B
Electricity

Contents

Appendix B. Electricity

B.1 2014 Electricity Conservation Program Results and Final Results Against 2011-2014 Targets

Introduction

2014 marked the end of a four-year electricity conservation framework. On the direction of the Minister of Energy, this framework assigned legal responsibility for conservation performance targets to each of Ontario's local distribution companies (LDCs) as a condition of their operating licences, while assigning joint responsibility for conservation program delivery to LDCs and Ontario's Independent Electricity System Operator (IESO).[1] This framework has been replaced by a new and different, six year conservation framework ("Conservation First"), to run from 2015 to 2020.[2]

These conservation programs were expected to reduce Ontario's electricity consumption, save money for customers, improve reliability, avoid new generation, and reduce greenhouse gas emissions. The final program results can be used to assess how successful we were in achieving these objectives.[3]

In total, Ontario LDCs exceeded their overall energy savings target, but only reached 70 per cent of the more important peak demand target. Performance on both targets varied widely between individual LDCs, many of whom failed to satisfy their licence conditions. As of May 2016, no LDC had been sanctioned for these failures.

Energy and Peak Demand Savings: Final Results Against 2011-2014 LDC Conservation Targets

Understanding the Targets

Each Ontario LDC was assigned two energy conservation targets for the 2011-2014 period by the Ontario Energy Board, following direction from the Ministry of Energy:

1. An **energy savings target** for reducing the overall amount of electricity consumption in all hours of the year, measured in gigawatt-hours (GWh). The aggregate 2011-2014 province-wide energy savings target for all LDCs was a cumulative energy savings of 6,000 GWh over the four-year period (about one per cent of total Ontario electricity consumption in these years). Somewhat confusingly, this choice of target meant that the performance of conservation programs in earlier years of the framework was weighted more heavily towards final results – a project completed in 2011 would deliver four years of savings towards the target, whereas a project completed in 2014 would only deliver one year of attributable savings.
2. A **peak demand target** for reducing the amount of electricity consumption during the peak hours of the year when Ontario electricity consumption is highest (usually hot summer afternoons, although in the cold winter of 2014, Ontario experienced its first winter peak in a decade), measured in megawatts (MW). The aggregate 2011-2014 province-wide peak demand target for all LDCs was a reduction in provincial peak demand of 1,330 MW (approximately five per cent of Ontario's system peak in 2014).

The two targets are complementary and both play important roles. Together, energy savings and peak demand reduction are good metrics of Ontario's conservation program efforts, and surrogates for the financial and environmental benefits that energy conservation produces, both for customers and for Ontario as a whole.

In the medium and longer term, the more important of the two targets is the peak demand target. Peak demand is the largest single long-term cost driver in Ontario's electricity system, which must be sized to deliver reliable power every moment of the year. Peak demand savings contribute to the reliability of the electricity system, free up capacity for other uses (e.g., space heating with heat pumps, electric vehicles) and help avoid spending on new generation, transmission and distribution. The 2013 Long-Term Energy Plan predicts that the IESO will need to buy 2800 MW of additional resources by 2025 to meet summer peak demand, on top of planned conservation improvements and increased renewable capacity.[4] The most likely option to fill this gap, although not the only one, is gas-fired generation.

Peak demand reductions also reduce operating energy costs and greenhouse gas emissions, because they reduce the use of high-cost, high-emissions gas-fired plants that only run when demand warrants. However, the size of these benefits depend on whether energy use is reduced only for a very small number of hours around peak (which has been the effect of some "demand response" programs[5]) or for a larger number of hours when gas-fired plants are operating. Reducing energy use in that larger block of hours is an important public priority which does not yet receive sufficient attention.

In Ontario's current electrical system, base load is provided by emissions-free nuclear, hydro and renewable energy. The fuel costs, air quality impacts and greenhouse gas emissions of the electricity system are much higher during the upper third of the daily demand curve, when gas-fired generation is used. The gas-fired generation used to meet the highest peak demand are simple cycle gas turbines, with generally higher fuel consumption and higher emissions than the combined cycle plants that are called on first.

The **energy savings target** (reducing total electricity consumption) can reduce operating costs, air quality impacts and greenhouse gas emissions of the electricity system, depending on the time of day that the savings occur. Total savings have air quality and greenhouse gas benefits, to the extent that they displace gas-fired generation, which only supplied nine per cent of Ontario's electricity in 2014, but operated at the margin (and could be displaced by conservation) in roughly 33 per cent of hours.[6] The IESO expects this percentage to increase in coming years, as Ontario's dependence on gas-fired generation increases.[7] It should also be noted that current conditions include the effects of conservation programs from previous years – had conservation not taken place, the amount of gas-fired generation operating in 2014 would have been higher.

Total energy savings will usually reduce customer bills. For the system as a whole, total energy savings reduce operating costs, except if they occur at times that Ontario is already legally obliged to pay for more power than we are using. In 2011-2014, this often occurred between midnight and 5 a.m., largely because:

- All nuclear plants are currently operating;
- Ontario has suffered a large loss of industrial operations since 2008, reducing electricity demand in the overnight hours;
- Some older gas-fired generators and renewable generators have contracts that reward them for electricity production in all hours, even when this energy is not needed.

