress Report – 2011 (Volume Two),[2] in Section 3.2. Distributors are concerned that necessary changes to the master contract have not yet been made for all programs that will be funded in 2015. Like last year, they remain critical of the slow legal review of program changes by OPA lawyers which delays implementing program improvements. Issues were flagged to the OPA in 2011. Yet, it is still fine-tuning programs three years into the target period. LDCs believe any program tweaks will come too late to significantly contribute to meeting 2014 targets. No new Tier 2 or 3 electricity programs (i.e., programs designed and delivered by LDCs without the participation of the OPA) were proposed or introduced by distributors in 2012, and thus the suite of electricity conservation programs remained the same as in 2011.

In the last days of 2012, the Minister of Energy **directed**[3] the OPA to extend funding of CDM programs under the *Green Energy Act's* 2011-14 framework for an additional year (January 1, 2015 to December 31, 2015). The rationale provided was to enhance the stability and continuity of conservation initiatives currently underway. Last year, in our Annual Energy Conservation Progress Report – 2011 (**Volume Two**), the ECO recommended this. Our report also urged the government to announce a long-term commitment to conservation. We maintained that this would enhance CDM activity and cautioned that a hard stop in 2014 would likely mean

some programs would wind down in the remaining years and so deliver fewer savings. The minister's directive did not alter the target date and electricity savings amounts. Notable also, the OEB was not directed to permit retroactive application of LDCs' 2015 savings to the 2014 targets. This means that the target essentially remains unchanged with a one-year program extension, presumably to maintain program momentum.

The end of 2012 was the target deadline for the Ontario government to reduce the use of electricity in its own operations. The government has tentatively (subject to independent third-party verification) achieved the 20 per cent target it set. Performance is reviewed in Section 3.1.

Also in late 2012, the Minister of Energy announced creation of a working group to adopt for Ontario a U.S. Department of Energy initiative called **Green Button**. It will help Ontarians access smart grid[4] data and conserve electricity. Finally, our report also discusses, in Section 4.3, the conservation implications of a new incentive program for large industrial power users. This new policy will result in cheaper electricity rates for large industrial power users (mainly resource companies) that locate new plants in Ontario or expand existing operations.

Natural Gas

In 2012, **Enbridge** and **Union** each launched revamped three-year Demand-Side Management (DSM) plans containing several new and redesigned programs covering the period 2012-2014. Although the metrics have changed, thus making it difficult to compare past to current performance, first year results of Enbridge and Union against their targets were positive and are discussed in Section 2.2. The two companies exceeded most of their targets.

Oil and Propane

No government programs for the conservation of oil and propane currently exist. As with previous years, no conservation targets for these fuels or targets for reduction of thermal energy use have been developed by the government. Government programs directed at reducing or displacing the use of these fuels, as well as natural gas and electricity, in residential, commercial and institutional uses (the Home Energy Savings residential retrofit program and the **Ontario Solar Thermal Heating** incentive program for commercial and institutional space heating) ended in 2011, except for home energy audit assistance which ended in March 2012.

Transportation Fuels

There was little activity in 2012 to reduce or make more efficient use of transportation fuels (e.g., modal shift from single occupant vehicles to rapid transit). As reviewed in the **ECO's Annual Greenhouse Gas Progress Report 2012**, the Ministry of Transportation (MTO) reduced a number of relevant programs. The ministry scaled back the budget of the Electric Vehicle Incentive program, designed to encourage adoption of electric vehicles and build charging infrastructure. The ministry put an early end to the Green Commercial Vehicle program, intended to reduce fuel use and greenhouse gas emissions from commercial vehicles. Finally, there were no developments related to MTO's stated intention to review next steps in planning a high-speed rail link between Windsor and Quebec City.[5]

Some action related to MTO's sustainability strategy, **Sustainability inSight**,[6] was evident during the reporting year. The strategy is intended to make the ministry a more sustainable organization and support a more sustainable provincial transportation system. The ECO reviewed this strategy in our 2011/2012 Annual Report.[7] In 2012, the ministry publicly released its first **Sustainability Implementation Plan** (SIP)[8] under the strategy, which outlines specific projects or commitments that the ministry will take over the course of three years (2011-2013) to achieve the strategy's seven goals. The plan contains a description of projects in varying stages of implementation, 2011 achievements, and 2012 and 2013 milestones with associated metrics which are mainly non-quantitative in nature. The SIP indicates that the ministry will provide a comprehensive update on all commitments in the current plan when it releases its next SIP at the end of the three-year period.

There has been meager progress towards targets established by the government for the substitution of lower carbon transportation fuels (e.g., greater market penetration of electric vehicles and low-carbon liquid fuels). In 2012, decisions on funding and building new transit for the Greater Toronto and Hamilton Area, as well as other regions of the province, were under review during the year. Overall, there was very modest activity to report on transportation fuels, and these are covered in Section 2.1.

2 Summary of Progress on All Targets

IN 2012,

65% OF

6,000 GWh

ENERGY TARGET
FOR 2014 WAS ACHIEVED
BY ONTARIO DISTRIBUTORS

Government-Established Targets

THE ECO'S MANDATE INCLUDES REPORTING ON ONTARIO'S PROGRESS IN MEETING GOVERNMENT-ESTABLISHED TARGETS TO REDUCE OR MAKE MORE EFFICIENT USE OF ENERGY.

The ECO considers "government-established targets" to result from either a formal government policy or a minister directing activities that specify an amount of energy to be conserved.[9] To date, the ECO has completed a detailed analysis of progress towards most of these targets, and references have been provided in various summary tables to direct the reader to the location of the analysis.

Targets for Natural Gas

Ontario's two large natural gas utilities (Enbridge Gas Distribution and Union Gas) have annual performance targets for their conservation activities, and progress on these targets is summarized in Section 2.2. While these targets are not "government-established targets," the ECO also reports on them to provide a more complete understanding of the state of energy conservation in Ontario. Each utility has three sets of targets measuring the success of conservation programs in the areas of: (1) resource acquisition; (2) conservation for low-income households; and (3) market transformation.

2.1 UPDATE ON GOVERNMENT-ESTABLISHED ENERGY TARGETS

The tables in this Section provide an overview of progress towards government-established energy targets for the 2012 reporting year.

2.1.1 A GUIDE TO THE TABLES ON GOVERNMENT TARGETS

TABLE 1 outlines the energy targets that are specifically set for government ministries. It is each ministry's responsibility to meet its respective target. Some of these targets influence activities across the entire province, while others influence activities internal to government. As evident from the table, all current targets were set prior to 2010.

TABLE 2 summarizes the active electricity conservation targets in Ontario contained in directives issued to the Ontario Energy Board (OEB) and the Ontario Power Authority (OPA), which the OPA and Local Distribution Companies (LDCs) are responsible for achieving. These targets are based on the new electricity conservation policies unveiled in 2010 and 2011.

In Section 3 of this report, a more detailed analysis of progress towards two targets is provided: electricity conservation in Ontario government operations (Section 3.1) and Year 2 of the LDC Conservation and Demand Management targets (Section 3.2).

Table 1: Summary of Government-Established Energy Targets for Ministries

Provincial Targets		
Target		**Progress on Target**
Initiative	Premiers' agreement at the 2008 Council of the Federation (COF)	Progress on the target is undetermined as the ministry has still not provided the methodology to measure progress against the 20% target. The government took the following new initiatives to increase Ontario's energy efficiency: more stringent efficiency measures were added to the updated 2012 Ontario Building Code to take effect in 2017; in December 2012 Ontario's minimum energy efficiency regulation, O. Reg. 82/95, was replaced by O.Reg. 404/12 reformatted to be more user-friendly, setting new/revised minimum energy performance standards, and/or test methods for 45 products (see Section 4.1); and regulatory amendments were passed in October 2012 to facilitate new innovative financing mechanisms for home retrofits (see Section 5, Volume One - 2012). Indirectly related to the COF 2008 target, at the 2012 COF meeting, it was agreed to renew a COF 2007 energy vision strategy, **A Shared Vision for Energy in Canada**, with a new **Canadian Energy Strategy**. This strategy existed prior to the setting of the 20% improvement goal at the 2008 COF meeting. Ten cross-Canada teams were formed to evaluate each of the Canadian Energy Strategy's areas of focus, including Team 1, to promote energy efficiency and conservation. (As of October 2013, Team 1 had not held any meetings).
Description	20% energy efficiency improvement in Ontario by 2020.	
Responsibility to address	Ministry of Energy	
Date announced	2008	
Completion date	2020	
ECO Report Section	2009 (Volume Two, Section 3.1)	
Initiative	Low Carbon Fuel Standard (LCFS)	Little measurable progress towards this target has been made. To a substantial degree, all of the issues identified previously by the ministry[10] remain apparent (see also Section 2.1.2). In 2012, monitoring and discussions occurred regarding how to move forward towards establishing an LCFS regulation for Ontario. The ministry advised that at this point, with or without an LCFS, the achievement of a 10% reduction in the carbon intensity of fuels by 2020 is uncertain in Ontario and also in jurisdictions that have enacted an LCFS because of a lack of commercially available methods to comply (e.g., wide-scale production of cellulosic biofuels). The ministry indicated that Ontario has other policies in place that support the lowering of carbon intensities in transportation fuels including blending low carbon biofuels with gasoline and diesel and replacing gasoline and diesel with alternative, lower carbon, fuel-vehicle systems (tax incentives in place for natural gas, propane, and electricity).
Description	10% reduction in carbon intensity from transportation fuels by 2020.	
Responsibility to address	Ministry of Energy	
Date announced	2007	
Completion date	2020	
ECO Report Section	2009 (Volume Two, Section 3.5)	

Provincial Targets		
Target		**Progress on Target**
Initiative	Electric vehicle (EV) purchases	As of December 31 2012, 653 purchase incentive grants and 848 green licence plates have been issued for EVs. In December 2012 the government announced details for EV charging station rebates. The **EV Charging Incentive Program** was launched on January 1, 2013. EV rebate recipients will be eligible for an additional rebate of up to $1,000 or 50% (whichever is lower) for the purchase and installation costs of a home charging station. As **previously mentioned by the ECO**, the 2012 Ontario Budget combined the EV purchase incentive budget ($84 million) and fund to spur development and investment in EV charging stations ($80 million) and reduced the total budget by $43.1 million. Following tabling of the Budget, in response to an ECO inquiry, MTO indicated that due to slow uptake and fiscal pressures the total budget for the combined initiative has been reduced by $101 million (i.e., the total budget is now $63 million). Preliminary EV charging infrastructure (i.e., pre-wiring construction) has been installed at four GO transit stations and incorporated into the design of new parking at five GO stations. Metrolinx issued a Request for Information for the installation and operation of EV chargers at the nine stations. The RFI process closed on June 27, 2012. (A Request for Proposals was issued in April 2013).
Description	1 in 20 vehicles driven in Ontario by 2020 to be an EV.	
Responsibility to address	Ministries of Transportation (MTO), Economic Development and Innovation, Infrastructure, and Energy	
Date announced	2009	
Completion date	2020	
ECO Report Section	2009 (Volume Two, Section 3.6)	
Initiative	Education sector energy consumption reduction	The **Utility Consumption Database** (UCD) was launched in August 2009. The UCD has collected electricity and natural gas consumption data for the 2009/10 school year, September to August, (the baseline year), the 2010/11 school year, and 2011/2012 school year. The provincial average energy intensity for the sector was: 0.73 GJ/m^2 in the 2009/10 school year 0.79 GJ/m^2 in the 2010/11 school year 0.68 GJ/m^2 in the 2011/12 school year[11]
Description	Establishment of a database to gather energy consumption data and set benchmarks.	
Responsibility to address	School boards assisted by the Ministry of Education	
Date announced	2008	
Completion date	Not applicable	
ECO Report Section	2011 (Volume Two, Section 4.0)	
Initiative	Ontario Public Service energy consumption reduction	Exceeded annual reduction target for vehicle fuel consumption in 2009/10, but not met in 2010/11, 2011/12 or 2012/13. Exceeded annual reduction targets for air travel in the first four years (2009/10, 2010/11, 2011/12, 2012/13). Exceeded annual reduction targets for energy used in government buildings in the first four calendar years (2009, 2010, 2011, and 2012).[12] Progress towards 2014 and 2020 targets will be reported on an ongoing basis.
Description	Annual reduction of 5% for the period 2009-2014 in each of vehicle fuel consumption, air travel, and energy used in government buildings.	
Responsibility to address	Ministry of Government Services	
Date announced	2009	
Completion date	March 2014	
ECO Report Section	2009 (Volume Two, Section 4.7)	

Provincial Targets		
Target		**Progress on Target**
Initiative	Electricity conservation in Ontario government operations	Government achieved 80% of its 2007 target. According to the Ministry of Infrastructure, the government has tentatively achieved 100% of its additional 10% by 2012 target. Final results are pending third party verification. The overall government reduction is expected to be 20% from the 2002/2003 electricity baseline, thereby achieving the total cumulative target.
Description	A two-step target measured against a baseline of 2002/03 electricity use: a 10% reduction in the government's own electricity use by 2007, and an additional 10% by 2012.	
Responsibility to address	Ministry of Infrastructure with assistance from Infrastructure Ontario	
Date announced	2004 and 2007	
Completion date	2007 and 2012	
ECO Report Section	2010 (Volume Two, Section 2.3.2)	
Initiative	Energy conservation in Ontario government operations	Progress to be monitored on an ongoing basis.
Description	A two-step target measured against a baseline of 2006 GHG emissions: a 19% reduction in GHG emissions in government-owned buildings by 2014, and a 27% reduction by 2020. Emissions reductions will be translated to a kWh-equivalent target to track energy savings.	
Responsibility to address	Ministry of Infrastructure	
Date announced	2009	
Completion date	2014 and 2020	
ECO Report Section	2012 (Volume Two, Section 3.1)	

Table 2: Summary of Government-Established Provincial Electricity Conservation Performance Targets for the OPA and LDCs

Provincial Targets*		
Target		**Progress on Target**
Initiative	Province-wide electricity conservation targets contained in the **Long-Term Energy Plan** and the February 2011 Supply Mix Directive[13]	2,445 MW of peak demand savings as of year-end 2012 (54% of 2015 peak demand target).[14] 7,615 GWh of energy savings as of year-end 2012 (59% of 2015 energy target). Note: A large portion of the savings claimed (60% of the energy savings and 37% of the peak demand savings) are attributed to codes & standards changes or to "non-OPA programs". Despite repeated inquiries by the ECO, the OPA was unwilling or unable to provide the ECO with an acceptable account of how these savings were estimated, or even with a list that identified the amount of savings attributed to each specific program, code, or standard. For this reason, the ECO does not vouch for even the approximate accuracy of these numbers.
Description	2015 target: 4,550 MW of peak demand savings and 13 TWh of energy savings (baseline year 2005). 2020 target: Additional 1,290 MW of peak demand savings and 8 TWh of energy savings (annual targets of 5,840 MW and 21 TWh). 2025 target: Additional 860 MW of peak demand savings and 4 TWh of energy savings (annual targets of 6,700 MW and 25 TWh). 2030 target: Additional 400 MW peak demand savings and 3 TWh of energy savings (annual targets of 7,100 MW and 28 TWh).	
Responsibility to address	Ontario Power Authority	
Date announced	November 2010 and February 2011	
Completion date	2015, 2020, 2025 and 2030	
ECO Report Section	2010 (Volume Two, Section 2.4.2)	
Initiative	Conservation and Demand Management Directive for electricity distributors for the period 2011-2014	378.7 MW expected to persist until 2014, as of year-end 2012 (29% of 2014 peak demand target).[15] 3,906 GWh of cumulative energy savings achieved as of year-end 2012 (65% of 2011-2014 energy target).
Description	1,330 MW of provincial peak demand reduction persisting at the end of the four year period, and 6,000 GWh of reduced electricity consumption accumulated over the four-year period. Distributors were allocated a share of the province-wide target and are required to submit annual reports on progress to the Ontario Energy Board. Achievements contribute to, but are measured separately from Long-Term Energy Plan targets (which also include savings from codes & standards, pricing policy, and non-OPA/LDC programs).	
Responsibility to address	Local Distribution Companies, with oversight by the Ontario Energy Board	
Date announced	March 2010	
Completion date	2014	
ECO Report Section	2011 (Volume Two, Section 3.2)	

Notes:

* The OPA funds programs that contribute to the provincial targets, based on procurement authority of four **directions** from the Ministry of Energy (directions for demand response programs, OPA-LDC conservation programs, a low-income conservation program, and an industrial conservation program). In addition, the OPA procures combined heat and power generation, which promotes more efficient use of energy, through a separate direction that authorized up to 1,000 MW of combined heat and power. At the end of 2012, the OPA had procured 472.2 MW of combined heat and power generation under this direction. These projects do not contribute to the provincial targets in this table.

ECO Comment

The ECO commends the government's continued progress towards long-term, province-wide electricity reduction targets contained in the **Long-Term Energy Plan**. However, the ECO also notes that 60 per cent of the energy savings and 37 per cent of the peak demand savings claimed are attributed to changes in codes and standards, and programs, the results of which cannot be verified by the ECO (see Table 2). Nonetheless, the ECO looks forward to the release of the renewed Long-Term Energy Plan in 2013 to provide ongoing direction and a prominent role for conservation in the province's energy future.

However, there are a number of other policy, regulatory and implementation gaps in the government's conservation efforts. The ECO remains concerned that the Ministry of Energy continues to ignore the need for a methodology to measure progress towards the Council of the Federation (COF) target for improving energy efficiency (Table 1). The ministry has provided no indication of progress on a methodology to measure the 20 per cent improvement target and hence no progress towards the target. It does not appear that participants raised the specific 2008 COF commitment of a 20 per cent improvement at either the 2012 or 2013 COF annual meetings, although action on energy conservation as part of a **Canadian Energy Strategy** was directed by the Council. A progress report released at the COF meeting in July 2013 indicated that a team to promote energy efficiency and conservation was formed as directed by the Council at its 2012 meeting. However, no conservation team meetings have been held to date. As mentioned in **past reports**, it is the ECO's position that the ministry is obliged to develop a methodology to measure progress on the target set at the 2008 COF meeting.

The ECO is further troubled by the Ministry of Energy's lack of direction on its **2007 commitment** to establish a Low Carbon Fuel Standard (LCFS) regulation to reduce the carbon intensity of transportation fuels by 10 per cent by 2020 (Table 1). The ECO believes that the ministry's delay in providing a clear framework for an LCFS regulation discourages investment and ultimately slows growth in the innovation and adoption of low-carbon fuel technologies in Ontario. Despite research and consultations conducted in 2008, the ministry has shown little measurable progress. The ministry also suggests that an LCFS is not technically feasible and questions the environmental benefits (see Section 2.1.2). If the ministry determines that an LCFS is unworkable, it should identify comparable carbon reductions in the transportation sector through alternative policy measures.

2.1.2 DIRECTION WANTED ON ONTARIO'S LOW CARBON FUEL STANDARD

Background

The Ontario government made scant progress in 2012 to reduce greenhouse gas (GHG) emissions from the transportation sector. In 2007, Ontario and California signed a **Memorandum of Understanding** (MOU) committing each jurisdiction to reduce the carbon intensity of transportation fuels by10 per cent by 2020.[16] Central to the commitment was the Low Carbon Fuel Standard (LCFS), but six years later, little progress has been made in Ontario to establish an LCFS regulation.

The LCFS incents the development and use of fuels that have lower carbon intensities than conventional gasoline or diesel. Carbon intensity values are assigned to a variety of transportation fuels and are calculated based on life-cycle GHG emissions created during the production/extraction, refining, transportation, and use of that fuel. By the end of 2012, the LCFS displaced approximately 6.2 per cent of total gasoline and diesel fuel from **California's fuel pool**.[17] According to an independent analysis conducted for the ECO, a similarly-designed Ontario LCFS could achieve approximately four per cent[18] of the GHG reductions required to meet the province's Climate Change Action Plan target for 2020.[19]

Ontario dithering

The Ministry of Energy began to assess the appropriateness of an Ontario LCFS in 2008. It met with California's LCFS regulator; held private consultations with stakeholders; commissioned a study to assess different life-cycle models; and held a conference where it publicly announced a commitment to the LCFS. However, for two years, the Ministry has told the ECO an Ontario LCFS may be hindered by issues such as the commercial immaturity of fuels that meet LCFS targets, and the complexity of modeling life-cycle emissions, especially from 'indirect' effects (e.g., land use change.)[20] The Ministry also questions the environmental benefit of an LCFS, since it does not guarantee absolute emissions reductions and may result in 'fuel shuffling,' where emissions are transferred to other jurisdictions without an LCFS regulation.

Benefits of an LCFS

Other jurisdictions have used the LCFS to discourage the use of conventional gasoline, diesel, and carbon intensive biofuels such as ethanol from corn,[21] and to spur investment and development in alternative fuels and fuel technologies. Since the LCFS does not dictate the type or volume of fuel that must be used to achieve compliance, an LCFS offers its regulated parties (e.g., fuel importers, refiners, fueling station owners) greater flexibility compared to current federal fuel standards.[22] Regulated parties may blend low carbon fuels with conventional fuel, substitute conventional fuels with low carbon fuel-vehicle systems that can run on liquefied or compressed natural gas, hydrogen, propane or electricity, or develop 'advanced biofuels' such as cellulosic ethanol, pending commercial availability[23] to achieve compliance.

Fuel shuffling can be reduced if multiple jurisdictions agree to harmonize fuel standard frameworks through commitments such as the Ontario-California MOU. In the U.S., 21 states are evaluating potential clean fuel standards or low carbon fuel policies,[24] and Oregon now has an LCFS. In Canada, **British Columbia has had an LCFS regulation** since 2008, although it has been criticized for failing to distinguish between fuels produced from conventional crude oil and fuels produced from the oil sands, which have higher lifecycle greenhouse gas emissions.[25]

What now in Ontario?

If Ontario does not implement an LCFS, the ECO questions what alternative measures exist to achieve similar GHG reduction targets and fulfill the province's MOU commitment. Five per cent ethanol in Ontario's gasoline pool has been achieved through **O.Reg. 535/05**,[26] but the regulation does not provide targets for the uptake of alternative fuels. Ontario has also **cancelled programs** to encourage efficient vehicle use, such as tax credits for fuel conservation and alternative fuel use in 2010.[27] While natural gas and electricity remain exempt from fuel taxes, funding for incentive programs to encourage lower carbon fuel-vehicle systems, such as the Electric Vehicle Incentive program, has declined.[28] The ECO strongly encourages the government to provide clear direction on how it intends to meet its commitment to reduce the carbon intensity of Ontario's transportation fuels by 10 per cent by 2020. Since the Ministry of the Environment has responsibility for regulating other transportation fuel qualities (e.g., vapour pressure, sulphur, benzene) to control emissions, it may be more appropriate to lead implementation of the MOU's LCFS commitment.

The ECO recommends that responsibility for implementing the government's commitment to a low carbon fuel standard be assigned to the Ministry of the Environment.