The current oversupply of contracted electricity is unusual and is expected to be over by the early 2020s. In addition to population and load growth, many of the current contracts for older gas plants (often referred to as "non-utility generators" or NUGs) have "take or pay" requirements that expire between now and 2020; the Ministry of Energy has indicated that they will not be recontracted on the same terms. Of the nuclear plants, Pickering is to be shut down in 2020 or 2024, and Bruce and Darlington units will be shut down progressively for refurbishment, beginning in 2016 for Darlington and 2020 for Bruce. After that time, conservation is expected to displace gas-fired generation in up to 90 per cent of hours.[8] This will increase the cost-effectiveness and environmental advantages of total energy savings.

In the new 2015-2020 conservation framework (discussed later in this appendix), LDCs have been assigned an energy savings target but not a peak demand target. The Long-Term Energy Plan contains a 2025 target for peak demand reduction through demand response programs that is the responsibility of the IESO. This creates a potentially troublesome gap, since LDCs receive little incentive to focus their energy savings on times when conservation would displace natural gas-fired generation or reduce the need for new generation.[9]

Most conservation programs will deliver both energy and peak demand savings, but some programs may contribute more to one target than the other, as shown in Table B.1.

Table B.1: Matching Conservation Program Measures to Conservation Targets

Conservation Program Measure (Example)	Pattern of Energy Savings	Contributes (Primarily) to Which Conservation Target?
High-efficiency refrigerator	Relatively constant over all hours of the year.	Energy savings
High-efficiency commercial air conditioning	Savings over several months of the year, with greater savings during hotter weather (usually correlating with system peak demand and higher greenhouse gas emissions).	Energy savings and peak demand
Demand response program*	Concentrated in very few hours at time of system peak demand. Energy savings may be zero if the program is not activated.	Peak demand

Note: * Demand response programs enable program operators to temporarily reduce the electricity consumption of program participants, at times when the electricity system is under stress.

Targets vs. Results

We compare the final 2011-2014 conservation program results with the two targets, both on a province-wide basis, and for individual LDCs. Savings from all conservation programs offered by an LDC to its customers are counted towards the LDC's targets, as are savings from time-of-use pricing. Results of specific conservation programs are discussed later in the article.

Final results against the 2011-2014 targets at the provincial level are shown in Figure B.1 and Figure B.2.[10]

In aggregate, Ontario LDCs achieved their overall energy savings target, but only reached 70 per cent of their peak demand target.

Figure B.1 shows how energy savings from each year of conservation program activity accumulate and make a meaningful dent in Ontario's overall electricity consumption.

Annual electricity consumption in 2014 was reduced by about 2800 GWh (about two per cent of Ontario's total electricity use in this year), due to the combined effects of conservation programs in all four years. In other words, each year of new conservation projects reduced Ontario's 2014 electricity use by about 0.5 per cent. This cannot continue forever – eventually a conservation measure reaches the end of its useful life and no longer delivers energy savings. Because most conservation projects have a useful lifetime of 10 to 20 years, a continuation of conservation programs at the same rate of activity as the 2011-2014 period would eventually reduce Ontario's electricity consumption by 5 to 10 per cent (0.5 per cent new savings each year).

Individual LDC Results

The results of individual LDCs against their 2014 targets are shown in Figure B.3. Full numerical results for each LDC are presented in Table B.6.

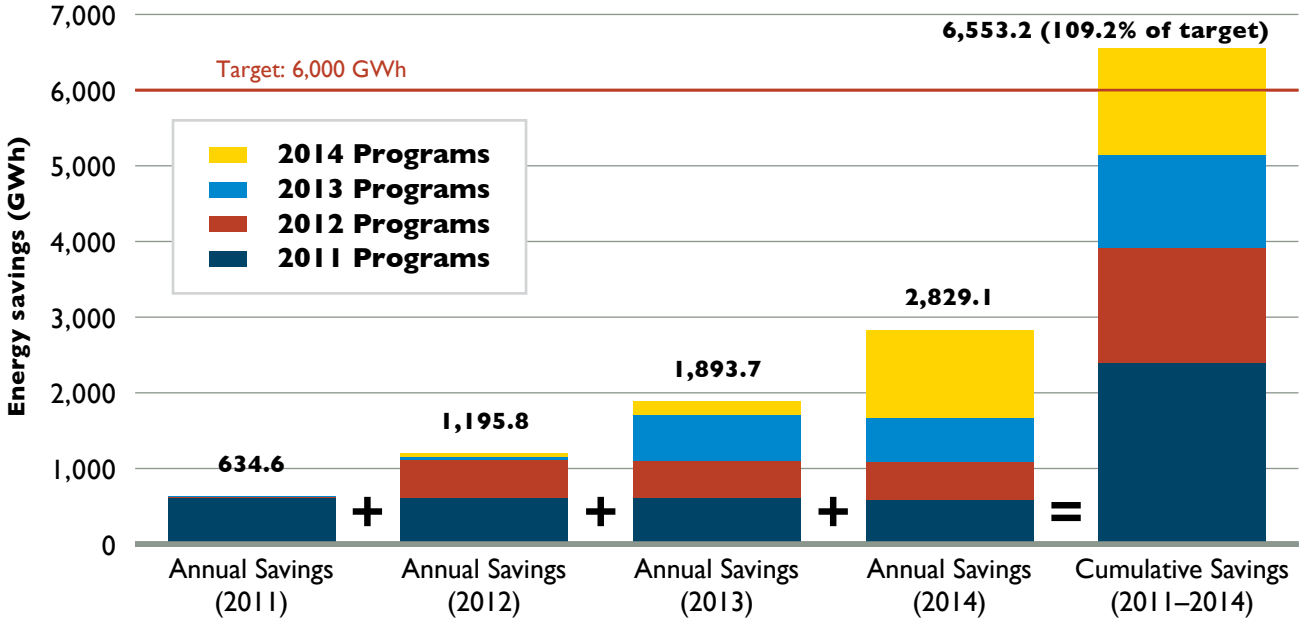

Figure B.1: Province-wide conservation results against 2011-2014 energy savings target

Notes: Results for 2012, 2013 and 2014 conservation programs include adjustments to previous years' verified results, due to late reporting of completed projects. These adjustments show up as small amounts of annual savings in earlier years.

Source: Independent Electricity System Operator

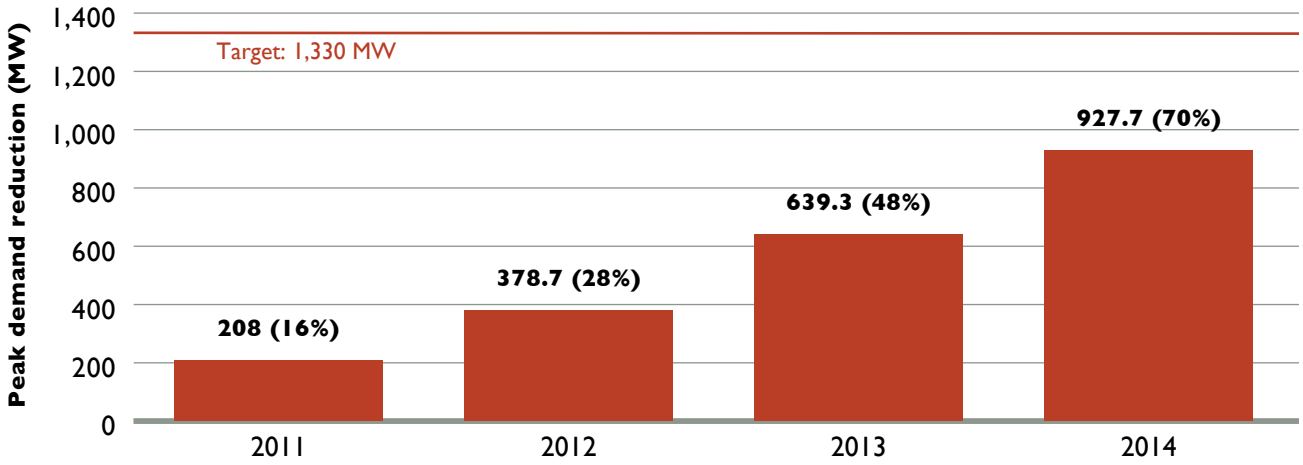

Figure B.2: Province-wide conservation results against 2014 peak demand target, achieved by year-end

Notes: Values for peak demand reduction show savings achieved by reporting year-end, that persisted until 2014 (assuming persistence of demand response savings through 2014). This is a different method of reporting year-to-year progress than found in the IESO and OEB reports on 2011-2014 conservation results, although the final 2014 peak demand reduction (and the final result against the 2014 target) is the same.