2.2 UPDATE ON NATURAL GAS UTILITY CONSERVATION TARGETS

An Updated Policy Framework for Natural Gas Conservation

The 2012 conservation results of Ontario's two largest natural gas distributors, Enbridge Gas Distribution and Union Gas, provide the first chance to assess whether an updated policy framework has improved conservation programs for Ontario's natural gas consumers. 2012 was the first year that utility conservation programs were subject to a new version of the Ontario Energy Board's Demand Side Management Guidelines for Natural Gas Utilities ("**the Guidelines**").

The new Guidelines set three primary goals for natural gas utility conservation programs: maximizing cost-effective natural gas savings; preventing lost opportunities (conservation opportunities that, if not currently undertaken, will be impossible or much more expensive to carry out later); and, pursuing "deep" energy savings (substantive measures that endure for a long period, such as improvements to a building's envelope, which often have a higher initial cost). In addition, the Guidelines require a larger focus on conservation programs that will benefit low-income households.[29]

Following the release of the new Guidelines, both gas utilities developed three-year plans for conservation programs covering the years 2012 to 2014, which were approved by the Ontario Energy Board (OEB or "the Board") in early 2012.[30] The three-year plans lay out the utilities' proposed conservation programs and program budgets, targets against which their performance will be measured, and the financial incentives that Enbridge and Union can receive for successful conservation efforts. These plans were developed in consultation with stakeholder groups, and both utilities were able to reach near-complete consensus on the contents of the plans prior to applying to the Board.[31]

Gas conservation programs for 2012 to 2014, as described in the approved three-year plans, differ in some key elements from conservation programs delivered in 2011 and earlier. These differences reflect the objectives of the new Demand Side Management Guidelines. The primary metric for conservation performance is now "lifetime natural gas savings" (the volume of natural gas savings achieved over the life of a conservation measure), a change which favours deep conservation measures such as insulation that will contribute to lowered gas consumption for many years. Both utilities have introduced customized programs to meet the new objectives of achieving deep energy savings or preventing lost opportunities. For example, Enbridge introduced a **Community Retrofit Program** that will target whole-home energy savings of 25 per cent or more in older energy-inefficient homes in selected neighbourhoods. This program addresses

the objective of deep energy savings, replacing previous conservation efforts for the residential sector that were largely focused on simple measures such as hot water pipe insulation and low-flow showerheads. Enbridge is also dedicating more resources to its **Savings by Design program**, which works with builders early in the design phase to improve the energy performance of new buildings, thus avoiding lost opportunities. Reflecting the greater degree of innovation in the new plan, Enbridge is devoting a larger share of its budget to "market transformation" programs, which aim to fundamentally increase the market for certain energy-efficient products and services over the long term.

For its part, Union also developed a market transformation program for high-efficiency homes, a home retrofit program, and an energy management program for the industrial sector, although it did not invest in market transformation programs to the degree that Enbridge did in 2012.

A final key change in the 2012-2014 conservation plans is that both utilities will be devoting larger amounts of their budget to conservation programs for low-income households.

2012 Results

The 2012 conservation results are presented for Enbridge in Table 3 and Figure 1, and for Union in Table 4 and Figure 2. All results are displayed against the targets from the utilities' three-year conservation plans. There are financial implications for the utilities based on their performance against these targets. Each utility is eligible for financial performance incentives based on: the budget for each program type, the weight assigned to each target, and the utility's progress towards the target. The target weighting, therefore, serves as a proxy for the amount of resources that a utility will dedicate towards achieving a target. For example, within its Resource Acquisition programs, Enbridge will place much more importance on reaching its lifetime natural gas savings target compared with its deep savings targets, given the much greater weight assigned to this target. Based on the 2012 results, the utilities will be eligible for $17.0 million ($8.8 million for Enbridge and $8.2 million for Union) in Demand Side Management Incentives. These incentives are paid for by natural gas ratepayers. For this reason, utility results are independently audited and the program assumptions used to calculate results are closely scrutinized by a technical evaluation committee. The results show that both Enbridge and Union were generally successful in reaching most of their targets.

Table 3: Summary of 2012 Conservation Targets – Enbridge Gas Distribution

Program Type	Target Description	Progress on Target	Target Weight
Resource Acquisition Programs (61.6% of total budget)	820.4 million m^3 of lifetime natural gas savings, due to 2012 conservation programs	1000.86 million m^3 of lifetime natural gas savings (123% of target)	92%
	Residential deep savings – 200 houses completing deep retrofits*	209 houses completed deep retrofits (105% of target)	4%
	Commercial/industrial deep savings - 45% of commercial/industrial custom conservation participants achieving at least 25% in total bill savings	25% of participants achieved at least 25% in total bill savings (56% of target)	4%
Low-Income Programs (22.7% of total budget)	17 million m^3 of lifetime natural gas savings in single family homes, due to 2012 low-income conservation programs	24.71 million m^3 of lifetime natural gas savings (145% of target)	50%
	45 million m^3 of lifetime natural gas savings in multi-residential buildings, due to 2012 low-income conservation programs	43.41 million m^3 of lifetime natural gas savings (96% of target)	50%

Program Type	Target Description	Progress on Target	Target Weight
Market Transformation Programs (15.6% of total budget)	8 builders/developers enrolled in Commercial Savings by Design program for higher-performance design of new commercial/industrial buildings	9 builders enrolled (111% of target)	20%
	2 of the top 20 volume residential homebuilders enrolled in Residential Savings by Design program for higher-performance design of new low-rise residential buildings	3 of top 20 builders enrolled (150% of target)	14.6%
	9 of the top 80 volume residential homebuilders enrolled in Residential Savings by Design program for higher-performance design of new low-rise residential buildings	9 of top 80 builders enrolled (100% of target)	14.6%
	4000 drain water heat recovery units installed in new homes	5047 drain water heat recovery units installed (126% of target)	43.8%
	Commitment from realtors responsible for at least 5000 listings to include energy rating information on home sale listings	Realtors responsible for 8600 listings committed to including energy rating information in future (172% of target)	7%

Source: Enbridge Gas Distribution, **2012 Demand Side Management Final Annual Report (2013)**.

(RED: <75% OF TARGET; BLUE: 75-125% OF TARGET, GREEN: >125% OF TARGET)

Notes:
* Defined as houses undertaking at least 2 major conservation measures and achieving at least 11 000 m^3 in lifetime gas savings.

Table 4: Summary of 2012 Conservation Targets – Union Gas

Program Type	Target Description	Progress on Target	Target Weight
Resource Acquisition Programs (53.5% of total budget)	826 million m^3 of lifetime natural gas savings, due to 2012 conservation programs	887.30 million m^3 of lifetime natural gas savings (107% of target)	90%
	Residential deep savings - 160 houses completing deep retrofits	73 houses completed deep retrofits (46% of target)	5%
	Commercial/industrial deep savings - 5% reduction in gas consumption for all commercial/industrial custom conservation participants, compared with baseline	9.36% reduction in gas consumption for participants (187% of target)	5%
Low-Income Programs (26.1% of total budget)	30 million m^3 of lifetime natural gas savings in single family homes, due to 2012 low-income conservation programs	44.04 million m^3 of lifetime natural gas savings (147% of target)	65%
	13 million m^3 of lifetime natural gas savings in multi-residential buildings, due to 2012 low-income conservation programs	11.87 million m^3 of lifetime natural gas savings (91% of target)	35%

Program Type	Target Description	Progress on Target	Target Weight
Market Transformation Programs (3.2% of total budget)	2 of the top 10 volume residential homebuilders enrolled in Optimum Home program for higher-performance design of new low-rise residential buildings	3 of top 10 builders enrolled (150% of target)	50%
	8 of the top 50 volume residential homebuilders enrolled in Optimum Home program for higher-performance design of new low-rise residential buildings	8 of top 50 builders enrolled (100% of target)	50%
Large Industrial Programs (17.3% of total budget)	1,000 million m^3 of lifetime natural gas savings, due to 2012 conservation programs	1,392.93 million m^3 of lifetime natural gas savings (133% of target)	100%

Source: Union Gas, **Final Demand Side Management 2012 Annual Report (2013)**.

The utilities were successful in 2012 in reaching many more low-income households with conservation measures, including deep retrofits. These programs are offered at no cost to participating households. In 2011, Enbridge had 599 participating homes in its low-income retrofit program; in 2012, this program reached 1,107 households and 57 larger multi-residential buildings. Union reached 450 households with its low-income retrofit program in 2011 and 1,755 households in 2012. A change in the Guidelines to allow low-income residents to participate even if they do not directly pay the utility bill has enabled many social housing buildings to be retrofitted.

Enbridge and Union were successful in reaching the targets for their new market transformation programs. The metrics for market transformation programs will become more sophisticated as these programs mature. For example, the metrics for Enbridge's Residential Savings By Design program will expand, from initially focusing solely on the number of builders who have enrolled in the program, to also measuring the number of higher performance homes actually built.

The distribution of natural gas savings by sector is shown in Figure 1 and Figure 2. There are notable differences between the two gas companies. Historically, Enbridge has derived the bulk of natural gas savings from the commercial sector (which also includes large multi-residential and institutional buildings), while the industrial sector dominates savings in Union's service territory.

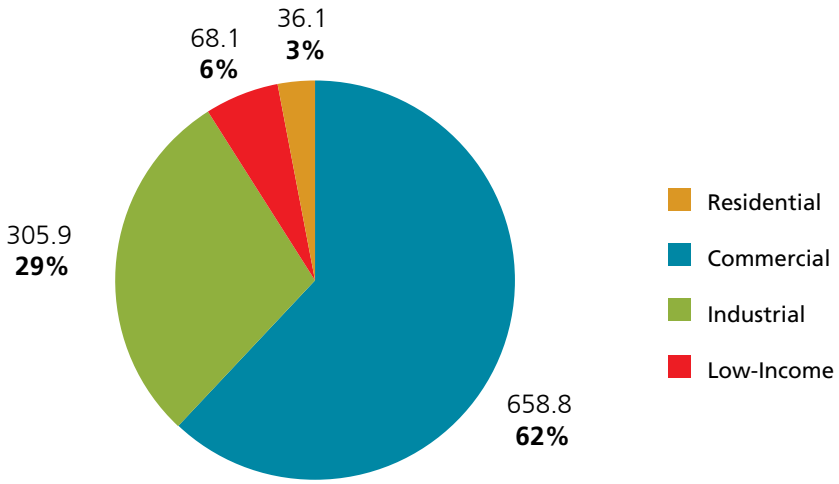


Figure 1: Lifetime Natural Gas Savings (million m³) from 2012 Conservation Programs, By Sector – Enbridge Gas Distribution

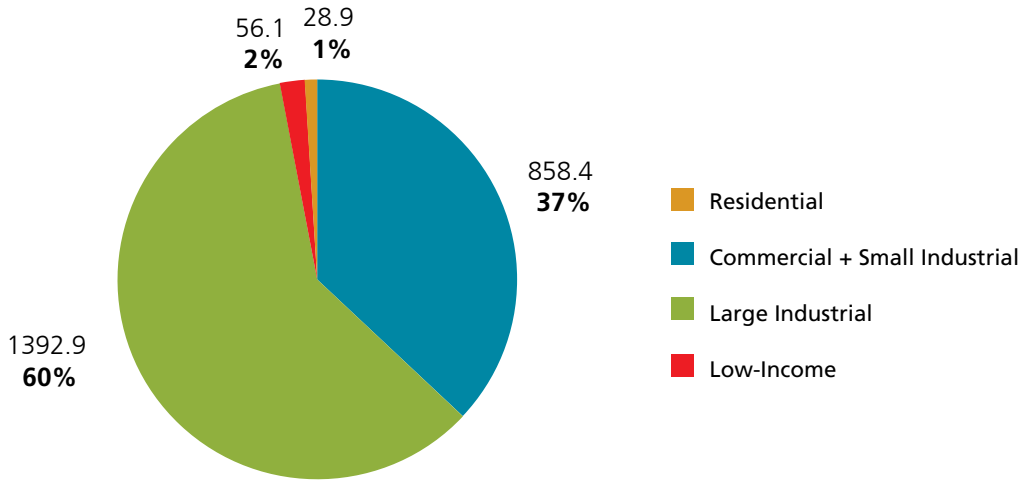


Figure 2: Lifetime Natural Gas Savings (million m³) from 2012 Conservation Programs, By Sector – Union Gas

Program Cost and Cost-Effectiveness

Not counting the utility performance incentives discussed above, the total spending on natural gas conservation programs in 2012 was $61.9 million ($30.6 million by Enbridge, and $31.3 million by Union). This represents a slight increase from 2011 (mainly due to larger budgets for low-income conservation programs allowed by the OEB), although still much less than is spent on electricity conservation. Spending on conservation programs continued to be very cost-effective for both Enbridge and Union customers. In 2012, Enbridge's resource acquisition programs cost about 1.35 cents for every cubic metre of natural gas saved, although this does not include any costs for conservation measures that are paid by participating customers. This cost of conservation is over ten times less than the delivered cost that consumers pay for a cubic metre of natural gas.[32] Enbridge's low-income conservation programs were still cost-effective but less so, ranging from 3.2 cents per cubic metre of savings for multi-residential buildings to 23.3 cents per cubic metre of savings for single family homes. These programs reach individuals who would otherwise be unable to participate in conservation programs.

Gas Conservation Programs in 2013 and Beyond

The programs offered by Union and Enbridge will remain essentially the same for 2013 and 2014, although the performance metrics and numerical targets that the distributors will be measured against will change from year to year.

In addition, Union made some changes to its conservation approach for large industrial consumers for 2013 and 2014.[33] Specifically, the **Association of Power Producers of Ontario** requested that gas-fired electricity generators be exempted from paying for conservation programs, and in return, would not be eligible to participate in these programs. Generators argued that Union's conservation programs were less valuable to them than to other industrial customers, and consequently generators believed they were subsidizing other customers (by paying for these conservation programs through their gas rates).

Union opposed allowing generators to opt out of conservation programs, but offered a solution to partially address generators' concerns about fairness. Union proposed establishing "self-direct" accounts for large industrial consumers, a suggestion that was **previously made by the ECO**.[34] Under this method, each customer, including gas-fired generators, will have exclusive access to an annual pot of funds, dedicated solely to their company, to undertake conservation measures through Union's programs. This provides each company with the opportunity to make sure that the money it has paid for conservation through gas rates goes to its own efficiency investments, and not to other customers. If a company does not use its funds by August 1, other industrial consumers could then access the money for their conservation projects. **This approach was approved by the OEB** in March 2013.

Beyond 2014, it is unclear whether the OEB will change the policy framework for natural gas conservation programs, by updating its Demand Side Management Guidelines, or will instead require the utilities to file new conservation plans under the existing Guidelines. In either case, it is likely that the program mix offered by the utilities will change in 2015, based on a better understanding of what has and has not worked well in the 2012 to 2014 period.

ECO Comment

The ECO believes that the new Demand Side Management Guidelines have been successful in improving the mix of conservation programs offered by the natural gas utilities. While the utilities' primary conservation goal is to deliver the largest possible amount of gas savings, focusing exclusively on this goal risks neglecting to develop future savings opportunities, and excluding some sectors and customers. In particular, as the ECO previously noted, the former policy framework limited residential conservation programs.[35] The broader mix of objectives in the new Guidelines reduces this risk, and the utilities have responded by broadening their program offerings, including expanded programs for the residential sector.

The ECO commends Union and Enbridge for continuing conservation programs for large industrial consumers, even though this is no longer required by the OEB. Industrial firms often do not make energy efficiency a priority without the impetus of utility assistance, given their focus on production. For this reason, utility programs can often uncover very cost-effective opportunities. Thus, industrial conservation programs have a history of delivering the largest energy savings per dollar.[36] The ECO is pleased that Union adopted the ECO's suggestion to offer self-direct funding for large industrial consumers and that the OEB approved this approach, preventing such customers from opting out entirely from paying for and accessing conservation programs.

The ECO notes that the OEB should promptly inform utilities whether it will extend the use of the existing Guidelines for the 2015 year, or update these Guidelines. If the latter, the Board should act immediately to give the utilities time to develop an updated set of programs. The ECO has previously identified two deficiencies in the Guidelines as they currently stand – the hard cap on conservation budgets (perhaps arising from uncertainty as to whether utility ratepayers or the government should have the lead role in funding gas conservation),[37] and the lack of any consideration of the climate change impacts of natural gas use.[38] The second issue in particular is of great concern. The ECO encourages the OEB to review these issues in its next update.

3 Select Targets

GOVERNMENT BUILDINGS USED

98 MILLION kWh LESS

ELECTRICITY IN 2012, COMPARED TO 2002/2003

3.1 ELECTRICITY CONSERVATION WITHIN GOVERNMENT OPERATIONS

3.1.1 INTRODUCTION

> "WE ALL HAVE A ROLE TO PLAY IN CONSERVING ENERGY. EVERY ACTION, NO MATTER HOW SMALL, CONTRIBUTES TO THE LARGER GOAL."[39]
> - HONOURABLE GERRY PHILLIPS, 2004

The Government of Ontario uses a large amount of energy to operate its many facilities, ranging from the office towers surrounding Queen's Park to the truck inspection stations along Highway 401. This energy (and associated emissions) footprint is one of the reasons why the government **committed to** reduce its own electricity use by 20 per cent by 2012, as measured against its 2002/2003 electricity needs.[40] According to the Ministry of Infrastructure (MOI), the government met this target and saved 98 GWh of electricity.* This is about equal to the amount used annually by 11,000 homes.

Success was never guaranteed. The government relied on a variety of programs to respond to the reduction target while resolving a major obstacle related to data verification, as it worked to reduce its own electricity use.

3.1.2 OVERVIEW

Two Halves Make a Whole: How the 20 per cent Target was set

The government committed to reduce its own electricity use by 20 per cent by 2012. This promise was made in two parts. First, in 2004, the government committed to reduce its electricity use by 10 per cent by 2007.[41] Second, in 2007, the government **renewed its commitment** and pledged to reduce its electricity consumption by an additional 10 per cent by 2012.[42]

* These savings are based on MOI internal estimates and pending third party verification.

A Major Obstacle: Tracking Historical Electricity Savings

Hundreds of different projects, such as building retrofits, operational improvements, development of standards and best practices, and employee awareness programs, were undertaken to conserve electricity after the government announced its 2007 target.[43] However, there was no central database to record all of the electricity used in different buildings and some ministries did not maintain a complete record of their electricity accounts. This lack of recordkeeping created a major obstacle because it was impossible to establish an accurate baseline, track progress and verify electricity savings. Electricity savings from these initial projects were estimated instead and, in 2007 relying on unverified data, the government mistakenly stated that it had reduced its electricity consumption by 12 per cent.[44] A third party was ultimately contracted to create a historical database to consolidate the different utility accounts and to fill in data gaps.[45] Once created, this central database provided valuable historical information on the amount of energy used within each government-owned building.

3.1.2.1 THE PLAYERS AND THEIR ROLES: INFRASTRUCTURE ONTARIO, CUSTODIAL MINISTRIES, AND THE MINISTRY OF INFRASTRUCTURE

Infrastructure Ontario is a crown corporation that manages many properties used by the provincial government.

A **custodial ministry** refers to one of the five ministries who manage the day-to-day operation of their own facilities independently of Infrastructure Ontario. These ministries include the Ministry of Transportation, Ministry of Education, Ministry of Child and Youth Services, Ministry of Community Safety and Correctional Services, and the Ministry of Natural Resources.

The **Ministry of Infrastructure** is responsible for reporting overall enterprise energy use for government-owned facilities, including those managed by Infrastructure Ontario and the custodial ministries. This ministry also funds energy conservation projects and capital improvements for government buildings.

Missing the 2007 Target: Analyzing Historical Electricity Data

Third-party verified electricity savings from the government's historical database revealed that the government was 2 per cent shy of its 2007 target, and had achieved an 8 percent reduction instead of the targeted 10 per cent lowering of consumption. Complete results are discussed in a **previous ECO report**.[46]

The historical database also revealed an important trend. Facilities managed by MOI and Infrastructure Ontario saved electricity at a rate of 2 per cent per year – almost twice the rate observed in facilities managed by individual ministries (referred to as "custodial ministries," see Section 3.1.2.1 for further details).[47] This discrepancy explains, in part, why the government did not meet its 2007 target. If unchanged, it would hinder the government's ability to meet its 2012 target. In response, the government took a variety of actions to improve electricity conservation in facilities managed by custodial ministries. As discussed in Section 3.1.2.2, conservation efforts also continued in facilities managed by MOI and Infrastructure Ontario.

Saving Electricity in Custodial Ministries

Although utility records for custodial ministries existed and were used to develop the historical database mentioned above, these ministries did not have access to the information necessary to track actual electricity used within their buildings.[48] MOI and Infrastructure Ontario worked with the Ministry of Government Services to make this data available and custodial ministries were also offered help with analyzing their utility data.[49] Together, these actions allowed custodial ministries to accurately track their energy consumption for the first time, and, ultimately, conserve more electricity. In addition, Infrastructure Ontario performed routine capital upgrades to building structures and equipment, like heating and cooling systems and windows.[50]

3.1.2.2 INFRASTRUCTURE ONTARIO'S ENERGY MASTER PLAN

The Energy Master Plan is a guidance document to support the government's energy conservation efforts. It applies to buildings operated by Infrastructure Ontario. The Energy Master Plan not only addresses some of the technical issues related to energy management, like how to measure and verify energy savings, but it also addresses organizational issues because it outlines how energy conservation programs should be planned and monitored.[51]

Using the Energy Master Plan, a **Short Term Energy Action Plan (2010 – 2012)** was developed to conserve electricity within Infrastructure Ontario's facilities.[52] Buildings were benchmarked and energy conservation projects were directed towards the highest consumers of energy. Some of those buildings underwent energy audits and/or received fine-tuning of their mechanical and electrical control systems. A set of minimum high performance energy standards for all ongoing capital investment projects was also developed.

Hitting the 2012 Target

Preliminary results from MOI indicate that the government met its 20 per cent electricity reduction target and saved 98 GWh of electricity.** A third party is currently reviewing the government's estimated electricity savings; the verified, final results were unavailable at the time of writing this report.[53]

3.1.3 NEXT STEPS

Even though there is no future target beyond 2012 specifically for electricity conservation, action on this file will not stop. A target to reduce greenhouse gas (GHG) emissions from government operations exists, so work to conserve electricity and other fuels will continue due to this target. (The GHG target can also be expressed in energy units, for example gigajoules or equivalent kilowatt-hours, to indicate the amount of energy being conserved). Lastly, as a result of a government directive, annual public reports for each ministry's energy consumption and GHG emissions will be available.

GHG Reduction Target

The government will continue to conserve electricity and other types of fuels as it works towards its future GHG reduction targets: a 19 per cent reduction in GHG emissions by 2014 and a 27 per cent reduction by 2020, compared against 2006 GHG emissions.[54] In response to this target, an internal 2 per cent annual reduction in energy target (measured in equivalent kilowatt-hours) has been set for facilities managed by Infrastructure Ontario. A GHG reduction target means conservation efforts are expanded from the previous sole focus on electricity to include fossil fuel-based energy like natural gas, propane, and heating oil. Since there is now a GHG target, it is worth restating a recommendation made in our **2011 Volume One** report that the Independent Electricity System Operator (IESO) make publicly available the estimated GHG emissions factors for Ontario's electricity consumption on an hourly basis.