Source: Independent Electricity System Operator

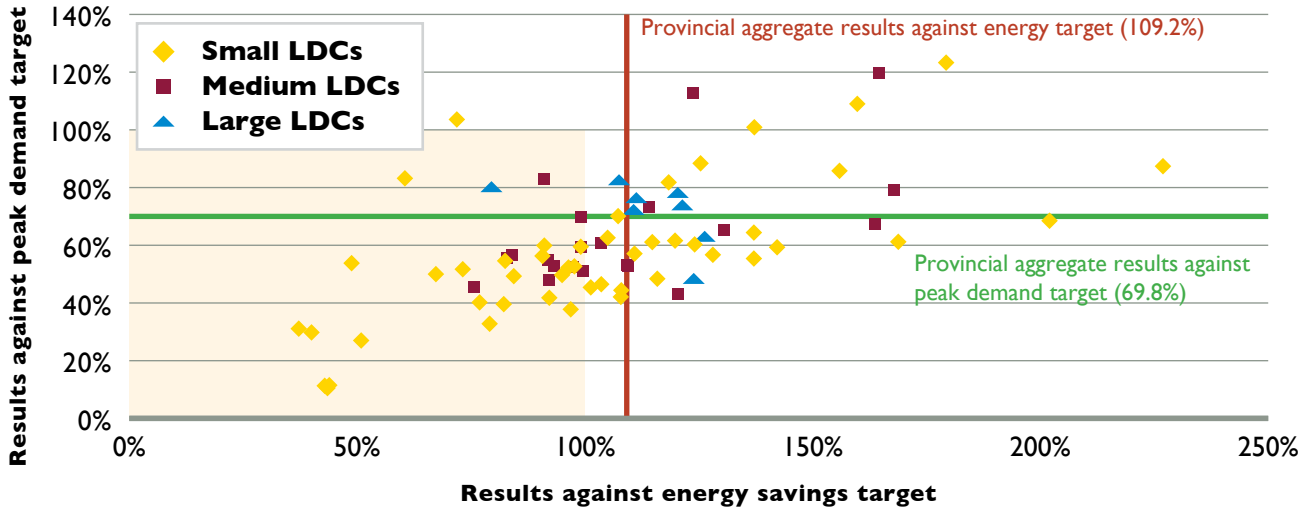

Figure B.3: Final LDC results against 2014 conservation targets

Note: "Small LDCs" have an energy target accounting for less than 0.5 per cent of the aggregate 2014 LDC energy target; "medium LDCs" have an energy target accounting for between 0.5 per cent and 2 per cent of the aggregate target, and "large LDCs" have an energy target accounting for more than 2 per cent of the aggregate target.

Sources: Independent Electricity System Operator, PowerStream

There was a wide variation in performance across LDCs. The LDC at the 75th percentile with regards to the energy savings target achieved roughly double the relative energy savings of the LDC at the 25th percentile (140 per cent of target versus 70 per cent). Variations in performance across LDCs reflect both the degree of effort which the utility put towards promoting conservation programs to its customers, and the fit between an LDC's customer base and the conservation programs offered. In particular, an LDC's results against the peak demand target will be affected based on whether the LDC has suitable large commercial and industrial customers who were able to participate in the Demand Response 3 program.

Forty-three of 76 LDCs met their energy target, but only five LDCs met both their energy and peak demand targets. Twelve LDCs met at least 80 per cent of their energy and peak demand targets, as shown in Table B.2. These twelve LDCs are eligible for performance incentives from the OEB.

Table B.2: Electric Utilities Reaching 80 per cent of Both Conservation Targets

Utility	Per Cent of Peak Demand Target Achieved	Per Cent of Energy Savings Target Achieved	Eligible Incentive ($)
Brantford Power	79.7	168.6	293,520
Centre Wellington Hydro Ltd.	110.9	137.2	34,557*
Chapleau Public Utilities Corporation	123.3	179.3	8,921*
Festival Hydro Inc.	85.8	155.9	179,766
Fort Frances Power Corporation	81.8	118.4	6,265*
Guelph Hydro Electric Systems Inc.	119.8	164.6	611,350
Horizon Utilities Corporation	80.8	107.5	270,624
Hydro 2000 Inc.	109.0	159.8	6,260*
Kingston Hydro Corporation	112.9	123.7	118,977
Midland Power Utility Corporation	88.4	125.4	28,319
Orillia Power Distribution Corporation	87.4	226.9	93,386
Peterborough Distribution Incorporated	83.0	91.0	16,243

Note: Performance incentives based on utility applications to the Ontario Energy Board, with the exception of those marked with an asterisk, which were estimated by the ECO using the Ontario Energy Board's performance incentive calculator.

Because the conservation targets were a license condition, the Ontario Energy Board (OEB) has the option of taking compliance action against LDCs that did not meet one or both of their targets, such as imposing financial penalties or suspending an LDC's electricity distribution license. To date, there have been no consequences for LDCs for failing to meet their conservation targets.

The OEB has stated that it will not take any action against LDCs for missing their peak demand target.[11] The performance of several key peak demand reduction initiatives (demand response programs and time-of-use pricing) was affected by the decisions of the Ministry and the OEB, making it difficult to hold LDCs fully accountable for missing their peak demand targets.[12] The Board is reviewing the annual reports for the thirteen LDCs that did not reach at least 80 per cent of their energy savings target, to assess whether these LDCs made best efforts to reach their target, and may take some compliance action with regards to these LDCs.[13] With the exception of Oshawa PUC Networks, these thirteen LDCs are all small, each serving 12,000 or fewer customers.

For the 2015-2020 Framework, achievement of conservation targets will no longer be an LDC condition of license. An LDC's license requirement will be simply to make conservation programs available to each customer segment, "as far as is appropriate and reasonable".[14] The new framework will rely primarily on financial incentives for high performance to motivate LDCs, although it does provide some tools for the IESO to address gross underperformance (for LDCs on pace to achieve less than 50 per cent of their target).

Overall Electricity System Impact

What was the overall impact of the four years of conservation programs on Ontario's electricity system, and the consequences of the deviation between conservation targets and final results?

As noted earlier, Ontario's annual electricity consumption in 2014 was about two per cent lower than it would have otherwise been, due to the combined results of all of the projects completed through LDC conservation programs over the 2011-2014 period. The greenhouse gas impact of this reduction is difficult to calculate, because the IESO does not publish hourly data as to which type of generation is "at the margin" and was displaced by conservation. However, a rough estimate is that 2011-2014 LDC conservation efforts displaced natural gas consumption about one-third of the time in 2014. This would have reduced the electricity sector's 2014 greenhouse gas emissions by roughly seven per cent, or 0.4 megatonnes of CO_2 equivalent.[15]

What about the peak demand target, where Ontario fell roughly 400 MW short of the target?

Missing the peak demand target had no impact on reliability in 2011 to 2014, because Ontario had ample electrical capacity to meet peak demand in the short term. In fact, the Ministry of Energy and the IESO took several actions in the 2011-2014 period that reduced spending on a primary peak demand reduction initiative, the Demand Response 3 program.[16]

The Ministry of Energy's directions to the IESO in recent years have not launched major new generation procurements, and in fact, have slowed down previously planned procurements, in particular, the re-contracting of non-utility generators. The IESO has also concluded that the strong supply position will continue in the medium term, and that existing and planned Ontario resources will be sufficient to meet Ontario demand over the period from 2015 to 2019.[17] If so, the failure to reach the peak demand target did not harm the reliability of Ontario's electricity system from 2011 to about 2019.

Will this hold true over the longer term? Ontario's supply position will be much weaker by the early 2020s, when Ontario's Pickering nuclear station is closed and refurbishments of the Bruce and Darlington nuclear stations are underway. The IESO currently has 400 MW less conservation on hand than it expected to help make up for the loss of these nuclear units. Whether this matters will depend on how successful the IESO is in its demand response initiatives in the next five years. More will likely be revealed in Ontario's next Long-Term Energy Plan update, scheduled to be initiated in 2016. If the Plan calls for any new gas-fired generation to meet peak demand, this would be an important sign of failure of the government's approach to peak demand reduction.

Only about 100 MW of the 400 MW shortfall between actual peak demand reduction and the 2014 peak demand target was due to lower than projected savings from the demand response programs that the Minister deferred.[18] The remaining 300 MW had been expected to come from other energy conservation programs and time-of-use pricing. The fact that Ontario met its energy savings target and missed its peak demand target means that less energy was saved from these programs in on-peak periods than expected, and more energy was saved in off-peak periods, which produce much fewer benefits. Therefore, Ontario's use of fossil-fueled generation and its greenhouse gas emissions between 2011 and 2014 were higher than they would have been had the peak demand target been achieved.

Specific Program Results

Conservation programs are offered to two different categories of electricity customers:

- **Programs for Distribution-Connected Customers** are offered by Ontario LDCs to customers connected to the electricity distribution system (the low-voltage part of the grid that provides final service to most customers) within their service territories. These programs (with one exception) are "province-wide programs" where the IESO and the LDC each play a role in program design and administration (the exact role that each party plays varies depending on the program). Programs are offered to different customer segments – consumers, businesses, and industry, in addition to specialized programs for low-income customers and Aboriginal peoples. An LDC may choose not to offer some of the province-wide programs, if it does not believe there will be sufficient interest from the LDC's customers. For a full description of all of the province-wide conservation programs and initiatives offered in 2011-2014, see the conservation annual reports filed by individual LDCs.[19] LDCs were also eligible to apply to the OEB to develop custom conservation programs for their customers, however, only one such program was implemented, by PowerStream. This program is discussed further below.
- **Programs for Transmission-Connected Customers** are offered to large customers (primarily industrial facilities) connected directly to the electricity transmission system (the high-voltage part of the grid that delivers electricity from large centralized generating stations), instead of to an LDC's distribution network. These programs are delivered by the IESO with no involvement from LDCs.

Results of specific programs for both transmission- and distribution-connected customers are discussed below. Only the results from programs for distribution-connected customers are counted towards the LDC targets discussed in the previous section.[20]

2014 Results: Conservation Programs for Distribution-Connected Customers

Looking at the results of programs for distribution-connected customers, 2014 was the strongest year

of conservation performance over the four-year period. This is shown in Figure B.4.

As 2014 was the final year of the old framework, there were only incremental changes to the suite of province-wide conservation programs for distribution-connected customers.

There was a large increase in 2014 in energy savings from LED lighting (incented through coupons and in-store retailer events), which accounted for 55 per cent of the energy savings in the residential sector. LEDs may expand the reach of lighting conservation to more households, by appealing to customers who did not find fluorescent bulbs to be a suitable replacement for traditional incandescent lighting.

Participation in the *peaksaver* program continued to rise in 2014. The energy use of nearly 300,000 devices (primarily air conditioners) in Ontario can now be temporarily controlled remotely through this program, to reduce electricity use at times of high system demand. This program is intended to be activated only when Ontario's electricity system is under serious stress, to avoid inconveniencing participating customers. This control was not activated at all in 2014, due to the province's strong supply situation, and a cooler than average summer with reduced electricity demand.