This target also highlights an opportunity for the government to use alternative technologies for government-owned buildings, such as district energy systems. District energy systems provide heating and/or cooling services to multiple buildings by transporting hot or chilled water through a network of pipes. The ECO discussed the general benefits from using these systems, as well as the specific benefits from installing these systems in government-owned buildings, in this year's Volume One report.[55]

Annual Energy and GHG Reports: The Ontario Facilities Energy Reporting Directive

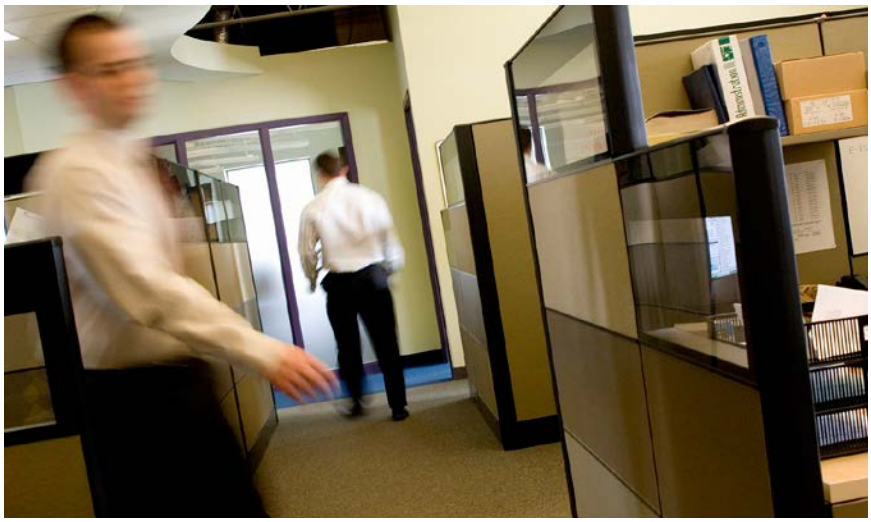
The Minister of Infrastructure recently issued a directive requiring annual energy and GHG emissions reports for government facilities. An information notice summarizing the directive was placed on the Environmental Registry (**#011-6798**) in August 2012. The Ontario Facilities Energy Reporting Directive requires government ministries to produce reports similar to those required for the broader public sector under **O. Reg. 397/11** (previous ECO reports have discussed this regulation and its requirements).[56]

** Electricity consumption was 366 GWh in 2012 vs. 464 GWh in 2002/2003.

A copy of the directive did not accompany the information notice. Instead, the posting described what will be required. With some exceptions of buildings where reporting is optional, each ministry must prepare a report for the facilities that it operates.[57] These reports must include a description of each ministry's building portfolio, an overview of any renewable energy technologies used, and actual consumption information by building for electricity, natural gas, generated steam, heating oil, diesel, propane, and water; any associated GHG emissions will be calculated. A five-year conservation strategy that includes an update on previously committed conservation efforts/targets is also a reporting requirement. The directive was finalized and became effective on January 1, 2013. Unlike the requirements for the broader public sector, no specific reporting deadline is provided in the directive. Instead, the directive's accompanying procedural manual - produced by MOI - outlines the timing requirements that ministries must follow for publishing their energy reports. According to this manual, custodial ministries are required to post plans publicly on an annual basis by June 1 each year (with government-wide results available by July 1). MOI did not make this directive public because it is an internal government policy.[58]

ECO Comment

MOI reports that the government has saved almost 100 GWh of electricity consumption annually in its buildings because of actions taken over the last eight years by MOI, Infrastructure Ontario, and custodial ministries. The ECO commends these ministries and Infrastructure Ontario for their work on achieving this target and offers some observations on the government's overall progress and its future path for energy conservation in its operations.



Overall Progress and Maintaining Momentum

The ECO commends the government for setting its original electricity conservation target, even though it did not initially have reliable 2002/2003 baseline data. Lessons from this were learned. The government did a significant amount of verification work to determine how much electricity was used in 2002/2003 and how much was saved across different facilities between 2004 and 2007. This target was a necessary first step in launching electricity conservation projects throughout government facilities. The target evidently changed mindsets within ministries and led to the development of verification and analytical tools.

While setting an electricity conservation target may be easy, achieving it can be hard. As outlined here, the average rate of conservation in facilities managed by custodial ministries lagged behind the average rate of conservation in facilities managed by MOI and Infrastructure Ontario. This corroborates the common sense view that access to data is needed to identify promising conservation opportunities. Custodial ministries now have the ability to readily access and analyze their energy and utility data – something that was impossible until they faced a target and needed tools to meet it.[59]

Maintaining momentum for electricity conservation in government facilities is perhaps the biggest challenge. Ontario's electricity system is mostly supplied by carbon-free sources, like nuclear and renewable energy, so the forthcoming work to reduce GHG emissions from government facilities will not likely focus on electricity conservation. Future electricity savings in government facilities could be even harder to achieve because so much has already been done over the last eight years. Despite this, the ECO encourages government ministries to continue working on electricity conservation. The Ontario Public Service's challenge will be to continue to conserve electricity at the rate of 2 per cent per year achieved during the past 10 years.

Electricity conservation remains important for several reasons. First, the Ontario government should set an example for the rest of the public sector. Second, the electricity system is built to meet peak demand, usually experienced in Ontario on hot summer afternoons. Government offices in many parts of the province contribute to this peak, and there has been opposition from communities across the province to the construction of transmission wires and any generating plants to meet this demand growth. Conservation replaces (or at least reduces and delays) the need for new facilities. Lastly, U.S. state governments, like Ohio and New York which face comparable challenges to Ontario, are pursuing continuous **improvement in their energy efficiency**.[60]

Ontario Facilities Energy Reporting Directive

As discussed in an earlier **ECO report**, energy reporting and requirements for the broader public sector were set out in August 2011, under **O. Reg. 397/11**.[61] In June 2012, the **ECO formally recommended** that the Minister of Infrastructure issue its Ontario Facilities Energy Reporting Directive by the end of 2012. The ECO commends MOI for finally issuing its directive, which makes information available on a building-by-building basis, for all energy consumed in government-owned facilities. However, we remain concerned about the directive's transparency and scope.

The ECO is dissatisfied that MOI failed to release a copy of the draft directive with the information notice posted on the Environmental Registry. Moreover, after the directive was issued, MOI informed the ECO that this directive is "internal government policy not intended for the public." The ECO sees no apparent reason to keep the directive confidential. Similar reporting requirements are outlined for the broader public sector under O. Reg. 397/11, a regulation that can be accessed by any Ontarian interested in their government's policies.

3.1.3.1 WHY NOT SHARE THE ONTARIO FACILITIES ENERGY REPORTING DIRECTIVE WITH THE PUBLIC?

The clear and transparent reporting of energy and GHG emissions in government facilities is one of the provincial government's guiding principles for managing its facilities.[62] The ECO believes that the reports that ministries produce to comply with the Ontario Facilities Energy Reporting Directive would be easier to understand if a copy of the directive was publicly available, since certain facilities are excluded from these public reports. At a time when the Ontario government is committed to being more open and transparent, the ECO wonders why the government chose not to share this directive with the public.

Many of the directive's requirements for energy and GHG emissions reports are similar to the requirements set out under O. Reg. 397/11, although the scope of the reporting is different. Ontario Regulation 397/11 requires broader public sector agencies to report on the energy used and GHG emissions released from facilities that these agencies own or *lease*. MOI's Ontario Facilities Energy Reporting Directive does not require information to be reported for leased government facilities, which likely means that energy used in leased facilities will not be tracked.

The ECO believes that 15 to 20 per cent of the government's occupied floor space occurs in leased facilities. This is a significant portion, and there is no guarantee that this number would not increase or decrease in the future. As such, the ECO requested that MOI estimate how much energy is used by these leased facilities. MOI indicated that the energy used in leased facilities is not tracked and is difficult, if not impossible, to acquire because building owners, not tenants, have access to this information. Although there are currently no requirements for third party landlords to divulge energy information to tenants (including the Ontario government) and it can be difficult for MOI to obtain this information, the ECO believes that MOI should undertake work to track, or at least estimate, energy use within leased facilities. A method to estimate energy use where tenant-specific information is not available is used by the broader public sector to meet its energy reporting requirements under O. Reg. 397/11.

MOI has demonstrated it can overcome informational barriers to energy reporting. After all, when the government originally committed to reduce its own electricity use, access to energy data for buildings operated by custodial ministries was limited. As outlined in this section, a significant amount of work was undertaken to resolve this. Now, custodial ministries and MOI are able to accurately manage, track, and report on the energy used across government-owned buildings as required by the Ontario Facilities Energy Reporting Directive.

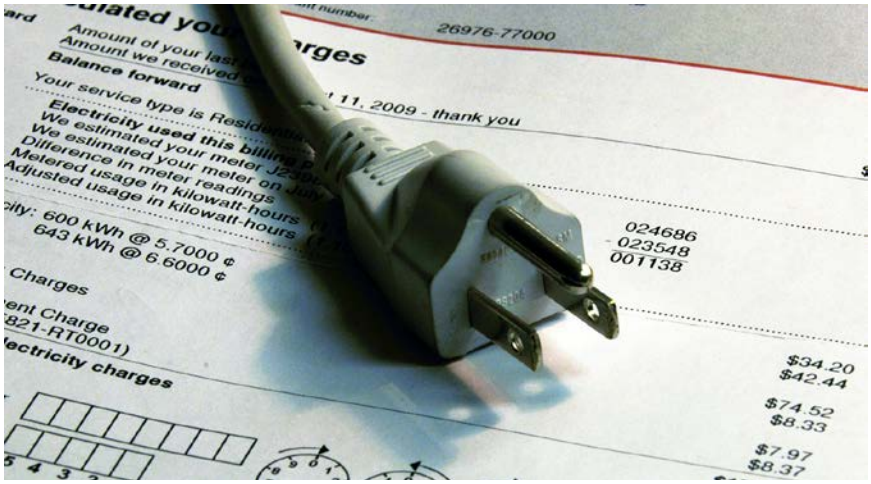
The ECO notes that the blanket exclusion of leased facilities from the Ontario Facilities Energy Reporting Directive creates a barrier to understanding the energy use of these facilities. Once this barrier is removed, the government can assess if there are opportunities to reduce the energy consumed.

The ECO recommends that the Ministry of Infrastructure amend the Ontario Facilities Energy Reporting Directive to include leased facilities.

3.2 THE 2014 LDC ELECTRICITY CONSERVATION TARGET, YEAR TWO

3.2.1 INTRODUCTION

We are now halfway through the operating period of the **2011-2014 framework** for electricity conservation programs in Ontario, and in a better position to predict final results. This framework assigned a cumulative energy savings target and a peak demand reduction target to each LDC, and required the OPA and LDCs to work together in the design and delivery of conservation programs. In aggregate, the targets are 6,000 GWh of energy savings over four years and 1,330 MW of peak demand reduction.



As **previously reported by the ECO**, the first year of the framework's operation, 2011, was marred by: a late start in launching some programs; the inability to get customized, LDC-specific, programs approved by the Ontario Energy Board (OEB); and difficulties in the operational relationship between the OPA and the LDCs.[64]

The year 2012 saw improvements in the relationship between the OPA and LDCs for program administration, strong performance of business conservation initiatives, and the roll out to many areas of the province of several major initiatives (e.g., the residential *peaksaver* **PLUS initiative** and the **low income conservation program**). Overall, the suite of conservation programs provided good value for ratepayers. On the downside, the performance of residential conservation initiatives tailed off sharply in 2012, and it now seems certain that many LDCs will not meet their 2014 peak demand targets. Crucially, the policy framework and long-term funding for conservation beyond 2014 remains uncertain.

3.2.2 2012 PROGRAM RESULTS

Results from the suite of province-wide electricity conservation initiatives are presented in Table 5. These initiatives are marketed using the saveONenergy brand name. Results are presented for both 2011 and 2012 to allow for comparison between the two years. Overall, 2012 incremental energy savings were down about 15 per cent **from 2011**.[65]

No results have been attributed yet to **time-of-use (TOU) pricing**, but the impact of TOU pricing in reducing peak demand will eventually be counted towards LDCs' 2014 targets. The OPA has been working with five selected LDCs to develop a methodology to assess the savings from TOU pricing, and expects to publish a preliminary evaluation report this fall.[66]

Table 5: Incremental Savings from 2012 Province-Wide Conservation Programs by Initiative

Initiative	Incremental Energy Savings (Net) (GWh)		Incremental Demand Reduction (Net) (MW)		Participation	
	2011	2012	2011	2012	2011	2012
Consumer Program						
Appliance Retirement (Fridge & Freezer Pickup)	23.0	13.4	3.3	2.0	56,110 appliances	34,146 appliances
Appliance Exchange	0.5	1.0	0.4	0.6	3,688 appliances	3,836 appliances
HVAC Incentives (Heating & Cooling Incentive)	59.4	32.8	32.0	19.1	111,587 installations	85,221 installations
Conservation Instant Coupon Booklet	21.2	1.4	1.3	0.2	559,462 products	30,891 products
Bi-Annual Retailer Event	29.4	26.8	1.7	1.5	870,332 products	1,060,901 products
Retailer Co-op	0.0	0.0	0.0	0.0	152 products	0 products
Residential New Construction	0.0	0.0	0.0	0.0	7 projects	19 projects
Residential Demand Response *(peaksaver* PLUS, *peaksaver* Extension)*	0.0	0.4	11.0	49.2	19,682 devices	98,682 devices
Consumer Program – All Initiatives	**133.6**	**75.8**	**49.8**	**72.6**		
Business Program						
Equipment Replacement Incentive (Retrofit)	164.9	314.9	29.1	61.1	2,949 projects	5,605 projects
Direct Install Lighting	61.1	57.3	23.7	15.3	20,297 projects	18,494 projects
Energy Audit	0.0	7.0	0.0	1.4	103 audits	280 audits
New Construction and Major Renovation (High Performance New Construction)	0.4	1.8	0.1	0.8	10 projects	69 projects
Pre-2011 Programs**	243.3	11.9	44.9	3.3	2,856 projects	69 projects
Business Program – All Initiatives	**469.6**	**393.0**	**97.9**	**81.9**		

Initiative	Incremental Energy Savings (Net) (GWh)		Incremental Demand Reduction (Net) (MW)		Participation	
	2011	2012	2011	2012	2011	2012
Industrial Program						
Demand Response 3	3.7	2.1	68.7	93.4	269 facilities	336 facilities
Energy Manager	0.0	7.4	0.0	1.1	0 projects	39 projects
Industrial Program – All Initiatives* **	**3.7**	**9.4**	**68.7**	**94.5**		
Home Assistance Program						
Low Income Initiative (Home Assistance)	**0.0**	**5.4**	**0.0**	**0.6**	**46 projects**	**5,033 projects**
Other						
Program-Enabled Savings	**0.0**	**1.2**	**0.0**	**2.3**	**0 projects**	**16 projects**
Adjustments to Reported Results						
LDC Activity Adjustments to 2011 Results**	**N/A**	**18.7**	**N/A**	**1.4**		
All Province-Wide Programs	**606.9**	**503.6**	**216.3**	**253.3**		

Notes:

* Results for the two demand response initiatives (Residential Demand Response and Demand Response 3) are reallocated each year. The 2012 results for these two initiatives in essence include the impact of both 2011 and 2012 activity, unlike the other initiatives listed in this table. Results for Residential Demand Response include both residential and business customers, and results for Demand Response 3 include both industrial and business customers.

** "Pre-2011 programs" include Data Centre Incentive Program, Electricity Retrofit Incentive Program, EnWin Green Suites, High Performance New Construction, Multifamily Energy Efficiency Rebate, and Toronto Comprehensive.

*** No results recorded for Process and Systems Upgrade initiative

**** "LDC Activity Adjustments" refers to changes in results due to 2011 program activity that were not incorporated until after 2011 results were publicly reported. For consistency, the ECO has followed the lead of the OPA and individual LDCs and included these results as part of 2012 incremental activity. There is a second type of adjustment to the 2011 results that is due to rounding errors or other reporting errors. These adjustments are not explicitly listed in this table, but are included within the 2011 results reported for each initiative. This means that the 2011 results shown here differ very slightly from the 2011 results presented in the 2011 report. For example, total 2011 incremental energy savings from all province-wide programs are reported here as 606.9 GWh, whereas last year's report estimated 605.5 GWh.

Source: Ontario Power Authority

For the residential sector, many LDCs introduced the *peaksaver* **PLUS initiative** in 2012 (although many participants were renewal customers that had previously signed on to an older version of the *peaksaver* initiative). This initiative reduces strain on the electricity system on very hot days by cycling down (or shutting off for short periods) residential appliances that have a high electricity demand, such as air conditioners and electric water heaters.[67] In return, participants receive an in-home energy display to track and control their electricity use. However, some utilities encountered technical compatibility issues between in-home displays and their smart meter technology, which prevented them from offering this initiative to their customers.

Savings results for other core residential initiatives, such as incentives for high-efficiency air conditioners and furnace motors, and free pick-up of old, inefficient refrigerators, declined in 2012. The **Fridge & Freezer Pickup initiative** has operated for many years and thus has now decommissioned much of the stock of older, inefficient units. The OPA may end this initiative. The **Residential New Construction initiative** remained unsuccessful in attracting builders to build new homes to higher levels of efficiency. The OPA has altered this initiative in an attempt to improve its appeal to larger production builders.

The **Home Assistance Program**, which upgrades the electrical efficiency of low-income households at no cost to participants, became available in many more regions in 2012. Only two LDCs completed projects using this program in 2011; in 2012, 40 different LDCs completed more than 5,000 projects.

The **Business Program** for commercial and institutional customers continued to account for most of the overall energy savings from electricity conservation programs. In 2012, the **Retrofit initiative** for business performed very well, doubling results from 2011. This one initiative, which provides incentives for energy efficiency improvements in existing buildings to commercial and institutional customers, particularly lighting upgrades, accounted for more than 60 per cent of total 2012 energy savings. Initiatives targeting higher-efficiency new commercial buildings and energy audits of existing buildings also saw increased participation in 2012, although energy savings from these initiatives (about 9 GWh in 2012) are still relatively insignificant.

In the industrial sector, **Demand Response 3** performs a role similar to *peaksaver* PLUS, by acting as insurance to reduce electricity consumption specifically on days of high system demand. Demand Response 3 was activated five times in 2012, reducing Ontario system demand by 313 MW on average. (Notably in July 2013, Demand Response 3 was used to mitigate the impact of electricity supply shortages in the Toronto area caused by storm-induced flooding of transformer stations). Changes made at the end of 2012 to Demand Response 3 will reduce customer incentive payments for future participants, a change that will likely make it more difficult to sign up new customers.

The **Energy Manager initiative**, which provides funds for large customers to hire dedicated energy professionals that audit and make recommendations on their use of energy, has successfully built energy management capacity in the industrial sector. However, it has not yet led to capital investments to improve industrial efficiency. The **Process and Systems Upgrade initiative** offers incentives for energy efficiency investments to Ontario's approximately 10,000 distribution-connected industrial customers, but not a single capital project was completed under this initiative in 2012. Some results are expected in future years, as industrial projects have a long lead time. Still, the performance of this program to date has been disappointing. Many potential participants found its onerous contractual and verification requirements unappealing.[68] The OPA has introduced a streamlined application process for smaller industrial projects, which will hopefully improve results.

2012 Program Spending and Cost-Effectiveness

Spending on province-wide electricity conservation programs is shown in Table 6 and totalled $177.1 million dollars in 2012, down from $209.0 million dollars in 2011.

Table 6: 2012 Province-Wide Conservation Program Spending

Program	Central Program Services (OPA)* ($)	Customer Incentives, Participant Based Funding, and Capability Building ($)	LDC Administration Costs (Program Administration Budget) ($)	Total Actual Charges ($)
Consumer Program	7,660,052	26,279,776	22,330,635	56,270,463
Business Program	7,882,954	68,989,782	25,427,797	102,300,533
Industrial Program	2,798,225	6,915,402	4,718,257	14,431,884
Home Assistance Program	6,588	1,058,945	2,618,472	3,684,005
Aboriginal Program**	417,189	0	0	417,189
Total – All Province-Wide Programs	**18,765,008**	**103,243,905**	**55,095,160**	**$177,104,073**

Notes:

*Central Program Services include: program delivery services, evaluation, measurement, & verification, marketing, awareness campaigns, IT support, call centre, technical review services, settlement services.

**The Aboriginal Conservation Program was launched in 2013 and will deliver energy-saving initiatives directly to First Nation communities across Ontario, including remote and northern communities, as well as provide support for Métis and urban Aboriginal peoples to encourage participation in existing programs being delivered by LDCs.

Source: Ontario Power Authority

Table 7: Cost-Effectiveness of 2012 Province-Wide Conservation Programs

Program	Total Resource Cost Test Benefit:Cost Ratio	Program Administrator Cost Test Benefit:Cost Ratio	Levelized Delivery Cost	
			Energy Efficiency (¢ /kWh)	Demand Response ($/MW-month)
Consumer	1.0	1.3	6.8	10,251
Business	1.3	2.8	3.3	N/A
Industrial (Demand Response 3 only)	4.0	1.2	N/A	8,766
Low Income	0.6	0.5	11.7	N/A
Total - All Province-Wide Programs	**1.2**	**2.1**	**4.0**	**9,855**

Note: Consumer program results also include commercial participants in Residential Demand Response initiative; Business program results also include industrial participants in Retrofit initiative; Industrial program includes commercial participants in Demand Response 3 initiative.

Source: Ontario Power Authority

The cost effectiveness of 2012 conservation programs is shown in Table 7. Two **cost-effectiveness tests** are used. Both tests compare the lifetime program benefits (primarily from reduced electricity consumption) and costs, but from different perspectives.[69] The Total Resource Cost test considers the impact on all parties, including ratepayers and program participants. The Program Administrator Cost test considers the costs and benefits from the perspective of the program administrator (the OPA). For both tests, a ratio of greater than one indicates that the program benefits exceed the costs. The portfolio of province-wide conservation programs was cost-effective using either test in 2012, as was the case in 2011. The cost effectiveness of the business and industrial conservation programs improved in 2012, while the cost effectiveness of residential (consumer) conservation programs declined.

The levelized delivery cost of conservation is also shown in Table 7. This presents the cost of saving a unit of electricity (or reducing a unit of peak demand) through conservation programs, which allows comparison with the cost of generating the same unit of electricity. The levelized cost of conservation was 4.0 cents per kilowatt-hour (¢/kWh) in 2012. Although this was higher than in 2011 (3.1¢/kWh), it is still much lower than any new form of electricity generation.

3.2.3 PROGRESS ON 2014 TARGETS

Conservation results from 2011 and 2012 programs (as well as 2013 and 2014) are counted towards the 2014 targets. The aggregate province-wide targets for all LDCs are cumulative energy savings of 6,000 GWh (about 1 per cent of expected total electricity consumption over the four years) and a reduction in provincial peak demand of 1,330 MW (a reduction of approximately 5 per cent in Ontario's system peak). Progress towards these targets is shown in Figure 3 and Figure 4.

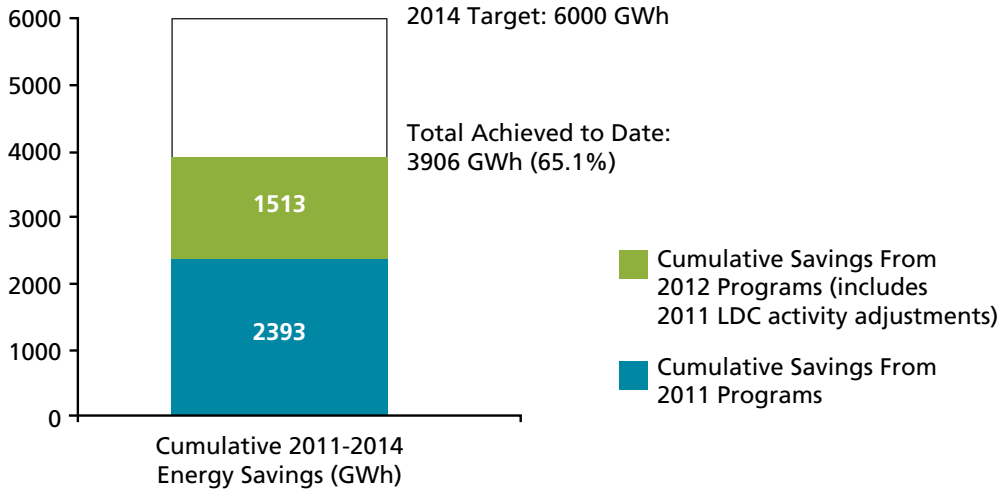


Figure 3: Province-Wide Progress Towards 2014 Energy Target

Source: Ontario Power Authority

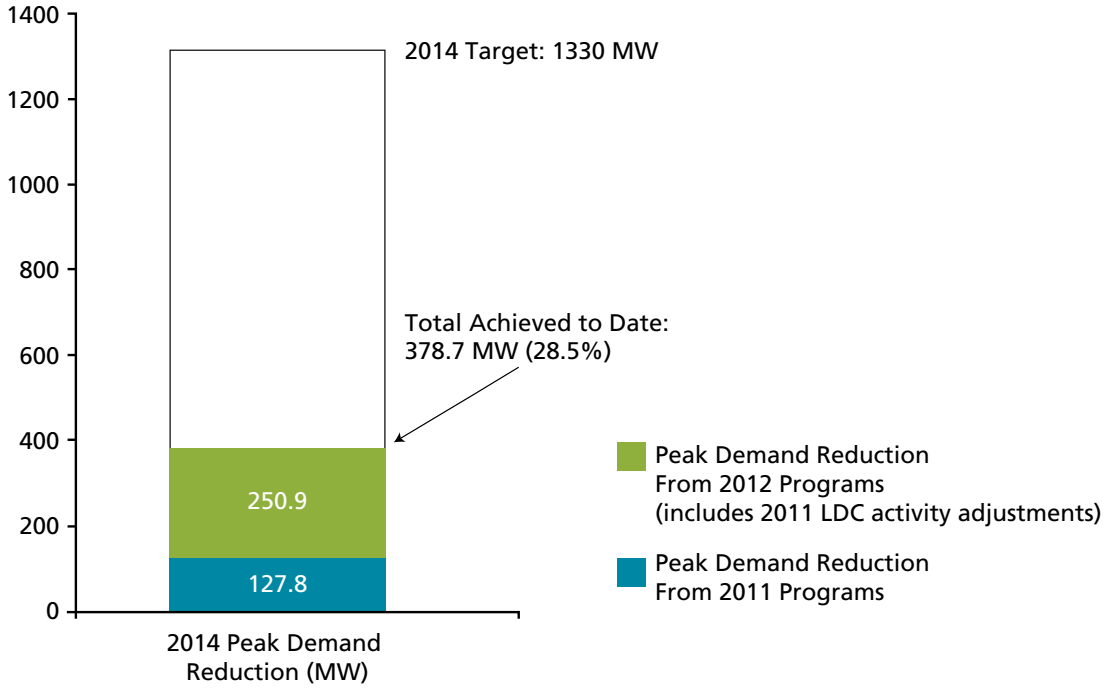


Figure 4: Province-Wide Progress Towards 2014 Peak Demand Target

Note: In some cases, demand response contracts need to be re-procured before 2014, meaning that not all peak demand savings are guaranteed to persist in 2014. The 2014 peak demand reduction of 378.7 MW assumes that all existing demand response customers (Demand Response 3 and Residential Demand Response) remain in place in 2014. An alternate approach (not shown here) is to assume that none of the existing demand response customers remain in place in 2014. This produces an estimated 2014 peak demand reduction of 237.2 MW (17.8 per cent of target). The ECO believes that the first method is the most accurate method of estimating progress towards the 2014 target, because most customers that have already committed to demand response are likely to remain participants in 2014.

Source: Ontario Power Authority

As Figure 3 shows, Ontario LDCs have on aggregate achieved approximately 65 per cent of the 2014 energy target. Because of the cumulative nature of this target, this puts them on pace to come close to the target, but fall slightly short.[70] At the moment, there appears to be no chance that the peak demand target will be reached, even after the expected savings from TOU pricing are included.

The two aggregate targets have no legal status, and in this sense do not exist at the provincial level. Rather, they exist and must be complied with at the local level by each individual LDC. Figure 5 shows the variation in results among LDCs (see Appendix B for full numerical results for each LDC). It is clear that many LDCs will miss one or both of their targets, and they have indicated as much in their annual progress reports to the OEB.

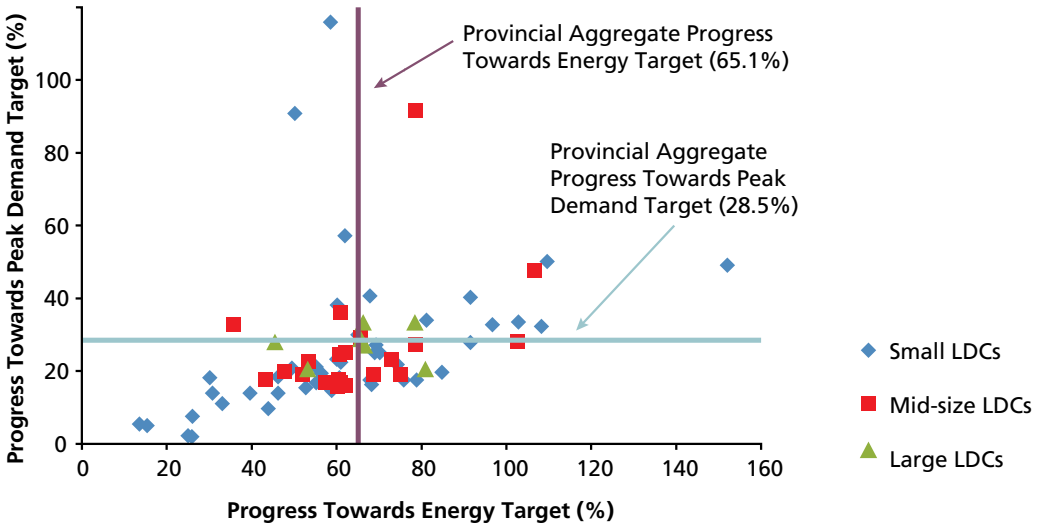


Figure 5: LDC Progress Towards 2014 Conservation Targets, as of December 31, 2012

Note: Progress towards peak demand target assumes that savings from demand response programs persist until 2014. "LDC size" is based on the size of each LDCís energy target (which in turn was based on the LDC's share of provincial energy consumption). Small LDCs have an energy target accounting for less than 0.5% of the aggregate 2014 LDC energy target, mid-size LDCs have an energy target accounting for between 0.5% and 2% of the aggregate target, and large LDCs have an energy target accounting for more than 2% of the aggregate energy target.

Source: Ontario Power Authority

Since meeting the conservation targets is a license condition for LDCs, a failure to meet both targets at the end of 2014 would technically put an LDC in breach of its licence conditions. This is a matter that the OEB would need to deal with, but the OEB has yet to announce what actions it will take to address this circumstance.[71]

3.2.3.1 RESULTS OF OPA-ONLY PROGRAMS

The Ontario Power Authority (OPA) also operates several programs without the involvement of local distribution companies (LDCs). These programs are designed for large industrial customers connected directly to the transmission system, instead of an LDC's distribution network. Also considered an "OPA-only" program is peak demand reduction from customers who enrolled in the peaksaver initiative prior to 2011 that have not converted to the peaksaver PLUS initiative offered by LDCs. Total spending on OPA-only programs in 2012 was $60.0 million, which includes $1.6 million for the Conservation Fund to provide financial support to new and innovative electricity conservation initiatives.

Results for OPA-only programs in 2012 are shown in Table 8. These results do not count towards the 2011-2014 targets, but do count towards the Long Term Energy plan targets noted in Section 2.1.

Table 8: 2012 Incremental Savings From OPA-Only Programs

Program	Incremental Energy Savings (Net) (GWh)	Incremental Peak Demand Reduction (Net) (MW)
Demand Response 2	75.7	54.9
Demand Response 3	7.2	248.8
Residential Demand Response *(peaksaver)*	0.3	40.7
Industrial Accelerator	44.5	5.1
All OPA-Only Programs	**127.7**	**349.5**

Source: Ontario Power Authority

3.2.4 NEW CONSERVATION PROGRAMS

The province-wide suite of conservation programs was never originally intended to contribute the full amount of savings towards LDC targets. It was initially assumed that custom programs designed by LDCs (and approved by the OEB) would be needed to achieve approximately 10 per cent of the energy target and 20 per cent of the peak demand target. However, by the end of 2011, no custom programs were in operation nor were any expected, following the failure in 2011 of Toronto Hydro and Hydro One/Hydro One Brampton to advance custom program applications through the OEB review process.

By the end of 2012, nothing had changed. In June 2013, the first custom program was finally approved by the OEB. **PowerStream** received approval to launch a program targeted at small business customers to upgrade inefficient refrigeration equipment, similar in concept to the Direct Install Lighting initiative that is part of the province-wide suite of programs. This program was launched to market in fall 2013. However, this custom program application appears to be a one-off; no other custom program applications have been submitted to the OEB for consideration.

At this late date, it is unlikely that new programs will make significant contributions to the 2014 targets. For this reason, the **Electricity Distributors Association** (EDA) has indicated that its focus is on maximizing the performance of existing programs, instead of dedicating significant resources to new program design.[72] Nevertheless, some effort in introducing new conservation initiatives is needed, although the payoff in terms of improved conservation results may not be seen until after 2014.

As an alternative to OEB approval of custom programs, the OPA has worked with LDCs to bring some of their program ideas into the province-wide program suite. The OPA has also made funding available through the **Conservation Fund** ($5 million annually with a cap of $1 million for any given project) for LDCs to pilot new programs with the potential to be replicated province-wide. LDC pilot projects underway include demand response initiatives for small commercial and multi-residential customers (**Toronto Hydro**), thermal energy storage to shift load to off-peak hours (**Hydro One**), energy density mapping to target high-potential conservation customers (**Horizon Utilities**), and social benchmarking of energy consumption to motivate behavioural change (Hydro One, Milton Hydro, Horizon Utilities).

3.2.5 PROGRAM OPERATIONAL ISSUES

In our Annual Energy Conservation Progress Report – 2011 (**Volume Two**), the ECO noted many specific operational issues with the design and delivery of province-wide conservation programs that had been raised by LDCs. A year later, the OPA has addressed many, though not all, LDC concerns, and the working relationship has improved. Importantly, most of the specific improvements to the suite of province-wide programs that have been suggested by LDCs have now been implemented.[73] In addition, the OPA has introduced an Expedited Change Management process that makes it easier for minor changes to be approved faster. However, distributors are still frustrated that it took so long to make these program improvements, and that potential energy savings opportunities were lost. Some concerns remain. For example, customers and LDCs continue to find the OPA's software tools used to submit and process conservation program applications

cumbersome. Many LDCs have had to dedicate staff resources specifically to helping their customers complete applications. LDCs also remain concerned that the slow legal review of program changes by OPA lawyers delays the implementation of program improvements.

Despite the general improvement in the working relationship between the OPA and LDCs, the EDA (which represents all Ontario LDCs) would prefer a transition away from the current operational model, towards a structure where the OEB would oversee all LDC conservation efforts.[74] Under this model, the OPA would serve more as a conservation service provider, and individual LDCs would choose whether or not to make use of their services.

3.2.6 BUILDING MOMENTUM BEYOND 2014

Conservation funding under the current framework was originally intended to come to a hard stop at the end of 2014. The ECO previously noted that in 2012 this deadline was already serving as a barrier to participation for projects with a multi-year horizon (e.g., new construction and large industrial projects), as customers could not be guaranteed that they would be eligible for incentive funding if their project was completed after 2014.

In December 2012, the Minister of Energy partially resolved this issue, by **directing** the OPA to continue province-wide funding of conservation programs for an additional year, through the end of 2015.[75] However, no change was made to the targets of individual LDCs, so LDC achievements will still be measured based on their results as of December 31, 2014. As a result, the focus of their conservation efforts will remain on projects that can be completed by the 2014 deadline.[76] While a welcome first step, this directive was clearly a stop-gap measure.

In July 2013, the Ministry of Energy released a discussion paper, **Conservation First: A Renewed Vision for Energy Conservation in Ontario**. At a high level, Conservation First states a preference for investing in conservation ahead of new generation, whenever this is cost-effective. It recognizes some of the problems with the current framework, in particular the limited ability of LDCs to launch custom programs and influence the design of province-wide programs, despite their responsibility for meeting the conservation targets. Through Conservation First, the Ministry of Energy sought public input on the next conservation framework, making use of the Environmental Registry (**Environmental Registry #011-9614**). The public consultation period on Conservation First ended in September 2013, but the Ministry has yet to make any policy decisions that would formalize a new conservation framework.

One issue not addressed in Conservation First is the date that the new conservation framework will take effect. Two scenarios appear possible. In the first, the existing framework and division of roles between the OPA and LDCs essentially rolls over for 2015, with or without an extension through the end of 2015 for LDCs to achieve their targets. In the second scenario, a new framework is in place for 2015; the Minister's December 2012 directive is used simply to honour existing commitments by paying conservation incentives to participants that had begun projects under the 2011-2014 framework. In the event that the first scenario applies, the OPA has been working with LDCs on which of the current conservation initiatives will be extended into 2015, and which initiatives will be reworked or cancelled.

ECO Comment

The ECO has previously commented extensively on the current conservation framework, **following the release of the Conservation and Demand Management Code**,[77] and **after the first year of program results**.[78]

Given that the Ministry of Energy has sought public comment and is likely to finalize a new conservation framework shortly, the ECO makes no new substantive comments at this juncture. The ECO repeats its previous comment that a long-term commitment to conservation by the ministry would improve the ability of LDCs to plan, design, and deliver more effective programs.

From a process perspective, the ECO believes that it is imperative to manage the transition between frameworks smoothly, so that gains made under the current framework (e.g., dedicated conservation staff at LDCs) are not lost, and there is no hiatus in offering customers a full suite of conservation programs. The ministry must promptly announce whether a new framework will be in place for 2015.

4 Select Initiatives

ONTARIO REGULATES

ENERGY PERFORMANCE

STANDARDS FOR 74 PRODUCTS

4.1 HOW ONTARIO IS INCREASING ITS ENERGY EFFICIENCY ONE PRODUCT AT A TIME

4.1.1 INTRODUCTION

ENERGY EFFICIENCY INVOLVES USING LESS ENERGY TO DELIVER THE SAME LEVEL OF SERVICE.

Ontario has had the authority to set minimum energy performance standards since 1988. The ECO last reported on Ontario's energy efficiency standards in **June 2012**, when we examined the provincial government's commitment to introduce leading North American energy efficiency standards for household appliances. There was little evidence at the time that the Ontario government gave such standards a high priority – the province's energy efficiency regulation was last updated in 2006. However, several important changes have taken place since the ECO's last report, including a major update to Ontario's energy efficiency regulation. A Ministry of Energy **vision paper** also recently suggested Ontario may change how it regulates product standards.

These changes, along with the merits of setting energy efficiency standards for appliances/products, are discussed in detail below.

4.1.2 BACKGROUND

Why Product Energy Efficiency Standards are Important

Minimum energy performance standards set the lowest energy efficiency level that a product must meet before it can be sold or leased. The benefits from regulating minimum energy performance standards are the significant energy savings. Considering just major home appliances and disregarding efficiency gains in other residential, commercial or industrial appliances and equipment, as shown in Figure 6, Canadians in 2010 were saving approximately 60 petajoules (PJ) of energy per year compared to 1992, thanks to a steady ratcheting up of energy efficiency standards for major household appliances shipped in Canada.[79] This amount represents more than one year's worth of energy consumption for 570,000 Canadian households.

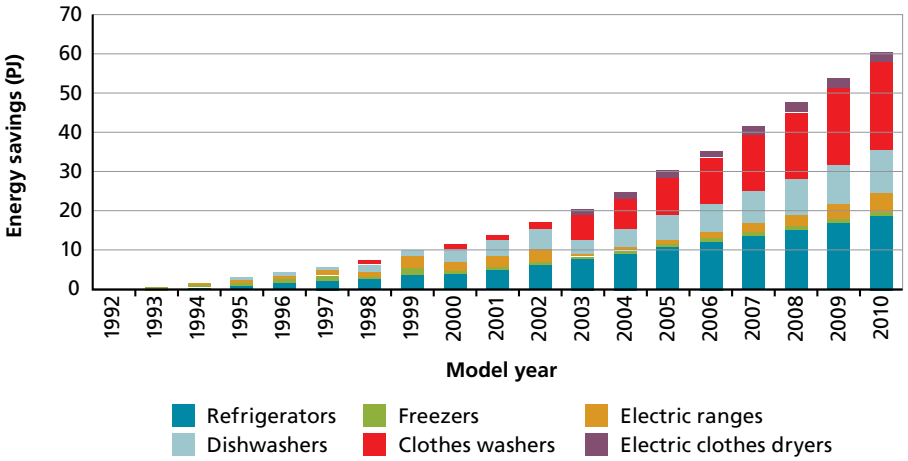


Figure 6: Canadian Energy Savings By Major Household Appliances Shipped, 1992 – 2010

Source: Natural Resources Canada

4.1.2.1 THE BENEFITS AND COSTS OF ENERGY EFFICIENCY STANDARDS

One of the key objectives for setting efficiency standards is to eliminate the least energy-efficient products from the marketplace. Standards exist for a wide range of products and appliances, and each time the performance bar is raised, one or more poor performing models can be removed. As the **ECO has noted**, the average set of major household appliances purchased in 2009 consumed roughly half the energy of a similar set purchased in 1990.[80] Over time, the step-wise improved minimum performance of a variety of products achieves a dramatic improvement in society's overall efficiency.

Product standards can overcome market barriers like the "split incentive" between landlords and tenants, where the purchaser of an appliance is not the same person who will pay the ongoing energy bill. They can also help protect consumers in a panic-purchase situation, when critical equipment breaks (e.g., a furnace) and must be replaced immediately.

It is true that energy-efficient products can cost more than their inefficient counterparts, but the higher upfront cost is typically paid back to the consumer through a reduced cost of operation over the lifetime of a product. In fact, this payback period can be relatively short before consumers save money. For example, a set of recently proposed standards in the U.S. has an average payback of 3.3 years (meaning that the additional upfront purchase cost is earned back from lower energy bills in just over 3 years, after which the consumer pockets the savings).[81]

Energy Efficiency Standards in Canada

The Canadian government has set national appliance and product standards under the federal *Energy Efficiency Act* since 1995. These standards specify the minimum energy efficiency levels and labelling requirements for a range of products imported into the country or manufactured and shipped between provinces and territories.

Provincial regulations can complement and exceed the existing federal regulations. Several provinces, including Ontario, have their own provincial regulations that set energy efficiency standards. Ontario has an opportunity to show standard-setting leadership in niche areas and products. Certain products (such as furnace fans) have important energy implications for Ontario consumers, yet are not receiving regulatory attention by either the Canadian or United States governments, as the ECO noted in its **2011 report** Restoring Balance: A Review of the First Three Years of the Green Energy Act.

Energy Efficiency Standards in Ontario

A Brief History

The province's history of regulating energy efficiency began in 1988 under the provincial *Energy Efficiency Act* which gave Ontario the authority to set minimum efficiency standards for residential, commercial, and industrial products.[82] The province set standards for a variety of products through regulation under this Act. In those early years, Ontario was truly a leading jurisdiction. A federal Act and legislation in other provinces and most U.S. states were introduced years later. Ontario worked to expand the number of products regulated, but in the last decade, the province mainly rested on its laurels.

The passage of the *Green Energy Act, 2009* (*GEA*) changed how energy efficiency is regulated. The province's *Energy Efficiency Act* was repealed, the power to regulate energy efficiency was recreated under the *GEA*, and the existing regulation for energy efficiency standards was transferred to the *GEA*. The government also made several commitments to fostering a culture of conservation when this legislation was announced, including a commitment to introduce leading North American energy efficiency standards (**Energy Star**) for household appliances.[83] Yet, as discussed in an earlier **ECO report**, between 2009 and 2011 there was little evidence that the Ontario government gave leading energy efficiency standards a high priority.[84]

How Minimum Energy Performance Standards Are Set

Ontario's currently stated policy is to "harmonize, where possible, Ontario's energy efficiency standards with the highest available minimum efficiency standards in North America."[85] The Ministry of Energy monitors new standards published by the Canadian Standards Association* and tracks activity in other jurisdictions in order to develop and update its minimum energy performance standards. When a new or higher minimum energy performance standard is set elsewhere, ministry staff conduct a preliminary evaluation of the energy savings that would occur in Ontario if it adopted the standard. Staff can then propose changes to amend Ontario's regulation based on their analysis. If the ministry decides to update its regulation, a proposal notice for public comments is placed on the Environmental Registry. The Ontario Power Authority is not involved in this process, even though it is mandated to forecast Ontario's energy demand and examine which appliances/products are expected to increase Ontario's energy demand (as discussed in box 4.1.2.2).

* The Canadian Standards Association receives funding through the Ministry of Energy, Natural Resources Canada, the OPA, and other regulators/utilities from across the country to develop new or update existing standards, many of which set or increase the minimum energy performance.