For the first time, demand savings from time-of-use (TOU) pricing were quantified and counted towards LDC conservation targets, due to the LDC role in installing smart meters and raising awareness of TOU pricing. Unfortunately, the measured results are somewhat disappointing. The IESO's evaluation found only a 0.7 per cent reduction in peak demand among residential customers, which equates to a province-wide demand reduction of 55 MW. At the time the 2011-2014 targets were set, the projected demand savings anticipated from time-of-use pricing were almost six times greater (308 MW). As the ECO has previously noted, peak demand reduction from TOU pricing would likely be greater if there was more of a difference between peak and off-peak electricity prices.[21] However, individual LDCs cannot adjust TOU prices, as they are set by the OEB.

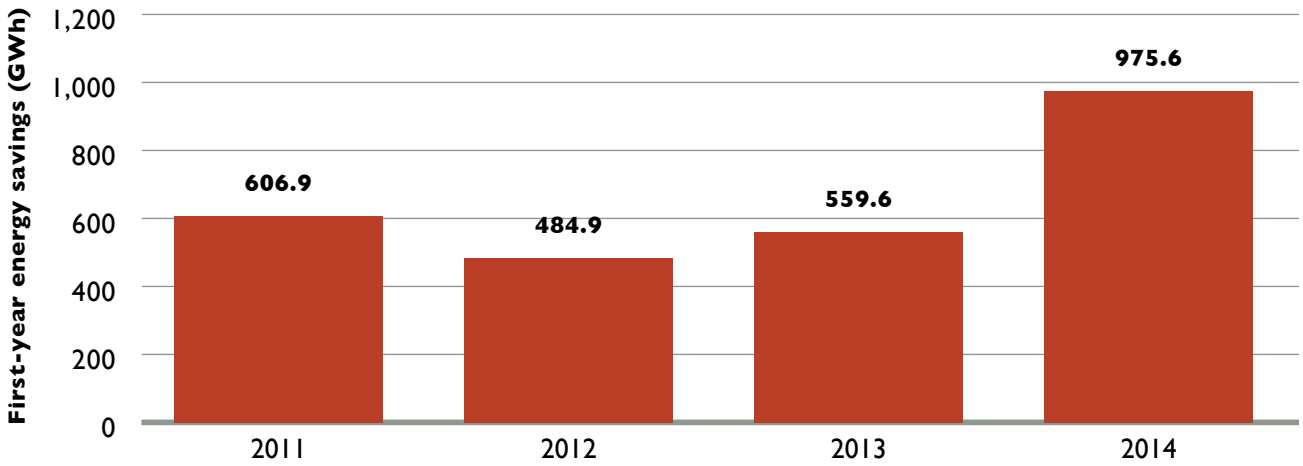

Figure B.4: First-year energy savings from new conservation program activity: programs for distribution-connected customers

Notes: Excludes results from previous years that were reported late.

Source: Independent Electricity System Operator

Business conservation programs continued to deliver the lion's share of conservation results. LED lighting projects were popular in this sector as well (through the Retrofit program and the Direct Install Lighting program). The Retrofit program was again the primary program utilized by businesses, although 2014 also saw an increase in energy savings from new construction projects. The Energy Audit program appeared to be successful in serving as a first step to encourage companies to undertake conservation projects. Toronto Hydro estimated that 60 per cent of audits led eventually to a project application.

Ten large industrial conservation projects were completed through the Process & Systems Upgrade initiative in 2014, doubling 2013 participation levels. However, four of these ten projects were behind-the-meter generation. While the impact of behind-the-meter generation is similar to conservation from the viewpoint of a power system planner (because it reduces the amount of electricity that needs to be supplied from the provincial grid), it does not always deliver the same environmental and climate benefits.

Peak demand savings from business and industrial customers were impacted by a directive in March 2014 from the Minister of Energy to the IESO, which essentially prevented new customers from enrolling in the Demand Response 3 (DR3) program.[22] For example, PowerStream reported that it had 27 customers who had agreed to participate in the DR 3 program, but had not yet finalized their program enrolment prior to the direction, costing PowerStream about 5 MW of savings. As with *peaksaver*, the DR3 program did not need to be activated in 2014 due to the province's strong supply situation and low electricity demand, as the cost of activating the program (in the form of additional payments to program participants) would have outweighed the system benefit of doing so.