4.1.2.2 A DISCONNECT FROM THE ONTARIO POWER AUTHORITY CONSERVATION FORECAST?

The Ontario Power Authority (OPA) is mandated to maintain an updated forecast of the province's energy demand.[86] This forecast provides context for conservation program planning, and includes an examination of which appliances/products are expected to increase provincial energy use. For example, the OPA anticipates that a relatively large increase in energy use will come from commercial lighting, industrial motor equipment, and residential computers.[87] The OPA also conducts detailed technical potential studies to inform its conservation programs. These studies provide valuable information on the stock of energy-consuming products in Ontario, and the potential energy savings from more efficient products. This is valuable information because it is Ontario-specific. Standards developed by other jurisdictions may not be representative of the opportunities in Ontario.

Even though the Ministry of Energy works with the OPA to have standards and compliance dates reflected in Ontario's demand forecast, the OPA is not involved during the standards development process. Yet appliance and product standards are an important tool to reduce future energy demand; up to 50 per cent of the 2030 energy conservation target in the **Long-Term Energy Plan** is currently planned to be met through the **Ontario Building Code** and the energy efficiency standards for products/appliances.[88]

Changes Ahead: Ontario's Plan to put Conservation First

Will Ontario continue to take this approach to standards development of monitoring leading standards and regulating on a retroactive case-by-case basis? In its vision paper **Conservation First: A Renewed Vision of Energy Conservation in Ontario**, the Ministry of Energy put forward the idea to automatically adopt leading efficiency standards from other jurisdictions in North America where it would improve Ontario's own regulatory process. The paper also suggests that the ministry is looking at strengthening "synergies" between the OBC and product efficiency standards by working with other ministries. This would help align the OBC and product standards with the province's conservation goals.

Before 2012, Ontario updated its regulation for energy efficiency standards 14 times[89], albeit on an irregular basis.[90] The power to review or update Ontario's minimum energy efficiency standards rests solely with the government of the day. Unlike Ontario's building code, which uses a five-year update cycle, there is neither a legislative requirement for the province to regularly review these standards nor an expert body that provides strategic advice for increasing the province's product efficiency standards.[91] These gaps leave Ontario without a trigger to strengthen standards, either predictably and step-wise, or strategically by seizing opportunities for big energy efficiency gains. This also limits the level of information available for anyone who is interested in Ontario's energy efficiency regulations, since there is no way of knowing ahead of time if a proposal will be put forward to introduce new or update existing energy standards. If the Ontario Building Code were aligned with Ontario's development of product standards, as mentioned in Conservation First, then perhaps some of these legislated elements for the Building Code would also apply to product standards.

4.1.3 KEY ACTIVITIES AFTER 2011

Several changes have taken place since the ECO **last reported** on Ontario's energy performance standards, including replacing Ontario's regulation from 1995 with **O. Reg. 404/12** in December 2012. Ontario Regulation 404/12 came into force in January 2013 and replaces the previous **O. Reg. 82/95**, which was made under the *Energy Efficiency Act.* The regulation's new format is designed to make it easier to compare old and new efficiency standards. The regulation also includes standards for both products that use energy and products that affect energy use (like windows). These changes and their associated energy savings are summarized in Table 9.

Table 9: Changes to Ontario's Energy Efficiency Standards for Appliances and Products, 2012 & 2013

Date	Change	Estimated Energy Savings
Completed		
February 2012*	Ontario's minimum energy efficiency regulation was amended to include a ban on inefficient incandescent lighting by December 2014. Ontario had originally committed to banning these light bulbs by December 2012.	5.7 TWh/year of electricity by 2030, which represents one year's worth of electricity use for 600,000 homes.
December 2012**	Ontario's minimum energy efficiency regulation (O. Reg. 82/95) was replaced by O. Reg. 404/12. Changes included reformatting the regulation to be more user-friendly, setting 19 new minimum energy performance standards, and revising 24 existing standards.[92]	2.3 TWh/year of electricity by 2030, which represents one year's worth of electricity use for 200,000 homes. 17.3 PJ/year of oil and gas by 2030, which represents one year's worth of energy use for 160,000 homes.
In Progress		
Proposed in June 2013*** The Ministry of Energy anticipates that any amendments from this posting will be done by early 2014.	Proposal to set or update 27 products. Many of these standards would be harmonizing with U.S. regulation. Six of these new products are not regulated at the federal level.[93]	4.9 TWh/year of electricity by 2030, which represents one year's worth of electricity use for 500,000 homes. 9.1 PJ/year of oil and gas by 2030, which represents one year's worth of energy use for 80,000 homes.

Note:

* Refer to page 14 of the ECO's Annual Energy Conservation Progress Report – 2011 (**Volume One**)
** See Environmental Registry **# 011-7151**
***See Environmental Registry **# 011-9337**

Source: Ministry of Energy

Working Together: Harmonization of Federal/Provincial Standards

Ontario currently regulates more products than the federal government. In some cases, the province's standards exceed those of the federal government. Ontario regulates 74 products, compared to approximately 50 products at the federal level – of the similar regulated products that both jurisdictions have in common, 12 of Ontario's standards are more stringent.[94]

Twenty-nine of Ontario's recently updated standards were designed to harmonize with existing proposals by the federal government (including line voltage thermostats, an important product identified by the federal government and discussed in Section 4.1.3.1). However, nine of these federal proposals did not move forward (Ontario finalized its standard for line voltage thermostats). This demonstrates how Ontario's standards can sometimes inadvertently move ahead of federal standards.

4.1.3.1 FEDERAL GOVERNMENT REGULAR AND SPECIAL REVIEWS OF EFFICIENCY STANDARDS[95]

Canada's federal Minister of Natural Resources is required to report on the relative stringency of the Canadian government's energy efficiency standards in comparison to other North American standards once every three years.

Before the end of 2013, the federal Minister was also required to examine the relative scope of federal energy efficiency standards. **This analysis was undertaken** and made some important findings. First, it identified key energy-using products that are not covered by current federal regulations, like line voltage thermostats – a component of electric baseboard heaters – which affect residential energy use. Second, it demonstrated that much of the energy used in the commercial and industrial sectors is not captured by federal standards.

Ontario's Minister of Energy does not have any of the reporting requirements that apply to the federal Minister of Natural Resources.

ECO Comment

The ECO commends the Ministry of Energy for its recent updates to Ontario's energy efficiency standards for appliances and products. Ontario Regulation 404/12 shows that the ministry is taking action, after much delay, to increase minimum energy performance standards. The June 2013 proposal on the Environmental Registry (**#011-9337**), to further update O. Reg. 404/12 and harmonize some products with those from the U.S., also shows an effort to increase the scope and performance of appliances and products covered by Ontario's regulation. Commendably, many of the recent and proposed changes to O. Reg. 404/12 exceed standards set by the Canadian federal government.

The ECO offers some comments on the current and possible future approaches used to set standards.

Ontario currently sets or updates standards as it deems appropriate. There is no requirement for standards to be regularly reviewed or updated. Instead, the Ministry of Energy monitors actions elsewhere and, where possible, harmonizes the province's standards with the highest minimum energy performance standards in North America. There is also no requirement for the Minister of Energy, unlike the minister's federal counterpart, to periodically report on the stringency of Ontario's efficiency standards compared to other jurisdictions. Such a requirement would be helpful for gauging Ontario's status in North America.

Minimum energy performance standards are an important tool to conserve energy, and the ECO encourages the Ministry of Energy to strategically develop standards that will reduce Ontario's energy demand. The Ministry of Energy should specifically prioritize opportunities to improve the energy efficiency of products that consume (or are expected to consume) a large amount of energy within this province. The ministry should establish an advisory body, similar to the **Building Code Conservation Advisory Council**, to provide advice for product standards that will reduce Ontario's energy consumption. Input from key agencies should also be sought. For example, the Ontario Power Authority would be an ideal agency for the Ministry of Energy to consult with because it forecasts provincial energy demand and identifies appliances/products that use a large amount of energy.

The ECO recommends that the Ministry of Energy develop a regular update cycle for product standards, which identifies Ontario's best opportunities to improve energy efficiency.

Conservation First and the Future Approach Used to Set Minimum Energy Performance Standards
Under the Ministry of Energy's proposed approach described in **Conservation First**, Ontario may start to automatically adopt leading efficiency standards from other North American jurisdictions - following the leader, rather than being a leader. Presumably this would streamline the standards-setting process, updating standards more quickly than in recent years and could still help Ontario conserve energy when other jurisdictions move first. This could, however, also encourage a habitually cautious approach by Ontario. An illustrative example is the U.S. Department of Energy's proposed energy efficiency standards for furnace fans.[96] The ECO previously encouraged the ministry to examine whether such a standard should be set in Ontario given that the province's colder climate compared to the U.S. justified taking action. Despite this, the ministry has watched from the sidelines, content to rely on the Department of Energy's proposal to become law. This does not guarantee that Ontarians will receive the most suitable and timely regulations for their needs.

4.2 ENERGY ISSUES IN THE ONTARIO BUILDING CODE

The Ontario Building Code (OBC or "the Code"), a regulation made under the *Building Code Act, 1992*, sets energy efficiency and other requirements for new buildings in Ontario. The Code is updated on a five-year cycle; new requirements can take effect immediately on passage of an updated Code or can be set to take force at a later date after the Code is issued, chiefly to allow building inspectors and builders to prepare for the new requirements.

4.2.1 THE NEW 2012 ONTARIO BUILDING CODE

In November 2012, the Ministry of Municipal Affairs and Housing (MMAH) finalized the next version of the Code (the "2012 Code"), through **O. Reg. 332/12**. The 2012 Code's more stringent energy requirements will not come into force immediately but will be phased in over the coming years.

The **2012 Code** builds on energy efficiency requirements that were previously introduced in the **last version of the OBC** and took effect on January 1, 2012 (those changes were **previously reviewed by the ECO**).[97]

MMAH introduced the energy efficiency changes in the 2012 Code in a **discussion paper** released for public comment in 2011.[98] With one notable exception, all of the energy changes proposed in the 2011 paper were adopted in the 2012 Code. The exception was a proposed requirement that houses be built "solar-ready" – constructed so as to easily accommodate connections for a future solar hot water or solar electricity system that could be added on the roof after the house has been built. MMAH did not adopt this proposal, in part due to concerns that the structural sufficiency of roofs with solar panels may not be properly addressed in the current OBC. MMAH noted that work is being done at the federal level to integrate solar energy into the model National Building Code, and that this work will inform future solar-related updates to the OBC.

The new energy requirements in the 2012 Code include higher overall levels of building energy performance relative to the 2006 Code, as well as several specific new energy efficiency requirements, as summarized in

Table 10. The 2012 Code requires a 15 per cent improvement in overall energy efficiency for houses and a 13 per cent improvement for large buildings.[99]

Table 10: Energy Provisions in 2006 and 2012 Ontario Building Codes

Code Version	Energy Efficiency Provisions	Date In Effect
2006 Code	Low-rise housing: 40 per cent more energy efficient than 1997 Code. Large buildings: 25 per cent more energy efficient than 1997 Code.	In force now (as of January 1, 2012).
2012 Code	Low-rise housing: 15 per cent more energy efficient than 2006 Code. Large buildings: 13 per cent more energy efficient than 2006 Code.	January 1, 2017.
	Additional new prescriptive requirements such as programmable thermostats and low-flow showerheads.	January 1, 2014 or January 1, 2015.
	New Code objective to limit the release of greenhouse gas emissions; new functional statement[100] to limit peak electrical demand.	January 1, 2014

4.2.2 ALLOWING TRADE-OFFS BETWEEN ENERGY EFFICIENCY TECHNOLOGIES

On occasion, the Minister of Municipal Affairs and Housing can and does make Code-related changes during the interim five-year period between full Code updates.

In early 2013, MMAH made a change of this nature, amending **SB-12**, a technical supplementary standard to the Code that provides additional detail for new home builders on meeting the Code's energy performance requirements. The change was effective immediately, thus having an impact on houses being built today.

The amendment added drain water heat recovery technology to SB-12. Drain water heat recovery recycles energy by capturing some of the heat in drain water (e.g., from showers) to pre-heat incoming cold water, thereby reducing the energy used for water heating.

The amended standard allows builders that incorporate drain water heat recovery technology to reduce the level of energy efficiency of other building components (e.g., by using lower levels of insulation or less efficient furnaces).[101] A similar provision already existed for other technologies specified in SB-12, allowing builders to trade off between the efficiency of the technologies specified in the standard. Buildings with drain water heat recovery technology would, on average, still meet the same overall level of energy performance required under the OBC.

In theory, trading off other energy features against drain water heat recovery was always an option for builders. However, a builder needed to demonstrate that the energy performance of the building with drain water heat recovery still met the Code's energy performance requirement.[102] The changes to SB-12 will make it easier for builders to use drain water heat recovery technology, by making the demonstration step unnecessary. Manufacturers of drain water heat recovery systems claim that the changes will allow builders to meet the Code's energy performance standard at a lower cost.

The treatment of drain water heat recovery raises a broader issue about the energy performance standards for low-rise housing and the use of SB-12. SB-12 allows builders to meet the OBC's energy performance standards using either a "performance path" or a "prescriptive path". Under the performance path, builders model or test the building to confirm that its overall energy performance is acceptable, whereas a prescriptive path provides pre-approved packages of different technologies from which a builder chooses. Each pre-approved package is deemed to meet the Code's energy standards.

In practice, most builders have chosen to use the prescriptive path because it does not require the time and expense of energy modeling (and possibly field testing). This means that the list of prescriptive packages is quite important. However, this list does not encompass all energy efficiency technologies, and some technologies can be left on the outside looking in, as drain water heat recovery technology was prior to the recent amendment. The issue may arise again in the future with other excluded technologies.

There is also a public consultation and transparency concern related to the procedures through which supplementary standards are amended. As SB-12 is a technical standard, not a regulation, MMAH can change the standard without Cabinet review by elected members of the government, and without public consultation. This was the case with the drain water heat recovery amendment. MMAH does consult the public during the five-year updates of the Code (which are amendments to a regulation), using its own website. So far, the ministry has not agreed to use the Environmental Registry to consult the public on Code updates, despite the **ECO's recommendation**.[103]

4.2.3 FURTHER WORK UNDERWAY – RENOVATIONS OF EXISTING BUILDINGS

Although the 2012 OBC has been finalized, MMAH is undertaking some additional work on Code-related energy issues. One necessary task will be to develop new editions of supplementary standards **SB-12** and **SB-10** (an equivalent technical standard for larger buildings) that are compatible with the energy performance requirements of the new **2012 Code**.

Another area that MMAH has been examining is whether and how energy efficiency provisions in the Code can be applied to renovations of existing buildings. Currently, existing buildings are essentially exempt from the Ontario Building Code's energy requirements, as is the case in other provinces. However, the City of Vancouver is likely to implement energy efficiency provisions for existing buildings undergoing renovations in its **2014 Building By-law**. The degree of energy efficiency requirements will be scaled to the size of the renovation, for both small and large buildings.[104]

MMAH conducted studies on this subject in 2013, but has not yet proposed any Code changes.[105] Codifying energy requirements for existing buildings is tricky for several reasons. Energy efficiency measures that make sense for new buildings may be more difficult or expensive for renovations. Insulation and air sealing measures, for example, may cause issues with moisture retention and mold if not implemented properly. Finally, overly strict requirements may run the risk of driving more renovations (particularly for residential buildings) to the "underground economy." Without building permits, renovations may fall short of both the safety and the energy requirements of the Code. As discussed in **past reports**, however, the large potential energy savings from retrofits of existing homes and buildings supports action on this front.[106]

ECO Comment

The ECO is pleased that Ontario has continued to move the goalposts for energy efficiency in new buildings, keeping Ontario at the forefront of North American jurisdictions. The ECO encourages MMAH to include the solar-ready requirement for homes to the OBC through an interim amendment as soon as possible, instead of waiting until the next full update in 2017. Given that more than half of Ontario's homes were built before 1983, in an era without meaningful energy efficiency requirements, the ECO is also encouraged that MMAH is considering energy efficiency requirements for existing buildings undergoing renovation.

The ECO supports use of drain water heat recovery technology. However, the ECO is concerned about the incorporation of drain water heat recovery into the prescriptive packages that builders use to comply with the OBC, and the "trade-offs" between building systems permitted under **SB-12**. One of the most popular compliance packages for builders (package "J") already allows reduced building insulation levels in exchange for higher-efficiency space heating and water heating equipment. Under the new version of SB-12, insulation levels can now be further reduced if drain water heat recovery equipment is installed. This is problematic. Energy savings derived from efficient water heating technologies like drain water heat recovery are highly variable and dependent on occupant behaviour compared to savings resulting from efficient space heating equipment or improvements to the building's envelope. This means that homeowners with lower than average hot water usage will see limited benefit from improvements such as drain water heat recovery.

MMAH has developed new versions of SB-12 and SB-10 that meet the higher energy performance requirements of the **2012 Code**, although these are likely to undergo updates and revisions before 2017, when the new energy performance requirements take effect. The ECO suggests that MMAH review these standards with an eye towards limiting the degree to which energy efficiency measures in one building component can be traded off against measures in another component.[107] In particular, there should be little compromise allowed on the building envelope, given its greater importance to overall energy consumption over a building's lifetime.

The ECO recommends that the Ministry of Municipal Affairs and Housing modify the 2012 Ontario Building Code's technical standards to restrict the use of trade-offs that reduce the level of energy performance of the building envelope.

Finally, the ECO makes several suggestions designed to ensure that the advantages and disadvantages of any proposed changes that would impact building energy efficiency can be discussed in a transparent manner.

First, MMAH should consult the public on substantive revisions to technical supplementary standards like **SB-10** and **SB-12**, similar to how the ministry amends the Code itself. Second, any energy modeling that MMAH undertakes to develop changes to the standards should also be made public. Finally, the ECO has long recommended that the *Building Code Act, 1992* should be prescribed under the *Environmental Bill of Rights, 1993* to allow the public to comment on Building Code-related policy proposals through the Environmental Registry.

4.3 INDUSTRIAL ELECTRICITY INCENTIVE PROGRAM

4.3.1 INTRODUCTION

In June 2012, the Ministry of Energy issued a curious **news release** that, on its face, appeared incompatible with the government's stated commitment to energy conservation. The ministry announced the Industrial Electricity Incentive (IEI) program to "make use of Ontario's strong supply of energy" by providing some

industrial facilities with a "reduced electricity rate in exchange for creating new jobs and bringing new investment to the province."[108] In essence, such a program aims to increase Ontario's electricity consumption, not reduce it. Our review of the IEI examines whether there is a policy justification for the program, and how the government's original policy direction has been put into practice. While the ECO agrees that part of the program reasonably addresses the challenge of surplus energy, drawbacks associated with the rest cast doubt about whether the approach is optimal for conservation and equitable for ratepayers.

4.3.2 AN ELECTRICITY SURPLUS IN ONTARIO?

Is there really excess electricity in Ontario? The answer can vary from hour to hour. Our electricity system is built to meet the highest demand Ontario will face, with a suitable reserve amount that provides a safety margin. In 2012, Ontario demand peaked at 24,636 megawatts (MW). However, it bottomed out at 10,998 MW, meaning that much of Ontario's electricity generation capacity lies idle at least some of the time.

Ontario can adjust to demand conditions that change throughout the day (as shown in Figure 7) by increasing or decreasing production from natural gas-fired generators or hydroelectricity from reservoirs, and by triggering pre-arranged agreements with certain consumers to conserve energy as part of demand response programs.

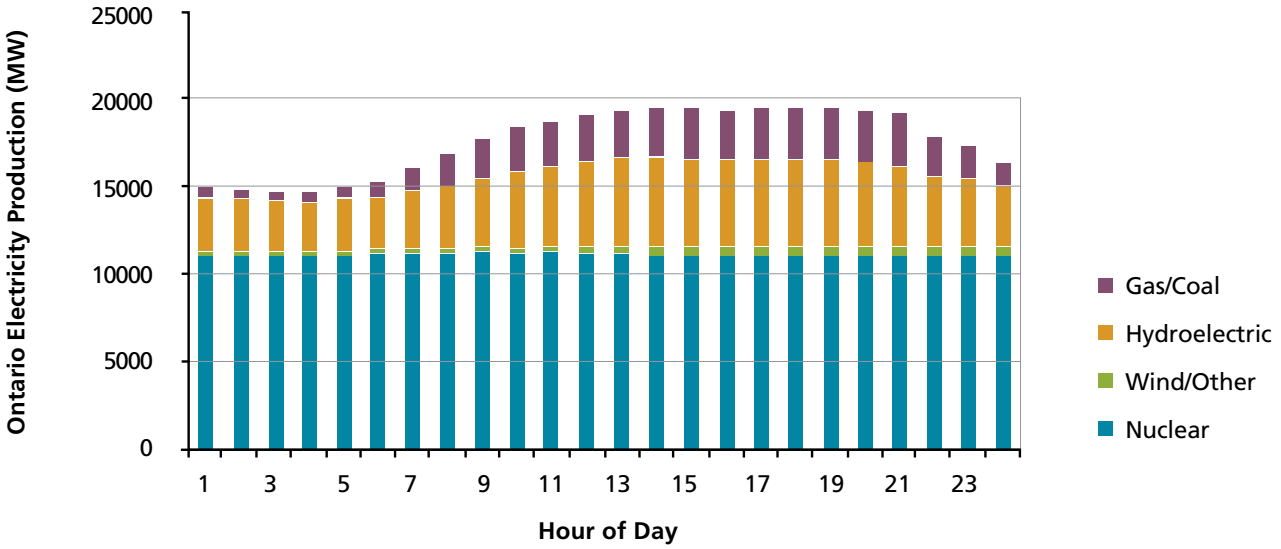


Figure 7: Daily Ontario Electricity Supply Curve (August 12, 2013)

Source: Independent Electricity System Operator

A less flexible option is to reduce production from other electricity supply resources, known as baseload generation. (Baseload in Ontario is primarily nuclear generation, run of river hydro, and intermittent renewable resources such as wind and solar). Baseload generation is designed to run full-out at all hours of the day, and not be ramped up and down to follow the variations of demand throughout the day. In most hours over the next few years, between 12,000 MW and 15,000 MW of baseload generation is expected to be on the system.[109] The amount of baseload generation has increased in recent years and will increase further, due primarily to the return of Bruce nuclear units 1 and 2 to service (some 1,550 MW) in late 2012, and to wind (about 2,200 MW) and solar generation (800 MW) that began production during the past several years.

Whenever the supply of baseload generation exceeds Ontario demand, there is potential surplus energy. Surplus energy is most prevalent during the nighttime when electricity demand is low; however, the variability associated with renewable energy production (particularly wind) adds an element of uncertainty as to exactly when surplus conditions will occur.

The **OPA has estimated** that surplus energy in Ontario will peak in 2015 at about 10 terawatt-hours (TWh), falling to zero around 2020 as nuclear units at Darlington and Bruce are shut down for refurbishment and the Pickering nuclear station closes, reducing the amount of baseload generation in the system.[110]

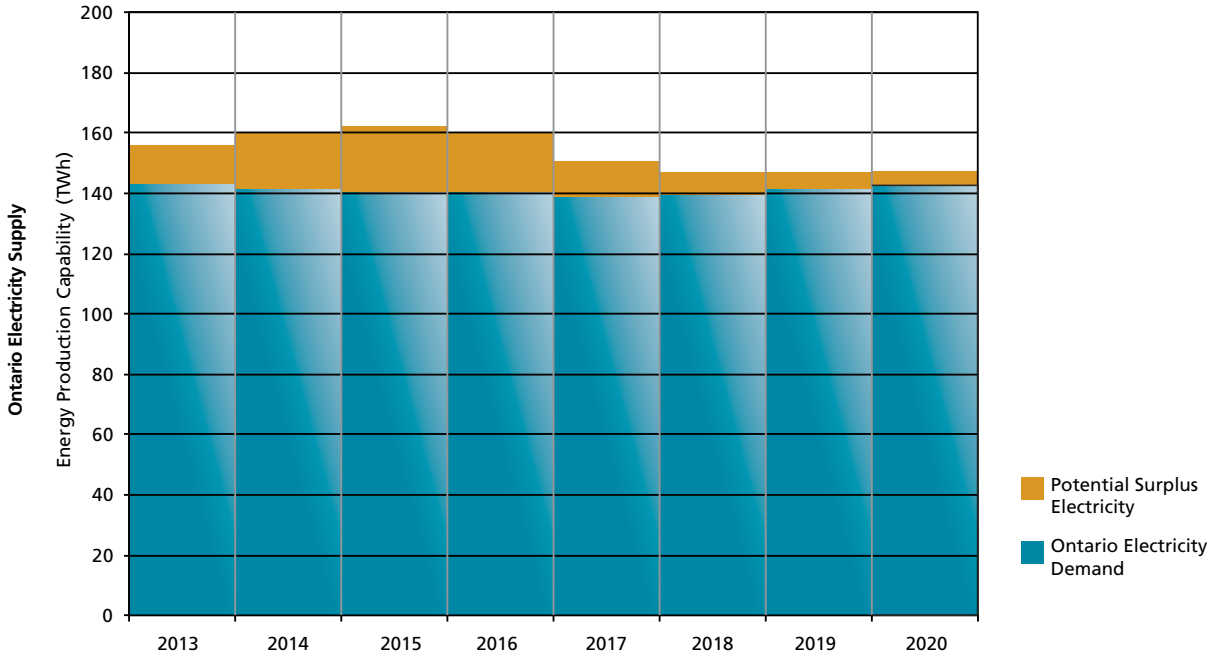


Figure 8: Predicted Ontario Electricity Surplus

Source: **Ontario Power Authority**

Ways to deal with surplus electricity exist. The energy can be exported out of Ontario, although there are transmission operational limits to this. Much of our current surplus electricity is exported – since 2005 Ontario has become a net exporter of about 10 TWh per year.[111] Beyond exports, the system operator can shut down baseload generation. As of September 2013, the **Independent Electricity System Operator** can dispatch large wind and solar generators, as with most other generators, reducing their output or shutting them off completely.[112]

However, both exports and reduced power production are economically poor deals for Ontario ratepayers because this energy goes unused,[113] or at best, is sold at a discount.[114]

In theory, it would be beneficial if this surplus electricity could be offered at low rates to those Ontario customers that can use more electricity in hours of surplus without imposing a cost on other electricity ratepayers. Industrial customers are ideal, as some have the ability to use electricity at night when surplus is more likely. This is essentially the economic logic behind the IEI program. Crucially, the logic only holds if such an incentive program can be designed so as not to increase electricity demand in other (non-surplus) hours. If such demand did increase, it would lead to the construction of additional electricity infrastructure and drive up costs for ratepayers. It would also lead to increases in greenhouse gas emissions whenever the increased demand was met with natural gas-fired power.

4.3.2.1 THE ROLE OF PRICE SIGNALS IN DEALING WITH SURPLUS ENERGY

In theory, price should play a major role in encouraging the use of surplus electricity. When the price of electricity drops, signalling surplus conditions, consumers should respond and increase demand to take advantage of the cheap electricity.

The **Hourly Ontario Energy Price** (HOEP) does closely track changes in supply and demand, falling to near zero (or occasionally becoming a negative number) during periods of surplus. However, Ontario's electricity pricing structure does not allow all customers to make full use of the HOEP signal.

Small customers pay electricity prices that vary with the time of day but are not directly linked to the HOEP or to real-time supply and demand conditions. Larger consumers pay a price that includes the HOEP and the **Global Adjustment** (a charge which largely reflects the fixed capital costs of electricity supply plants) for each unit of electricity consumed. In recent years, the Global Adjustment has been higher than the HOEP. This means that the marginal price of electricity from the consumers' perspective can be much higher than the HOEP, discouraging consumption even when the HOEP is low. This problem is made worse because there are additional components of the price that are also based on the total volume of electricity consumed, such as administration charges and the Debt Retirement Charge, further weakening the price signal.

Very large industrial customers with a peak electricity demand greater than 5 MW can elect to have their Global Adjustment charges calculated based only on their consumption at times of system-wide peak demand. For these customers, their Global Adjustment charge is not related to their amount of electricity consumption in other hours.[115] Therefore, the marginal electricity price that these consumers pay is much closer to the HOEP, and they are already in a better position to make use of surplus electricity at low cost.

4.3.3 PROGRAM DETAILS

Following its original June 2012 announcement, in November 2012 the Minister of Energy **directed** the OPA to run a competitive procurement for the IEI program. The directive stated that the primary purpose of the program was to benefit the electricity system by increasing industrial electricity consumption to deal with the issue of surplus generation, with "further benefits accru[ing] to the province through related economic and employment effects."[116] Up to 5 TWh of electricity consumption was made eligible for the IEI program. If the full amount is used, Ontario's total annual electricity consumption would increase by approximately 3.5 per cent.

The OPA finalized the **program's rules** in late 2012 and early 2013. The IEI program is divided into two streams. Stream 1 is intended to attract large new industrial facilities to Ontario, while stream 2 targets existing Ontario industrial consumers that may have reasons to use more electricity (e.g., by adding an additional shift).

The financial incentives differ between the two streams. Stream 1 customers will be provided with a guaranteed cap on their "all-in" price of electricity (including electricity supply, transmission, and other bill components) over a term of up to 25 years. Stream 2 customers will be eligible for rebates of up to 100 per cent on the Global Adjustment and other electricity charges, so that they will only pay the market price of electricity. These shorter term rebates for Stream 2 customers will end in December 2019 and will only apply to new electricity consumption, not their baseline consumption.

The size of these incentives will depend on many factors, including: future electricity price trends, the customer's variable daily electricity consumption, the customer's Global Adjustment (see Section 4.3.2.1) classification, and the bids submitted through the OPA's IEI procurement. As one point of comparison, the Ministry of Energy estimates that the average all-in electricity price for a large Ontario industrial customer was $72.50/MWh in 2012.[117] Stream 1 participants in the IEI program could be eligible for a price cap of $55.00/MWh, almost a 25 per cent discount.

Additional key details of the two IEI program streams are shown in Table 11.

Table 11: IEI Program Streams

	Stream 1	Stream 2
Eligibility	New facility, making direct capital investment of at least $250 million over 5 years or less, and creating products or using technologies not currently used in Ontario	Existing Ontario industrial customer, increasing electricity consumption
Electricity Demand	Must have a peak electricity demand of at least 25 MW	Must increase annual electricity consumption by at least 7,000 MWh (approximate peak demand increase of 1 MW)
Contract Length	Up to 25 years, depending on size of electricity demand	Must terminate by the end of 2019
Electricity Pricing Incentive	All-in electricity price capped at $55/MWh (or higher, depending on procurement), adjusted over time to track the inflation rate or change in the market electricity price	Rebate of Global Adjustment and various additional electricity charges (Debt Retirement Charge, variable transmission charges, administrative charges)
Maximum Amount of Electricity Eligible for Incentives (All Participants)	3 TWh	2 TWh

Source: Ontario Power Authority

4.3.4 PROGRAM PROCUREMENT

The OPA was responsible for converting the directive into action. In many aspects of the program's design, the **Minister's directive** was quite specific and left little discretion to the OPA.

The OPA developed detailed **program rules** and contracts prior to running separate competitive procurements for streams 1 and 2. As required, the OPA ranked program applications by giving 70 per cent weight to the electricity system benefit that would be delivered by a project and 30 per cent weight to the project's non-electricity economic impact (job creation and capital investment). The initial application window for the IEI procurement closed on February 15, 2013 for stream 1 participants and on July 10, 2013 for stream 2 participants.

As of the end of October 2013, no procurement results had been announced. The OPA was in the process of reviewing proposals, and would not provide any additional information to the ECO. The OPA expects that the review process will be completed by the end of 2013.[118] As required by the directive, any final contracts will be made public.

Despite the lack of details for the outcome of the IEI program procurement, the rules and draft contracts provide information as to how future IEI contracts will likely impact Ontarians. The ECO is particularly interested in two elements: whether the program structure meets the objective of providing electricity system benefits; and, whether the program encourages or inhibits energy conservation and efficiency for participating industrial consumers.

4.3.5 MAXIMIZING ELECTRICITY SYSTEM BENEFITS

The IEI program can only provide electricity system benefits if the new electricity consumption that it incents truly makes use of surplus baseload generation. If, on the other hand, the new electricity consumption expands beyond baseload generation and requires natural gas power plants to fire up, then it will no longer be meeting the stated intent of the IEI program: to absorb surplus power generation. Such projects would have a "poor electricity load shape", that is, would be creating demand during hours when Ontario does not

have excess baseload supply and would be drawing upon peaking generators rather than just the program's intended baseload generators. Furthermore, such projects would contribute to a rise in greenhouse gas emissions. Preventing a rise in greenhouse gas (GHG) emissions was not a stated objective of the IEI program, but arguably it should have been, given Ontario's commitment to its **Climate Change Action Plan**. Restricting any increased electricity consumption to hours of surplus baseload generation prevents an increase in GHG emissions, as any additional production would come from carbon-free sources.

To ensure that the IEI program will target true surplus electricity, the OPA included certain provisions in both the procurement process (influencing which projects would be selected as IEI participants), and in the contracts that would be offered to successful applicants. The OPA also included provisions intended to directly reduce the cost of any IEI price rebates to existing ratepayers.

Table 12 shows the provisions in the stream 2 procurement process that addressed electricity system benefits. The OPA used these factors to rank applications, together with additional criteria that dealt with job creation and economic development.

Table 12: Procurement Provisions for Electricity System Benefits for IEI Stream 2 Applications

Application Parameter	Weight	Approach and Rationale
Electricity Consumption Profile (time of day when incremental electricity consumption is used)	24 points	Favours projects that increase consumption during times of day when Ontario-wide demand is usually low and system is more likely to be in surplus (e.g. 11 p.m. – 7 a.m.)
Cost Contribution	20 points	Favours projects that seek lower rebates (do not require 100 per cent rebate of Global Adjustment and other charges), reducing cost for existing ratepayers
Location	6 points	Favours projects in geographic regions of the province (e.g., northern Ontario) where there is more likely to be surplus electricity available
Contract Term	Modifies score for above 3 parameters, based on percentage of time before December 2019 that project will be in service	Favours projects that start sooner and can take more advantage of near-term surplus

Source: Ontario Power Authority

The OPA used similar provisions to rank stream 1 applications, although the ranking methodology was more complicated. Stream 1 applicants could apply for contracts up to 25 years in length, but the OPA gave preference to shorter-term contracts, noting that longer-term contracts would "have a larger portion of the contract that falls outside of the current capacity surplus period."[119] Stream 1 applications were not ranked based on how their electricity consumption varied with time of day, but were given credit if they could commit to reducing demand during the top five hours of Ontario's annual system peak. This means that stream 1 projects will likely lead to increased electricity consumption at all times of day.

In the contracts that will be offered to successful IEI program applicants, the electricity prices paid by both stream 1 and stream 2 customers will still be tied to the market electricity price – the Hourly Ontario Energy Price (HOEP). This price acts as a proxy to signal whether or not surplus electricity is being produced (a low price indicates surplus power).[120] Stream 2 participants will be fully exposed to the variation in HOEP. Accordingly, they will have an incentive to increase or decrease their electricity consumption to match the changes in the HOEP. Stream 1 participants will not be fully exposed to variations in HOEP, as they are guaranteed a maximum all-in price. However, by timing their production to coincide with low HOEP, stream 1 participants can reduce their price below the maximum all-in price.[121]

4.3.6 ENERGY EFFICIENCY FOR IEI PROGRAM PARTICIPANTS

By the **Minister's directive**, the IEI program will include energy efficiency requirements for participants. This approach follows a precedent set by the **Northern Industrial Electricity Rate program**, another industrial electricity subsidy program.[122] The energy efficiency levels of stream 1 projects could have long-term implications for Ontario's energy load. Stream 1 projects will be more likely than stream 2 projects to increase electricity consumption during those hours where no surplus exists.

Both stream 1 and stream 2 program participants will be required to submit energy management plans (EMPs) to the OPA. These EMPs must be prepared by a certified energy manager and firms will need to provide yearly progress reports. Alternatively, participants can choose to be certified under the ISO 50001 energy management standard. The OPA has the right to audit a facility to ensure compliance with its EMP, and to cancel the IEI program contract if a participant fails to act on its EMP. However, the EMPs will not necessarily be ambitious on energy efficiency if participants choose not to design a stringent plan. While EMPs must include information about a firm's energy use and potential energy savings opportunities, it is left to the participants' discretion, not the OPA, whether to commit to specific energy efficiency projects.

For stream 1 participants, there is a second OPA contractual provision to encourage energy efficiency. By definition, stream 1 participants will be building entirely new production facilities, and so there is a clear opportunity to make these projects as energy efficient as possible. Unfortunately, there is no assurance that participants will take advantage of this opportunity. The IEI program does require participants to allow the OPA to review the energy efficiency of the proposed new industrial facility at the design stage, and make recommendations for improvements. However, firms are not obliged to act on the OPA's advice.

A final factor influencing the energy efficiency of IEI program participants is whether these firms are allowed to participate in OPA industrial electricity conservation programs. These programs can provide funding for engineering studies to analyze potential energy efficiency projects and capital incentives for proceeding with such projects. The Minister's directive prohibited IEI program participants from participating in the main industrial conservation program, the **Industrial Accelerator program**, in relation to their IEI program load (i.e., their incremental electricity demand related to new IEI investments.)[123] The Ministry of Energy was concerned that allowing industrial customers to benefit from the incentives of both the IEI program and the Industrial Accelerator program could require too large a cross-subsidy from other classes of electricity customers.[124]

ECO Comment

The IEI program serves as a way to deal with time-dependant imbalances in electricity supply and demand. In general, the ECO's preference is for resolution of these imbalances through stronger electricity price signals that are made available to all electricity consumers.[125] This allows for market-based solutions to emerge and avoids the problem of favouring some consumers over others which the IEI program inherently does.

Despite this caveat, the ECO believes the stream 2 program reasonably addresses the near-term surplus of electricity in off-peak hours. The ECO accepts the Ministry of Energy's view that alternative solutions would have taken too long to deliver results, given the short-term nature of the surplus.[126] The firm end date of 2019 for stream 2 contracts means that the program has the potential to provide successful applicants with a short-term supply of cheap incremental electricity without raising bills for existing ratepayers.

On the other hand, the ECO believes that the stream 1 IEI program approach is a bad deal for electricity ratepayers, as well as for the environment. This element of the program could potentially increase electricity demand across all hours, for a contract length as long as 25 years. As such, consumption will occur well beyond the current period of surplus, and will likely contribute to the need for new or upgraded electricity infrastructure. Stream 1 likely commits to providing successful applicants with a long-term electricity supply at less than the cost of producing it. The cost difference will need to be made up by other ratepayers. It will also increase greenhouse gas emissions from natural gas-fired generators, particularly in the years when nuclear units are down for refurbishment. Over the longer time period of the stream 1 contracts, it would be wiser to employ improved price signals, supported by technologies such as smart grid-enabled load shifting, electric

vehicles, and electricity storage. Price signals would deal with the variation in electricity demand in a more efficient and equitable fashion. If the government believes that electricity pricing incentives are necessary in order to attract new industry to Ontario, this should be stated explicitly and funded through taxes, not funded by ratepayers and disguised as a measure to benefit the electricity system.

The ECO makes two additional observations on the **Minister's directive** that apply to both program streams. First, there was no need to restrict program eligibility to industrial facilities. While such facilities are the most obvious potential consumers of off-peak electricity, other enterprises such as data centres may have also been able to participate. Second, to ensure that the IEI program does not undermine Ontario's climate change efforts, the Minister's directive should have explicitly included an objective of minimizing any increase in GHG emissions from IEI-related electricity consumption. This objective is achieved unintentionally to a degree by some of the IEI program provisions that are designed to reduce price impacts on electricity ratepayers. However, an explicit GHG-related objective would have led the OPA to design the procurement process and contracts to include stronger disincentives to increasing electricity consumption at times when natural gas is the marginal electricity source or incentives to increase energy conservation to achieve the same result.

In terms of implementing the IEI program directive, the ECO believes that the procurement process was appropriately structured by the OPA to favour projects that will truly use surplus baseload generation, thus minimizing the cost to electricity ratepayers.

While the provisions for determining the participant's contribution to electricity system benefits, such as the company's demand profile, plant location, contract length and amount of price rebate, do affect the ranking of a project within the procurement process, they do not necessarily exclude a poor project from consideration. If few projects apply, a poorly ranked project with high cost or poor load shape may still be in line for a contract. The ECO believes that the OPA should use its discretion and not sign contracts that would not achieve the objective of providing benefits to the electricity system, even if this means not allocating the entire 5 TWh. The OPA's latitude on this matter is open to interpretation, as the Minister's directive notes that "the OPA, acting reasonably, shall continue to make the IEI program available, until all of the 5 TWh are allocated."[127] The ECO notes that the OPA has used its discretion in past procurements, such as combined heat and power procurements, to refrain from signing contracts that it did not believe were in the best interest of ratepayers.

The ECO recommends that the Ontario Power Authority provide Industrial Electricity Incentive price discounts only for projects that predominantly use surplus electricity.

The ECO also believes that the OPA should use its authority to strengthen the energy efficiency requirements for stream 1 participants, and only sign contracts containing the provision that new facilities must be built to premium levels of energy efficiency. If the OPA does not use this authority, then IEI program participants will underinvest in energy efficiency since participants will compare the cost of efficiency investments against their IEI discounted electricity price, not the true cost of electricity, and are not eligible for energy efficiency incentives through the Industrial Accelerator program. Also, as the ECO has noted, stream 1 contracts likely represent a long-term transfer of funds from existing ratepayers to IEI program participants. Every unit of electricity saved through efficient initial design will reduce this cost burden.

5 Appendices

848 'GREEN LICENCE PLATES'
HAVE BEEN ISSUED IN ONTARIO

APPENDIX A: CURRENT ENERGY CONSUMPTION

THE ECO HAS CHOSEN TO EXAMINE ENERGY CONSUMPTION BY FUEL TYPE FOR ONTARIO.

This approach is taken because this office is responsible for reporting on the progress of government activities related to reducing or making more efficient use of electricity, natural gas, propane, oil, and transportation fuels.

Like **earlier ECO reports**, data is derived from the energy consumption statistics contained in the **Report on Energy Supply and Demand in Canada** (RESD), produced by Statistics Canada. However, after the release of the ECO's Annual Energy Conservation Progress Report - 2011 (**Volume Two**), Statistics Canada made significant methodological changes to the data surveys that supply information to the RESD.[128] These methodological changes are incorporated into the following analysis. Since results previously reported by the ECO do not contain the same methodology, this report analyzes trends in energy consumption statistics for 2011 (the most recently released RESD), with 2007-2010 datasets available from the Canadian socioeconomic (**CANSIM**) database produced by Statistics Canada and revised to incorporate the same methodological changes.[129] Comparisons between this analysis and the energy consumption analyses contained in previous ECO reports should be done with caution.

Analysis

Only preliminary data are available for the 2011 calendar year. According to the preliminary data for 2011, total energy demand for Ontario was 2,513 Petajoules (PJ). Figure 9 shows the breakdown of this energy demand by fuel type. Natural gas and transportation fuels accounted for 70 per cent of the total energy demand. Meanwhile, electricity accounted for 20 per cent of Ontario's overall energy demand. Propane, oil and other fuels accounted for roughly 10 per cent of Ontario's overall demand. As shown in Table 13, this trend is virtually identical to what was observed between 2007 and 2010.[130]

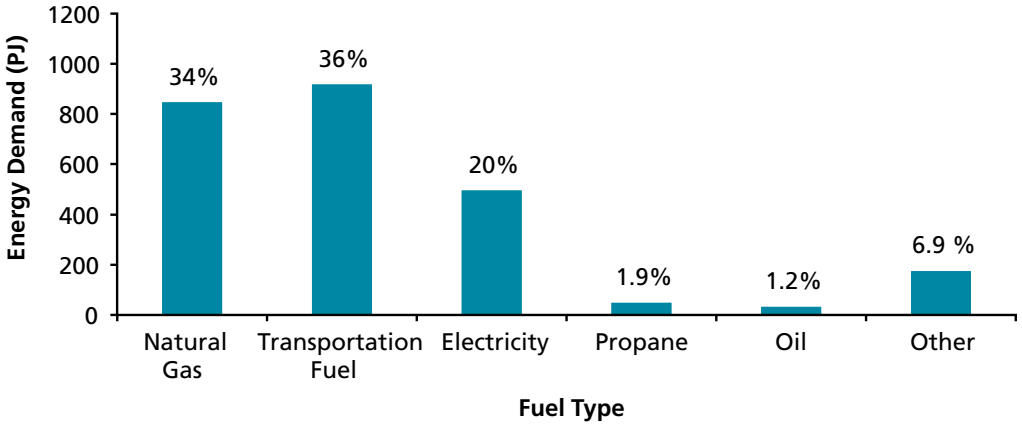


Figure 9: Ontario 2011 Total Final Energy Demand by Fuel Type

Notes:

Oil demand incorporates kerosene and stove oil, and light fuel oil amounts; Transportation Fuel incorporates motor gasoline, diesel fuel oil, heavy fuel oil, aviation gasoline, and aviation turbo fuel amounts; details of Oil and Transportation Fuels come from Table 4-8 of Statistics Canada's 57-003-X report; Other fuel amount is based on Ontario's total final energy demand for 2011 (preliminary).

Source: Statistics Canada – Catalogue no. 57-003-X Report on Energy Supply and Demand in Canada - 2011 Preliminary (released April 2013).

Table 13 provides numerical details for Figure 9, and energy demand values for calendar years 2007 through 2010. In 2011, total energy consumption in Ontario increased by 90 PJ (3.8 per cent) from 2010 levels, a trend largely due to recovery from the economic recession of 2008-2009.

Table 13: Annual Ontario Total Energy Demand by Fuel Type*

Year	Natural Gas (PJ)	Transportation Fuel (PJ)	Electricity (PJ)	Propane (PJ)	Oil (PJ)	Other (PJ)	Total (PJ)
2007	892	909	548	40	41	192	**2621**
2008	884	908	586	43	34	187	**2643**
2009	801	897	464	38	34	152	**2387**
2010	776	918	480	41	34	173	**2422**
2011	846	917	495	49	31	175	**2513**

Notes:

*All values in Table 13 incorporate methodological changes made by Statistics Canada.