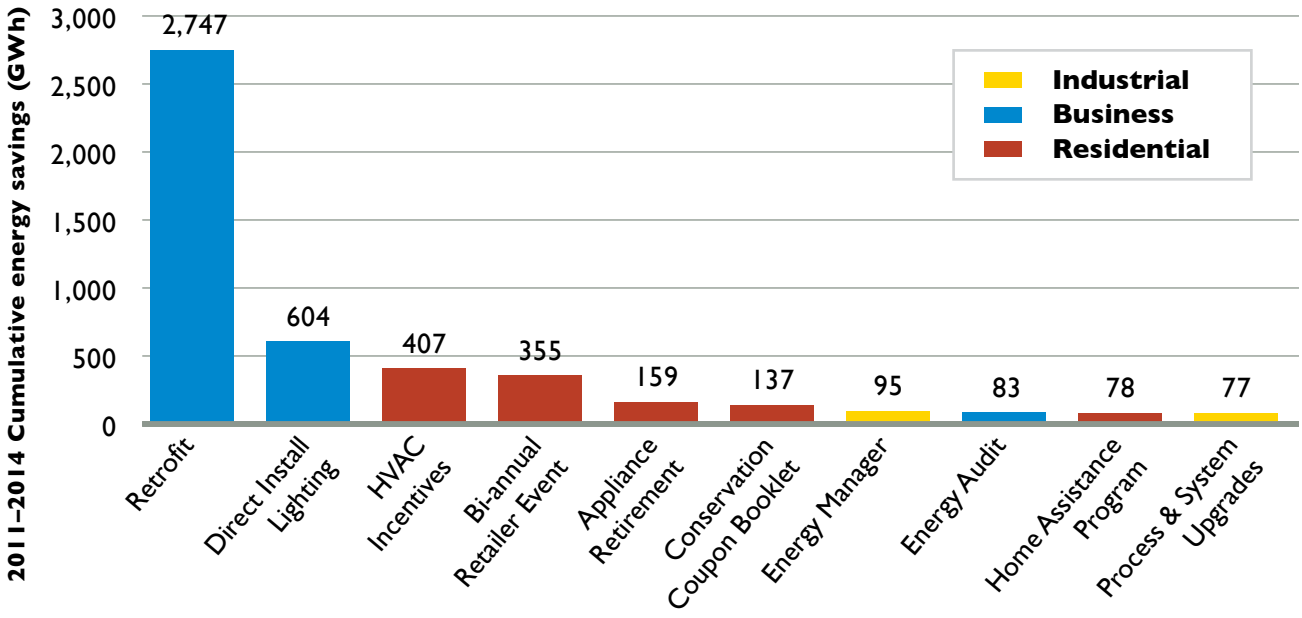

Figure B.5: 2011-2014 cumulative energy savings from leading conservation initiatives

Notes: Excludes results from pre-2011 programs completed in 2011-2014. Results for Retrofit initiative include commercial and industrial customers.

Source: Independent Electricity System Operator

The cumulative energy savings of the most successful conservation initiatives for distribution-connected customers are shown in Figure B.5. The importance of the Retrofit initiative for business customers is apparent. Final results for all initiatives are shown in Table B.3, including 2014 activity and incremental energy savings, cumulative energy savings over four years, and peak demand reduction.

Table B.3: 2014 Conservation Results by Program for Distribution-Connected Customers

Initiative	2014 Participation (New Projects)	2014 Incremental Energy Savings (2014 savings from new activity in 2014) (GWh)	2011-2014 Cumulative Energy Savings (GWh)	2014 Peak Demand Reduction (MW) (from program activity in all four years)
Consumer Program				
Appliance Retirement	22,563 appliances	9.5	159.1	8.2
Appliance Exchange	5,685 appliances	2.1	10.6	3.0
HVAC Incentives	113,002 installations	42.9	447.0	93.8
Conservation Instant Coupon Booklet	1,208,108 products	32.8	137.3	4.5
Bi-Annual Retailer Event	4,824,751 products	122.9	355.2	12.4
Retailer Co-op	0	0	0.01	0
Residential Demand Response (*peaksaver*PLUS)	241,381 devices	0.01	0.8	117.5
Residential Demand Response In-Home Display	188,577 devices	0	0	0
Residential New Construction	2,367 homes	2.3	2.7	0.4
Consumer Program Total		**212.5**	**1112.6**	**239.7**

(continued)

Table B.3: Continued

Initiative	2014 Participation (New Projects)	2014 Incremental Energy Savings (2014 savings from new activity in 2014) (GWh)	2011-2014 Cumulative Energy Savings (GWh)	2014 Peak Demand Reduction (MW) (from program activity in all four years)
Business Program				
Retrofit	10,925 projects	462.9	2631.4	213.5
Direct Install Lighting	23,784 projects	84.5	604.2	73.3
Building Commissioning	5 buildings	1.5	1.5	1.0
New Construction	226 projects	20.4	37.4	8.9
Energy Audit	473 audits	30.9	82.9	10.6
Small Commercial Demand Response (*peaksaver*PLUS)	3,652 devices	0	0.002	2.1
Small Commercial Demand Response IHD	820 devices	0	0	0
Demand Response 3	180 facilities	0	1.3	23.4
Business Program Total		**600.2**	**3358.7**	**332.8**
Industrial Program				
Process & System Upgrades	10 projects	72.1	77.3	10.0
Monitoring & Targeting	5 projects	0.5	0.5	0.1
Energy Manager	379 projects	40.4	95.3	8.4

(continued)

Table B.3: Continued

Initiative	2014 Participation (New Projects)	2014 Incremental Energy Savings (2014 savings from new activity in 2014) (GWh)	2011-2014 Cumulative Energy Savings (GWh)	2014 Peak Demand Reduction (MW) (from program activity in all four years)
Retrofit	0 projects	0	115.5	4.6
Demand Response 3	336 facilities	0	9.2	166.1
Industrial Program Total		**113.0**	**297.7**	**189.2**
Home Assistance Program				
Home Assistance Program	**25,424 homes**	**19.6**	**77.5**	**5.4**
Aboriginal Program				
Aboriginal Program	**1,125 homes**	**3.1**	**6.3**	**0.8**
Pre-2011 Programs Completed in 2011-2014				
Electricity Retrofit Incentive Program	0 projects	0	484.6	21.7
High Performance New Construction	3 projects	0.7	148.2	9.3
Toronto Comprehensive	5 projects	2.5	350.3	16.1
Multifamily Energy Efficiency Rebates	0 projects	0	30.4	2.0
LDC Custom Programs	0 projects	0	5.5	0.4
Pre-2011 Programs Total		**3.2**	**1018.9**	**49.4**