Source: **Statistics Canada**

With the exception of the transportation sector, where total energy demand fell by 0.6 per cent, energy demand in 2011 increased from 2010 values across all major sectors of the economy including; industrial (5 per cent), agricultural (9 per cent), commercial and institutional (8 per cent) and residential (7 per cent).

Of the 91 PJ increase in Ontario's total energy demand in 2011, 77 per cent is attributable to natural gas demand growth and 16 per cent is due to electricity demand growth. In its **18-Month Outlook for December 2010 to May 2012**, Ontario's Independent Electricity System Operator (IESO) noted that while electricity demand was expected to increase between 2010 and 2012, growth would be limited by an increase in savings from conservation and distributed generation.[131] Growth in natural gas demand may be influenced by the low price of natural gas, which declined throughout 2011 and reached a decade-long low in April 2012.[132]

Natural Gas Consumption Trends

Between 1994 and 2003, the number of natural gas utility customers and the total volume of natural gas delivered to consumers in Ontario grew relatively uniformly (Figure 10). Since 2003, while the total number of natural gas customers has continued to increase, the volumetric demand for natural gas has plateaued. This trend suggests that over time, the average consumption of natural gas per customer has decreased, offsetting much of the customer related growth. However, it should be noted that natural gas customers are billed by household (i.e., one 'customer' equals one household), and does not take into account the size of the household. As such, the downward trend in the size of private households witnessed over the last several decades[133] may also be contributing to reduced average consumption per customer.

In 2012, the volume of natural gas supplied by Enbridge was the lowest recorded since 1998, despite a continued upward trend in its customer numbers. For Union, the volume of natural gas transported through its transmission network (referred to as "throughput" volume) decreased by 1.6 per cent from 2011 to 2012, even though the total number of customers increased by 1.4 per cent.

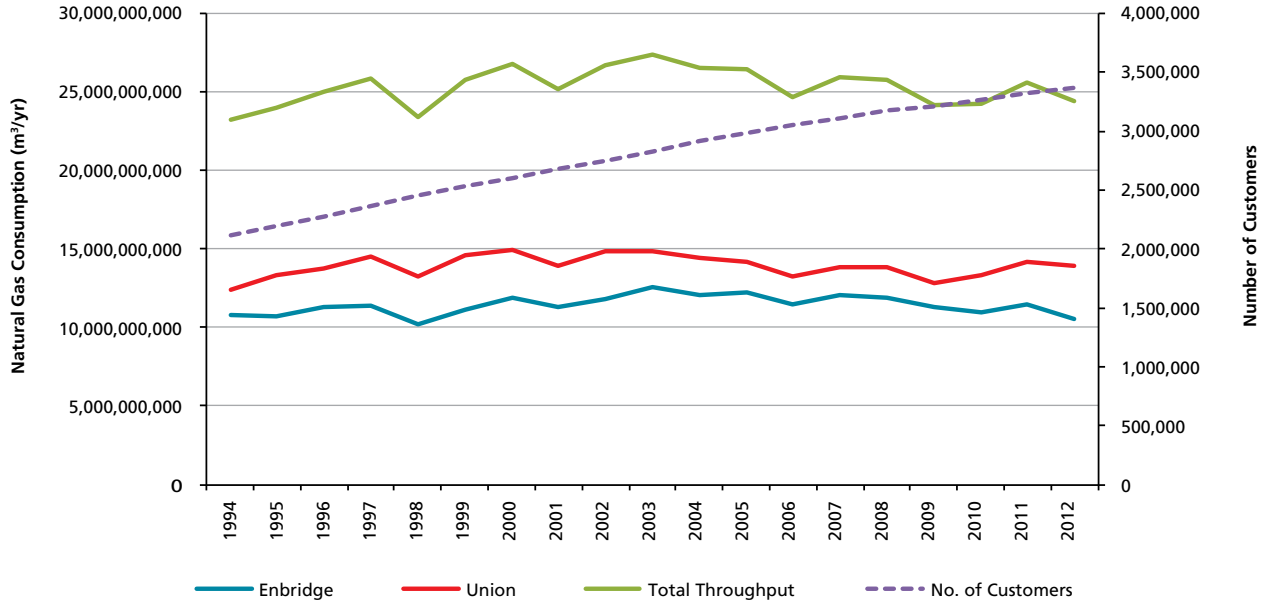


Figure 10: Natural Gas Consumption 1994-2012

APPENDIX B: 2012 CONSERVATION RESULTS FOR EACH LDC

Local Distribution Company	Energy				
	Target		Achieved To Date		
	2011-2014 Cumulative Energy Savings	LDC's Share of Aggregate Provincial Energy Target	2012 Incremental Energy Savings	2011-2014 Cumulative Energy Savings	Amount of 2011-2014 Energy Target Achieved
	GWh	%	GWh	GWh	%
Algoma Power Inc.	7.37	0.12	0.41	1.92	26.0
Atikokan Hydro Inc.	1.16	0.02	0.08	0.61	52.7
Attawapiskat Power Corporation	0.29	0.01	0.01	0.10	26.0
Bluewater Power Distribution Corporation	53.73	0.90	3.99	32.80	61.0
Brant County Power Inc.	9.85	0.16	1.41	5.81	59.0
Brantford Power Inc.	48.92	0.82	5.36	33.64	68.8
Burlington Hydro Inc.	82.37	1.37	8.41	54.12	65.7
Cambridge and North Dumfries Hydro Inc.	73.66	1.23	7.91	75.64	102.7
Canadian Niagara Power Inc.	25.08	0.41	1.27	11.57	46.1
Centre Wellington Hydro Ltd.	7.81	0.13	1.06	7.16	91.7
Chapleau Public Utilities Corporation	1.21	0.02	0.30	1.33	109.6
COLLUS Power Corporation	14.97	0.25	0.96	5.95	39.7
Cooperative Hydro Embrun Inc.	1.12	0.02	0.22	0.95	84.8
E.L.K. Energy Inc.	8.25	0.14	1.18	5.63	68.3
Enersource Hydro Mississauga Inc.	417.22	6.95	36.52	277.35	66.5
ENTEGRUS	46.53	0.78	6.04	28.14	60.5
ENWIN Utilities Ltd.	117.89	1.96	16.94	85.82	72.8
Erie Thames Powerlines Corporation	22.97	0.31	3.18	13.93	60.7
Espanola Regional Hydro Distribution Corporation	2.76	0.05	0.40	2.67	96.8
Essex Powerlines Corporation	21.54	0.36	2.18	14.63	67.9
Festival Hydro Inc.	29.25	0.49	6.43	31.62	108.1
Fort Albany Power Corporation	0.24	0.00	0.01	0.10	26.0
Fort Frances Power Corporation	3.64	0.06	0.46	1.80	49.4
Greater Sudbury Hydro Inc.**	43.71	0.73	3.57	22.79	52.1
Grimsby Power Inc.	7.76	0.13	0.99	7.11	91.6
Guelph Hydro Electric Systems Inc.	79.53	1.33	8.95	84.95	106.8
Haldimand County Hydro Inc.	13.3	0.22	1.01	9.22	69.3
Halton Hills Hydro Inc.	22.48	0.37	2.11	13.71	61.0

Peak Demand						
Target		Achieved To Date				
2014 Peak Demand Reduction Target	LDC's Share of Aggregate Provincial Peak Demand Target	2012 Incremental Peak Demand Reduction	2014 Persistent Peak Demand Reduction		Amount of 2014 Demand Target Achieved	
MW	%	MW	MW		%	
			Method 1*	Method 2	Method 1	Method 2
1.28	0.1	0.07	0.1	0.1	7.4	7.4
0.2	0.02	0.01	0.0	0.0	14.9	14.9
0.07	0.01	0.00	0.0	0.0	2.0	2.0
10.65	0.8	2.80	2.0	3.9	18.6	36.2
3.3	0.25	0.38	0.4	0.5	11.8	14.6
11.38	0.86	1.21	1.9	2.1	16.6	18.8
21.95	1.65	4.74	3.6	6.4	16.3	29.1
17.68	1.33	2.53	4.1	5.0	23.1	28.1
6.4	0.48	0.51	0.7	0.9	10.6	14.1
1.64	0.12	0.28	0.4	0.5	26.8	27.8
0.17	0.01	0.07	0.1	0.1	50.3	50.3
3.14	0.24	0.28	0.4	0.4	12.4	13.6
0.34	0.03	0.05	0.1	0.1	19.6	19.6
2.69	0.2	0.30	0.4	0.4	14.4	16.6
92.98	6.99	15.17	18.0	25.1	19.4	27.0
12.12	0.91	1.33	1.9	1.9	15.4	15.9
26.81	2.02	4.04	4.9	6.1	18.3	22.9
5.22	0.32	0.59	0.8	0.8	14.5	16.2
0.52	0.04	0.11	0.2	0.2	32.7	32.7
7.19	0.54	2.44	0.9	2.9	12.8	40.6
6.23	0.47	1.47	1.9	2.0	31.1	32.2
0.05	0.004	0.00	0.0	0.0	2.0	2.3
0.61	0.05	0.11	0.1	0.1	21.0	21.0
8.22	0.62	0.86	1.5	1.5	17.7	18.8
2.06	0.15	0.61	0.4	0.8	21.7	40.2
16.71	1.26	5.07	6.9	8.0	41.2	47.6
2.85	0.21	0.37	0.6	0.7	20.0	24.8
6.15	0.46	0.98	0.8	1.4	12.2	22.6

Local Distribution Company	Energy				
	Target		Achieved To Date		
	2011-2014 Cumulative Energy Savings	LDC's Share of Aggregate Provincial Energy Target	2012 Incremental Energy Savings	2011-2014 Cumulative Energy Savings	Amount of 2011-2014 Energy Target Achieved
	GWh	%	GWh	GWh	%
Hearst Power Distribution Company Limited	3.91	0.07	0.22	1.21	30.8
Horizon Utilities Corporation	281.42	4.69	18.92	186.71	66.3
Hydro 2000 Inc.	1.04	0.02	0.15	0.73	70.2
Hydro Hawkesbury Inc.	9.28	0.15	0.69	4.88	52.6
Hydro One Brampton Networks Inc.	189.54	3.16	16.07	100.84	53.2
Hydro One Networks Inc.	1,130.21	18.84	59.96	513.80	45.5
Hydro Ottawa Limited	374.73	6.25	35.09	245.97	65.6
Innisfil Hydro Distribution Systems Limited	9.2	0.15	0.61	4.04	43.9
Kashechewan Power Corporation	0.33	0.01	0.01	0.10	25.0
Kenora Hydro Electric Corporation Ltd.	5.22	0.09	0.13	0.71	13.7
Kingston Hydro Corporation	37.16	0.62	5.42	29.18	78.5
Kitchener-Wilmot Hydro Inc.	90.29	1.50	6.61	70.95	78.6
Lakefront Utilities Inc.	13.59	0.23	0.67	7.50	55.2
Lakeland Power Distribution Ltd.	10.18	0.17	1.34	6.19	60.8
London Hydro Inc.	156.64	2.61	14.40	126.76	80.9
Midland Power Utility Corporation	10.82	0.18	0.97	6.53	60.4
Milton Hydro Distribution Inc.	33.5	0.56	1.40	20.23	60.4
Newmarket - Tay Power Distribution Ltd.	33.05	0.55	3.46	24.86	75.2
Niagara Peninsula Energy Inc.	58.04	0.97	5.62	36.11	62.2
Niagara-on-the-Lake Hydro Inc.	8.27	0.14	0.85	6.51	78.8
Norfolk Power Distribution Inc.	15.68	0.26	1.52	8.68	55.3
North Bay Hydro Distribution Limited	26.1	0.44	2.52	16.96	65.0
Northern Ontario Wires Inc.	5.88	0.10	0.47	3.30	56.2
Oakville Hydro Electricity Distribution Inc.	74.06	1.23	5.98	45.08	60.9
Orangeville Hydro Limited	11.82	0.20	0.96	7.32	61.9
Orillia Power Distribution Corporation	15.05	0.25	1.47	12.22	81.2
Oshawa PUC Networks Inc.	52.24	0.87	4.00	22.58	43.2
Ottawa River Power Corporation	8.97	0.15	0.78	5.40	60.1
Parry Sound Power Corporation	4.16	0.07	0.19	1.37	33.0
Peterborough Distribution Incorporated	38.45	0.64	4.12	22.15	57.6

Peak Demand						
Target		Achieved To Date				
2014 Peak Demand Reduction Target	LDC's Share of Aggregate Provincial Peak Demand Target	2012 Incremental Peak Demand Reduction	2014 Persistent Peak Demand Reduction		Amount of 2014 Demand Target Achieved	
MW	%	MW	MW		%	
			Method 1*	Method 2	Method 1	Method 2
0.68	0.05	0.05	0.1	0.1	13.9	13.9
60.36	4.54	13.60	10.6	20.3	17.6	33.6
0.19	0.01	0.04	0.0	0.0	24.8	24.8
1.82	0.14	0.15	0.3	0.3	14.7	15.3
45.61	3.43	6.48	6.1	9.4	13.4	20.6
213.66	16.06	42.48	30.3	59.7	14.2	28.0
85.26	6.41	16.55	16.6	24.6	19.5	28.9
2.5	0.19	0.12	0.3	0.3	10.0	10.0
0.07	0.01	0.00	0.0	0.0	2.0	2.3
0.86	0.06	0.04	0.0	0.0	5.5	5.5
6.63	0.5	5.43	1.7	6.1	25.5	91.5
21.56	1.62	3.42	4.0	5.9	18.6	27.2
2.77	0.21	0.24	0.4	0.5	13.4	17.0
2.32	0.17	0.31	0.4	0.4	18.0	18.0
41.44	3.12	4.73	7.1	8.6	17.1	20.7
2.39	0.18	0.73	0.4	0.9	16.8	38.1
8.05	0.61	0.59	1.2	1.4	14.6	17.6
8.76	0.66	0.87	1.6	1.7	17.8	19.0
15.49	1.16	1.49	2.3	2.5	15.1	16.2
2.42	0.18	0.19	0.4	0.4	17.5	17.5
4.25	0.32	0.66	0.7	0.9	15.3	21.1
5.05	0.38	1.00	1.0	1.5	20.7	29.8
1.06	0.08	0.12	0.2	0.2	19.4	19.4
20.7	1.56	1.81	3.1	3.5	14.8	16.9
2.78	0.21	1.34	0.5	1.6	17.2	57.3
3.07	0.23	0.66	0.7	1.0	21.4	34.0
12.52	0.94	1.58	1.6	2.2	12.5	17.7
1.61	0.12	0.20	0.4	0.4	23.4	23.4
0.74	0.06	0.05	0.1	0.1	11.0	11.0
8.72	0.66	1.01	1.5	1.5	16.8	16.9

Local Distribution Company	Energy				
	Target		Achieved To Date		
	2011-2014 Cumulative Energy Savings	LDC's Share of Aggregate Provincial Energy Target	2012 Incremental Energy Savings	2011-2014 Cumulative Energy Savings	Amount of 2011-2014 Energy Target Achieved
	GWh	%	GWh	GWh	%
PowerStream Inc.	407.34	6.79	41.59	271.47	66.6
PUC Distribution Inc.	30.83	0.51	2.72	18.77	60.9
Renfrew Hydro Inc.	4.86	0.08	0.44	3.37	69.3
Rideau St. Lawrence Distribution Inc.	5.1	0.09	0.48	5.25	102.9
Sioux Lookout Hydro Inc.	3.32	0.06	0.09	0.51	15.4
St. Thomas Energy Inc.	14.92	0.25	1.76	10.17	68.1
Thunder Bay Hydro Electricity Distribution Inc.	47.38	0.79	2.83	16.94	35.8
Tillsonburg Hydro Inc.	10.25	0.17	1.09	5.13	50.1
Toronto Hydro-Electric System Limited	1,303.99	21.73	112.20	1019.23	78.2
Veridian Connections Inc.	115.74	1.93	8.46	61.67	53.3
Wasaga Distribution Inc.	4.01	0.07	0.63	3.04	75.8
Waterloo North Hydro Inc.	66.49	1.11	5.47	41.32	62.2
Welland Hydro-Electric System Corp.	20.6	0.34	1.41	12.09	58.7
Wellington North Power Inc.	4.52	0.08	0.50	2.09	46.3
West Coast Huron Energy Inc.	8.28	0.14	0.18	2.49	30.1
Westario Power Inc.	20.95	0.35	3.04	15.54	74.2
Whitby Hydro Electric Corporation	39.07	0.65	2.20	18.65	47.7
Woodstock Hydro Services Inc.	18.88	0.31	2.53	28.72	152.1
TOTAL	**6000**	**100**	**503.59**	**3906.43**	**65.1**

Notes:

* "Method 1" of calculating progress towards 2014 peak demand target assumes that no savings from demand response initiatives *(peaksaver,* Demand Response 3) persist in 2014. "Method 2" assumes that all savings from demand response programs persist until 2014.

** Uniquely among LDCs, Greater Sudbury Hydro Inc. (GSHI) continued to deliver custom conservation programs in 2011 and 2012 that were approved and funded prior to the current conservation framework. The savings from these programs are not included in GSHI's results shown in this table, as the Ontario Energy Board has not yet determined whether these savings will count towards GSHI's 2014 targets. Results from GSHI's custom programs have a negligible impact on peak demand reduction, but would increase cumulative energy savings, such that GSHI would have achieved 62.3 per cent of its 2014 energy target, instead of 52.1 per cent.

Source: Ontario Power Authority

Peak Demand						
Target		Achieved To Date				
2014 Peak Demand Reduction Target	LDC's Share of Aggregate Provincial Peak Demand Target	2012 Incremental Peak Demand Reduction	2014 Persistent Peak Demand Reduction		Amount of 2014 Demand Target Achieved	
MW	%	MW	MW		%	
			Method 1*	Method 2	Method 1	Method 2
95.57	7.19	17.14	17.4	25.7	18.2	26.9
5.58	0.42	0.75	1.4	1.4	24.7	24.7
1.05	0.08	0.14	0.3	0.3	24.8	27.1
1.22	0.09	0.1 8	0.4	0.4	33.5	33.5
0.51	0.04	0.02	0.0	0.0	5.0	5.0
3.94	0.3	0.42	0.7	0.7	16.5	17.4
8.48	0.64	2.29	1.1	2.8	13.1	32.7
2.29	0.17	1.98	0.4	2.1	15.5	91.5
286.27	21.52	61.09	57.9	95.6	20.2	33.4
29.05	2.18	4.46	4.1	6.6	14.0	22.6
1.34	0.1	0.19	0.2	0.2	12.7	17.7
15.79	1.19	2.54	2.6	4.0	16.5	25.2
5.56	0.42	6.05	0.7	6.5	13.3	116.1
0.93	0.07	0.13	0.2	0.2	18.4	18.4
0.88	0.07	0.07	0.1	0.2	15.4	18.3
4.24	0.32	0.70	0.9	0.9	21.6	21.6
10.9	0.82	1.48	1.2	2.2	10.7	19.9
4.49	0.34	1.32	1.4	2.2	31.0	49.1
1330	**100**	**253.3**	**237.2**	**378.7**	**17.8**	**28.5**

6 Endnotes

40 ELECTRICITY DISTRIBUTORS DELIVERED

5,000

ELECTRICITY CONSERVATION PROJECTS

TO LOW-INCOME HOUSEHOLDS IN 2012

ENDNOTES

1. Environmental Commissioner of Ontario, *Annual Energy Conservation Progress Report – 2009* (*Volume One*): *Rethinking Energy Conservation in Ontario* (Toronto, Ontario: 2010), 6 contains a full description of the reporting mandate and approach.
2. Environmental Commissioner of Ontario, *Annual Energy Conservation Progress Report – 2011* (*Volume Two*): *Restoring Balance - Results* (Toronto, Ontario: 2012), 42-46.
3. Minister of Energy Chris Bentley, **Directive to the Ontario Power Authority**, *Extension of Funding Time Period for OPA-Contracted Province-Wide Conservation and Demand Management (CDM) Initiatives Under the GEA Conservation Framework*, December 21, 2012.
4. Environmental Commissioner of Ontario, *Annual Energy Conservation Progress Report – 2010* (*Volume One*): *Managing a Complex Energy System* (Toronto, Ontario: 2012), 44-52 provides a description of the smart grid.
5. Environmental Commissioner of Ontario, *Annual Greenhouse Gas Progress Report 2012*: *A Question of Commitment* (Toronto, Ontario: 2010), 36-45.
6. Ontario Ministry of Transportation, **Sustainability insight: An Innovative Strategy for Ontario's Ministry of Transportation** (February 2011).
7. Environmental Commissioner of Ontario, *Annual Report 2011/2012 Part 2: Losing Our Touch* (Toronto, Ontario: 2012), 147-150.
8. Ontario Ministry of Transportation, **Sustainability Implementation Plan** (Undated 2012).
9. Some targets include a deadline for conclusion of the conservation activities and some specify energy savings from a particular sector or class of customers. Although not stated, the ECO assumes, unless otherwise indicated, that the quantity of energy specified represents net savings (i.e., adjusted for free riders and other factors).
10. Environmental Commissioner of Ontario, *Annual Energy Conservation Progress Report – 2011 (Volume Two): Restoring Balance - Results* (Toronto: Ontario, 2012), Table 1, 15.
11. Provincial energy intensity values previously reported by the ECO differ from values reported this year. The Ministry of Education indicated that the UCD is a live database and any changes, such as the addition of new sites or meters, will impact the data and calculations of energy intensity.
12. Note:

Vehicle Fuel Consumption (fiscal year values)	Air Travel (fiscal year values)	Energy in Facilities* (calendar year values)
Baseline in 2006: 41,365,508 L	Baseline in 2006: 29,197,253 mi	Baseline in 2006: 915.9 eGWh
2009/10: 37,638,885 L	2009/10: 23,732,087 mi	2009/10: 926.1 eGWh
2010/11: 37,897,815 L	2010/11: 24,579,468 mi	2010/11: 923.0 eGWh
2011/12: 36,858,804 L	2011/12: 23,377,226 mi	2011/12: 935.3 eGWh
2012/13: 34,656,113 L	2012/13: 21,722,619 mi	2012/13: 891.0 eGWh

* Between November 2012 and July 2013, the Ministry of Infrastructure performed a data verification exercise. All values shown under "Energy in Facilities" have been updated to reflect the most recent utility data retrieved by custodial ministries for the Ministry of Infrastructure.

13. A discussion document to review the Long-Term Energy Plan was released in 2013 and contains no conservation targets. A Conservation First vision paper was also released in 2013 and is seeking views on how electricity conservation targets should be set.

14. In response to an ECO information request, the OPA indicated that in 2012, non-OPA funded conservation programs contributed 1,284 MW of peak demand savings and 2,959 GWh of net persisting energy savings counted towards 2015 LTEP targets. At this time, the ECO has not been provided with the methodology or underlying assumptions used to calculate non-OPA funded conservation program savings.

15. Assumes existing demand response remains under contract through 2014. See section 3.2 for more details.

16. Office of the Governor (California, USA), "**Governor Schwarzenegger Joins Ontario Premier McGuinty in Signing Pact to Fight Greenhouse Gases**" News Release, May, 30 2007.

17. UC Davis Institute of Transportation Studies, **Status Review of California's Low Carbon Fuel Standard** *(Research Report ICD-ITS-RR-13-06)*, 2013, 1.

18. A rigorously-designed Ontario LCFS could achieve approximately 1.2 megatonnes (Mt) of GHG reductions according to Pembina Institute, *Reducing GHG Emissions from Ontario's Transportation Sector – Technical and Policy Report for ECO*, 2010, unpublished ECO Report, 43. Emissions reductions based on a 10 per cent reduction in the lifecycle intensity of gasoline and diesel. Gasoline and diesel emission factors from GHGenius vs 3.18. Absolute reductions calculated based on 2007 gasoline and diesel use for Ontario. This value is an order of magnitude estimate only. Actual reductions will depend on actual gasoline and diesel use over the 10 year life of the policy.

19. A gap of 28 Mt exists between projected GHG reductions for 2020 and GHG reductions required to meet 2020 target set out in Ontario's Climate Action Plan. Government of Ontario, **Climate Vision: Climate Change Progress Report, Technical Appendix** (Toronto: Ontario, 2012), 10.

20. It is assumed that an increase in the demand for ethanol would increase the demand for the crops used to produce ethanol and would require more land to be converted to farmland (i.e., land use change), causing an indirect increase GHG's emitted from the production of ethanol from corn.

21. See Table 6, section 95486 of title 17, California Code of Regulations, listing all transportation fuel pathways identified by ARB and their corresponding carbon intensity values. Four corn ethanol pathways are more carbon intensive than conventional gasoline or diesel.

22. Canada's Federal Renewable Fuels Regulations require gasoline to have a 5% renewable content, and diesel to have a 2% renewable content. The U.S. Renewable Fuels Standard required 1 billion gallons of cellulosic biofuel to be used in biofuel. The requirement was revised down in August 2013, based on forecast availability of cellulosic biofuel.

23. Advanced biofuels such as cellulosic ethanol are derived from non-edible biomass feedstocks (e.g., plant stalks, fast-growing grasses, and algae). Cellulosic ethanol offers significantly reduced life-cycle GHG emissions; however, its commercialization remains complex and progress has been slower than anticipated.

24. Eleven states evaluating a Clean Fuel Standard include: Connecticut, Delaware, New Hampshire, New Jersey, New York, Maine, Maryland, Massachusetts, Pennsylvania, Rhode Island, and Vermont. Ten states evaluating low carbon fuel policies include Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Ohio, South Dakota, and Wisconsin (represented collectively by the Midwestern Governor's Association), and Washington DC.

25. Environmental Defence and Natural Resources Defense Council, **A Comparison of California and British Columbia's Low Carbon Fuel Standards** (2010).

26. Environmental Commissioner of Ontario, *Annual Energy Conservation Progress Report – 2010 (Volume Two): Managing a Complex Energy System - Results* (Toronto: Ontario, 2011), Table 3, 14.

27. Environmental Commissioner of Ontario, *Annual Greenhouse Gas Progress Report – 2011: Meeting Responsibilities: Creating Opportunities* (Toronto: Ontario, 2012), Appendix 3.

28. Environmental Commissioner of Ontario, *Annual Energy Conservation Progress Report – 2011 (Volume Two): Restoring Balance - Results* (Toronto: Ontario, 2012), 16.

29. See in particular, sections 3, 4.2 and 8.3 of the Ontario Energy Board's **Demand Side Management Guidelines for Natural Gas Utilities.**

30. The three-year plans were submitted and approved through OEB hearings **EB-2011-0295** (Enbridge) and **EB-2011-0327** (Union).
31. The only issues where consensus was not reached and an OEB decision was needed were the total incentive levels (Enbridge) and the flexibility to overspend on programs for large industrial customers in the event these programs proved very successful (Union Gas).
32. As of October 1, 2013, Enbridge residential customers pay about 12¢/m^3 for gas supply and an additional 12¢/m^3 for transportation and distribution. On average, commercial and industrial customers would pay less than this.
33. The 2013 and 2014 conservation programs for Union's large industrial customers was submitted and approved through OEB hearing **EB-2012-0337**.
34. Environmental Commissioner of Ontario, *Annual Energy Conservation Progress Report - 2010 (Volume Two): Managing a Complex Energy System - Results* (Toronto, Ontario: 2011), 43.
35. Environmental Commissioner of Ontario, *Annual Energy Conservation Progress Report - 2009 (Volume Two): Re-thinking Energy Conservation in Ontario - Results* (Toronto, Ontario: 2010), 41.
36. See Environmental Commissioner of Ontario, *Annual Energy Conservation Progress Report - 2010 (Volume Two): Managing a Complex Energy System - Results* (Toronto, Ontario: 2010), 38-44 for a more detailed look at natural gas conservation programs for industrial consumers.
37. Environmental Commissioner of Ontario, *Annual Energy Conservation Progress Report - 2010 (Volume One): Managing a Complex Energy System* (Toronto, Ontario: 2011), 39.
38. Environmental Commissioner of Ontario, *Annual Energy Conesrvation Progress Report - 2010 (Volume Two): Managing a Complex Energy System - Results* (Toronto, Ontario: 2011), 43.
39. **Statement to the House** by the Honourable Gerry Phillips, Chair of Management Board of Cabinet Energy Conservation in the OPS. April 1, 2004.
40. Statement to the House by the Honourable Gerry Phillips, Chair of Management Board of Cabinet Energy Conservation in the OPS. April 1, 2004.
41. Statement to the House by the Honourable Gerry Phillips, Chair of Management Board of Cabinet Energy Conservation in the OPS. April 1, 2004.
42. Government of Ontario, **Go Green: Ontario's Action Plan on Climate Change** (Toronto, Queen's Printer for Ontario: 2007), 31.
43. Ministry of Energy and Infrastructure, information provided to the ECO in response to ECO inquiry, February 24, 2010.
44. For more details, refer to Section 3.4 of the ECO's *Annual Energy Conservation Progress Report – 2009 (Volume Two)*.
45. Ministry of Energy and Infrastructure, information provided to the ECO in response to ECO inquiry, August 9, 2010.
46. Environmental Commissioner of Ontario, *Annual Energy Conservation Progress Report – 2010* (*Volume Two*)*: Managing a Complex Energy System* (Toronto, Ontario: 2011), 22.
47. Ministry of Infrastructure, information provided to the ECO in response to ECO inquiry, September 20, 2011.
48. Ministry of Infrastructure, information provided to the ECO in response to ECO inquiry, October 16, 2013.
49. Ministry of Infrastructure, information provided to the ECO in response to ECO inquiry, October 16, 2013.
50. Ministry of Infrastructure, information provided to the ECO in response to ECO inquiry, October 30, 2013.
51. Ministry of Infrastructure, information provided to the ECO in response to ECO inquiry, October 16, 2013
52. Ontario Ministry of Infrastructure and Infrastructure Ontario, **Energy Consumption & Greenhouse Gas Emissions Report: MOI/IO Five Year (2006-2010) Energy Conservation Strategy & Enterprise-Wide Summary** (Toronto, Queen's Printer for Ontario: 2013).

53. Ministry of Infrastructure, information provided to the ECO in response to ECO inquiry, October 30, 2013.

54. In the Green Transformation Strategy, the government committed to reduce its GHG emissions in government-owned buildings by 19 per cent by 2014 and 27 per cent by 2020, over a 2006 baseline. The government plans to achieve these reductions by cutting vehicle fuel consumption, air travel, and energy use in facilities by 5 per cent each year. For more information, refer to the Ontario Ministry of Government Services' website, *Strategy for a Greener Government*.

55. Environmental Commissioner of Ontario, *Annual Energy Conservation Progress Report – 2012* (*Volume One*)*: Building Momentum: Provincial Policies for Municipal Energy and Carbon Reductions* (Toronto, Ontario: 2013), 24.

56. Environmental Commissioner of Ontario, *Annual Energy Conservation Progress Report – 2012* (*Volume One*)*: Building Momentum: Provincial Policies for Municipal Energy and Carbon Reductions* (Toronto, Ontario: 2013), 37; Environmental Commissioner of Ontario, *Annual Energy Conservation Progress Report – 2011* (*Volume One*)*: Restoring Balance: A Review of the First Three Years of the Green Energy Act* (Toronto, Ontario: 2012), 32.

57. The directive excludes leased facilities and government-owned facilities that cannot easily reduce their energy consumption due to safety issues (ex: remote airports). The procedural manual that accompanies the directive encourages ministries to include any success stories associated with conservation efforts through their annual reports.

58. Ministry of Infrastructure, information provided to the ECO in response to ECO inquiry, October 16, 2013.

59. Work on this target also created a new approach for managing energy in facilities operated by the MOI and Infrastructure Ontario through the Energy Master Plan.

60. National Governors Association, **An Energy Efficiency Primer for Governors** (2013).

61. Environmental Commissioner of Ontario, *Annual Energy Conservation Progress Report – 2011* (*Volume One*)*: Restoring Balance: A Review of the First Three Years of the Green Energy Act* (Toronto, Ontario: 2012), 32.

62. **Section 10** of the *Green Energy Act, 2009* provides a list of guiding principles for constructing, acquiring, operating and managing government facilities.

63. Ministry of Infrastructure, information provided to the ECO in response to ECO inquiry, October 30, 2013.

64. Environmental Commissioner of Ontario, *Annual Energy Conservation Progress Report - 2011 (Volume Two): Restoring Balance - Results* (Toronto, Ontario: 2012), 34-46.

65. However, the 2011 results were given a one-time boost from projects initiated under pre-2011 programs, which accounted for about 40 percent of total energy savings in 2011.

66. Ontario Power Authority, information provided to the ECO in response to ECO inquiry, October 16, 2013.

67. The *peaksaver* PLUS initiative was activated twice in response to high system demand in 2012, on June 20, 2012 and July 6, 2012.

68. Innovologie, **Process Evaluation of the Process and Systems Upgrade Initiative (PSUI)**, prepared for the Ontario Power Authority (2012). Many of the 2011 conservation annual reports submitted to the Ontario Energy Board by LDCs also noted these issues.

69. Environmental Commissioner of Ontario, *Annual Energy Conservation Progress Report - 2009 (Volume Two): Re-thinking Energy Conservation in Ontario - Results* (Toronto, Ontario: 2010), 8, has more information on cost-benefit tests.

70. Because the formula used to calculate cumulative results gives extra weight to results in early years (2011 projects count for four years of energy savings, 2012 projects count for three years, 2013 projects count for two years, and 2014 projects count for one), LDCs would need to have achieved 70 per cent of their energy target at the end of 2012 to be on pace to achieve the final target.

71. Ontario Energy Board, information provided to the ECO in response to ECO inquiry, October 16, 2013.

72. Electricity Distributors Association, letter to the Ontario Power Authority, *Re: OPA consultation on the December 21, 2012 Ministerial Directive on one year CDM Extension,* February 21, 2013.

73. The program improvements recommended by LDCs were described in: Electricity Distributors Association, letter to the Ontario Power Authority, *Re: OPA consultation on the December 21, 2012 Ministerial Directive on one year CDM Extension,* February 21, 2013.

74. Electricity Distributors Association, letter to Ms. Yvonne DiTullio, Ontario Ministry of Energy (untitled), September 16, 2013. This letter was the EDA's submission in response to the Ministry of Energy's discussion paper: *Conservation First: A Renewed Vision for Energy Conservation in Ontario.*

75. Minister of Energy Chris Bentley, **Direction to the Ontario Power Authority**, *Re: Extension of Funding Time Period for OPA-Contracted Province-Wide Conservation and Demand Management (CDM) Initiatives Under the GEA Conservation Framework,* December 21, 2012.

76. Electricity Distributors Association, letter to the Ontario Power Authority, *Re: OPA consultation on the December 21, 2012 Ministerial Directive on one year CDM Extension,* February 21, 2013.

77. Environmental Commissioner of Ontario, *Annual Energy Conservation Progress Report - 2010 (Volume One): Managing a Complex Energy System* (Toronto, Ontario: 2011), 31-38.

78. Environmental Commissioner of Ontario, *Annual Energy Conservation Progress Report – 2011* (*Volume Two*)*: Restoring Balance - Results* (Toronto, Ontario: 2012), 34-46.

79. Natural Resources Canada, **Energy Consumption of Major Household Appliances Shipped in Canada: Trends for 1990 – 2010** (2012)*,* 54.

80. Environmental Commissioner of Ontario, *Annual Energy Conservation Progress Report – 2011* (*Volume* One): *Restoring Balance – A Review of the First Three Years of the Green Energy Act* (Toronto, Ontario: 2012), 11.

81. American Council for an Energy-Efficient Economy, **The Efficiency Boom: Cashing In on the Savings from Appliance Standards** (2012), 19-20.

82. Ontario Ministry of Energy, "**Tough new energy efficiency standards help protect the environment and save consumers money**," News Release, March 26, 2004.

83. Ontario Ministry of Energy, "**Ontario's Bold New Plan For a Green Economy**," News Release, February 23, 2009.

84. Environmental Commissioner of Ontario, *Annual Energy Conservation Progress Report – 2011* (*Volume* One): *Restoring Balance – A Review of the First Three Years of the Green Energy Act* (Toronto, Ontario: 2012), 15.

85. Ontario Ministry of Energy, information provided to the ECO in response to ECO inquiry, October 16, 2013.

86. As stated on the Ontario Power Authority's website, this agency was established by *The Electricity Restructuring Act, 2004* which set out nine objectives. Included in these objectives is the need to forecast electricity demand in the medium and long-term, and to collect and provide to the public information relating to medium and long-term electricity needs of Ontario.

87. Ontario Power Authority, "**Ontario Electricity Demand 2012 Annual Long Term Outlook**," slide 31 (presented Summer 2012).

88. Ontario Ministry of Energy, information provided to the ECO in response to ECO inquiry, October 16, 2013.

89. Ontario Ministry of Energy, information provided to the ECO in response to ECO inquiry, October 16, 2013.

90. Rebecca Mallinson, "**Electricity Conservation Policy in Ontario: Assessing a System in Progress**," (York University, 2013), 43.

91. Under legislation, the Ontario Building Code's energy conservation elements must be reviewed every five years. There is also a Building Code Conservation Advisory Council appointed to identify issues related to energy conservation.

92. Ontario Ministry of Energy, information provided to the ECO in response to ECO inquiry, October 16, 2013.
93. Ontario Ministry of Energy, information provided to the ECO in response to ECO inquiry, October 16, 2013.
94. Ontario Ministry of Energy, information provided to the ECO in response to ECO inquiry, October 16, 2013.
95. Natural Resources Canada, **Improving Energy Performance in Canada – Report to Parliament Under the Energy Efficiency Act For the Fiscal Year 2011 – 2012** (2013), 27.
96. American Council for an Energy-Efficient Economy, "**New Efficiency Standards Would Tackle the Energy Hog Lurking in your Basement**," News Release, October 1, 2013.
97. Environmental Commissioner of Ontario, *Annual Energy Conservation Progress Report – 2011 (Volume One): Restoring Balance – A Review of the First Three Years of the Green Energy Act* (Toronto, Ontario: 2012), 23.
98. Ontario Ministry of Municipal Affairs and Housing, **Potential Changes for the Next Edition of the Building Code: Second Round of Consultation** *(February-April 2011)* (2011).
99. The discussion paper had put forward three options for consideration as to the required level of energy performance for low-rise buildings - a 10, 15, or 20 per cent improvement. For larger buildings, the discussion paper presented two options – a 10 or 13 per cent improvement.
100. As used in the Code, a functional statement is a "function that a building or an element of a building is intended to perform" and against which performance can be measured. It is a way of moving down a level from the societal objectives of the Code to specifics of what the building can be measured against.
101. See sections 2.1.1.2 (10) and 2.1.1.3 (8) of **SB-12** for the allowable trade-offs.
102. By following the "performance path" described in section 2.1.2 of **SB-12**.
103. Environmental Commissioner of Ontario, *Annual Report 2005/2006: Neglecting Our Obligations* (Toronto, Ontario: 2006), 65.
104. City of Vancouver, **Policy Report: New Edition of the Building By-law** (2014 Building By-law), September 11, 2013, 12. For example, low-rise buildings undergoing renovations costing more than $25,000 will be required to include air sealing measures, while renovations costing more than $50,000 will also be required to include attic insulation.
105. Discussed at March 1, 2013 Building Code Conservation Advisory Council meeting.
106. Environmental Commissioner of Ontario, *Annual Energy Conservation Progress Report – 2011 (Volume One): Restoring Balance – A Review of the First Three Years of the Green Energy Act* (Toronto, Ontario: 2012), 19.
107. There is already some precedent for this in the existing version of SB-12. For buildings undergoing the "performance path" option to demonstrate compliance with the OBC's energy efficiency provisions, the performance of the building envelope cannot be reduced by more than 25%, in comparison with the building envelope requirements of the comparable prescriptive package.
108. Ontario Ministry of Energy, "**Industrial Electricity Incentive Program**," News Release Backgrounder, June 12, 2012.
109. Independent Electricity System Operator, **18-Month Outlook from September 2013 to February 2015** (2013), 21.
110. Amir Shalaby, Ontario Power Authority, "**Outlook for Electricity Demand and Supply in Ontario**", 26 (presented November 6, 2012 at Association of Power Producers of Ontario conference).
111. Independent Electricity System Operator, "Supply Overview," **http://www.ieso.ca/imoweb/media/md_supply.asp** (accessed November 8 ,2013).
112. This has been done through the **IESO's Renewable Integration initiative (SE-91)**.

113. Reductions in a generator's power production can be directed by the system operator. The generator can be ordered to stop supplying power altogether or to produce some power but not the maximum amount of energy that it could produce. The generator is either not dispatched, that is, does not inject electrons into transmission wires, or the generator is dispatched at less than its maximum possible capacity (and is still connected to the grid injecting electrons into the wires). The method of reducing power production depends on the type of generator. It may involve "spilling water" and not sending all or some of the available water through the turbines at a hydroelectric plant, venting steam at nuclear plants, and angling the blades or adjusting the rotor speed for wind turbines.

114. Exported electricity is not subject to the Global Adjustment, meaning export consumers are not paying the full cost of producing this electricity. The remainder must be paid for by Ontario ratepayers.

115. Environmental Commissioner of Ontario, *Annual Energy Conservation Progress Report – 2010 (Volume One): Managing a Complex Energy System* (Toronto, Ontario: 2011), 25, reviews the Global Adjustment pricing regulation.

116. Minister of Energy Chris Bentley, **Direction to the Ontario Power Authority**, *Re: Industrial Electricity Incentive Program,* November 1, 2012. Prior to issuing the directive, the Ministry consulted on the program details using the Environmental Registry (EBR 011-7086).

117. Ontario Ministry of Energy, information provided to the ECO in response to ECO inquiry, October 16, 2013. This price is temporarily reduced for Northern Ontario industrial consumers to $52.50/MWh through the Northern Industrial Electricity Rate program. These price estimates assume a transmission-connected customer classified as a Class A consumer for the purpose of the Global Adjustment payment.

118. Ontario Power Authority, information provided to the ECO in response to ECO inquiry, October 16, 2013.

119. Ontario Power Authority, information provided to the ECO in response to ECO inquiry, October 16, 2013.

120. If nuclear or intermittent renewable resources are on the margin (i.e., are the last generators to be dispatched, or directed to operate, in order to meet expected demand), the system is likely in surplus and the HOEP will usually be low. If natural gas or stored hydroelectric power is on the margin, HOEP will usually be higher.

121. Technically, this is done by settling a contract for differences that assumes the IEI customer consumed the same amount of electricity in all hours of the month (and thus paid the average unweighted monthly HOEP).

122. For the past three years, the Northern Industrial Electricity Rate (NIER) program has reduced electricity rates by 2¢/kWh for existing industrial firms in northern Ontario, as a way to maintain their competitiveness against firms in other jurisdictions (northern Ontario firms will not be allowed to make the same electricity loads eligible for both the IEI and NIER incentives). The NIER program is paid for from general government expenditures, not electricity rates. In this case, there is a clear government policy interest in reducing electricity consumption among participants. Every unit of electricity saved by a participating firm will reduce the cost of the subsidy to taxpayers, and also improve the firm's competitiveness by reducing its electricity bill. Consequently, energy efficiency requirements are an important part of the NIER program. Each participant must develop an Energy Management Plan and report quarterly to the Ministry of Northern Development and Mines on their progress on implementing energy efficiency and conservation measures.

123. For example, if a stream 2 participant proposed to expand electricity consumption by adding a new process, the equipment for this process would not be eligible for conservation program incentives. If a participant proposed expanding load by adding a new production shift, energy-efficient upgrades to the production equipment would be eligible for conservation program incentives, but only in proportion to the electricity savings that would be achieved outside of the IEI contract hours. An exception to this rule was made for IEI applicants that had entered into an Industrial Accelerator agreement with the OPA prior to June 1, 2012.

124. Ontario Ministry of Energy, information provided to the ECO in response to ECO inquiry, October 29, 2013.

125. Environmental Commissioner of Ontario, *Annual Energy Conservation Progress Report – 2010 (Volume One): Managing a Complex Energy System* (Toronto, Ontario: 2011), 21, reviews electricity pricing policy.

126. Ontario Ministry of Energy, information provided to the ECO in response to ECO inquiry, October 16, 2013.

127. Minister of Energy Chris Bentley, **Direction to the Ontario Power Authority**, *Re: Industrial Electricity Incentive Program,* November 1, 2012.

128. Methodological changes were made to improve data quality for the Annual Industrial Consumption of Energy Survey, including adding a new survey in 2009 - the annual Survey of Secondary Distributors of Refined Petroleum - to provide data to the RESD and track consumption of diesel, light fuel oil, heavy fuel oil and motor gasoline.

129. **CANSIM Table128-0016** (Annual Supply and Demand of Primary and Secondary Energy in Terajoules) was revised to incorporate methodological changes made in 2009 for the period 2007 to 2011.

130. CANSIM Table128-0016: Annual Supply and Demand of Primary and Secondary Energy in Terajoules.

131. Independent Electricity System Operator, **18-month outlook from December 2010 – May 2012**, (2010), iii.

132. Natural gas prices trended downwards throughout 2011 and reached a 10-year low in April 2012. National Energy Board, "Summer Energy Outlook 2013, Outlook Summary", Figure 2, **http://www.neb-one.gc.ca/clf-nsi/rnrgynfmtn/nrgyrprt/nrgytlk/tlksmmr2013/tlksmmrsmmr-eng.pdf** (access November 25, 2013).

133. According to 2011 census data for Ontario, the proportion of total private households with only one person has increased by 16.1 per cent from 1961 to 2011, while the proportion of larger households (five or more persons) has decreased by 19.9 per cent in the same period.

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