(continued)

Table B.3: Continued

Initiative	2014 Participation (New Projects)	2014 Incremental Energy Savings (2014 savings from new activity in 2014) (GWh)	2011-2014 Cumulative Energy Savings (GWh)	2014 Peak Demand Reduction (MW) (from program activity in all four years)
Other Programs				
Program-Enabled Savings	43 projects	19.0	30.8	11.5
Time-of-Use Savings		0	0	54.8
LDC Pilots	1,174 projects	5.1	5.1	1.2
Other Programs Total		**24.1**	**35.8**	**67.4**
Adjustments to Previous Years' Results		**195.2**	**645.4**	**43.0**
Overall Totals		**1,170.8**	**6553.0**	**927.7**

Source: Independent Electricity System Operator

Custom Local Conservation Programs and Pilots

Only one custom conservation program, PowerStream's Business Refrigeration Incentives (BRI) program, was developed by an LDC and approved by the OEB, under the 2011-2014 framework (in addition, Greater Sudbury Hydro operated custom conservation programs throughout the 2011-2014 period that had been approved prior to 2011). PowerStream's BRI program launched in late 2013. It was evaluated at the end of 2014 and the evaluation tells a positive story of a program successfully delivering conservation to a customer segment that was missed by the larger province-wide programs.[23]

The BRI offers energy audits and free upgrades of energy-efficient commercial refrigeration technologies to targeted customers (primarily grocery stores, restaurants, and other food service establishments). More than one thousand businesses participated in the program, and the evaluation found the program to be cost-effective. The evaluation also provided strong evidence that most of these conservation projects would not have taken place without

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a dedicated program in place. Only 5 per cent of program participants had previously intended to upgrade their refrigeration equipment immediately, and 72 per cent had no upgrade plans at all. In addition, some of the energy-efficient technologies (e.g., motor upgrades) were uncommon in the marketplace, and it would have been difficult for customers to identify and purchase these upgrades on their own. The BRI program was instrumental in overcoming barriers to conservation in these businesses. PowerStream will continue the BRI program under the new 2015-2020 framework, as will a second LDC (Collus PowerStream).

Several LDCs also delivered pilot programs in 2014. Pilot programs are smaller-scale conservation initiatives delivered by an LDC and funded through the IESO's Conservation Fund, to test the viability of a program concept, and assess whether it can be scaled up into a full program that may also be applicable for other LDCs. For the first time, the IESO attributed a small amount of energy and demand savings to pilot projects in 2014. Only those pilots that were in market in 2014 are listed below, however, many additional pilots were approved late in 2014 or in 2015, and some will hopefully evolve into full programs in the coming years. Particularly exciting is Hydro One's "Heat Pump Advantage" pilot, which will promote and test cold-climate air source heat pumps, an improved technology that has the potential to cut heating energy use in half in electrically-heated homes, without the high installation cost of geothermal heat pumps.

Table B.4: LDC Conservation Pilots in Market in 2014

Local Distribution Company	2014 Conservation Fund Initiatives
Cambridge & North Dumfries Hydro	"Rush Hour Rewards" – Rebate for smart thermostat (Nest learning thermostat) in return for participation in residential demand response program
EnWin	Integration of water conservation measures into the Home Assistance Program Retrocommissioning in commercial buildings
Horizon Utilities	Energy mapping
Horizon Utilities, Hydro One, Milton Hydro	Social benchmarking program for residential customers that compares household energy usage to peer groups and provides energy-saving advice
Hydro One	Thermal storage

(continued)

Table B.4: Continued

Local Distribution Company	2014 Conservation Fund Initiatives
Hydro Ottawa	Rebate for smart wi-fi thermostat (Honeywell) in return for participation in residential demand response program Conservation voltage reduction
Kitchener-Wilmot Hydro	Direct install of demand control ventilation in commercial kitchens
Niagara Peninsula Energy	Time-shifting of charging of non-road electric vehicles
Niagara-on-the-Lake Hydro	Energy efficiency in wineries and other facilities
Toronto Hydro	"Grid Saver" – Demand response by small commercial and institutional customers using roof-top units for space heating and cooling. "Suite Saver" – Demand response in multi-unit residential buildings, through control of the central building chiller.
Toronto Hydro/PowerStream	Strategic energy management for large commercial and industrial consumers

Source: Independent Electricity System Operator, Ontario Energy Board

2014 Results: Conservation Programs for Transmission-Connected Customers

Results for programs for transmission-connected customers in 2014 are shown in Table B.5. These programs delivered very little in the way of energy savings (only one per cent of the incremental energy savings in 2014 that the programs for distribution-connected customers delivered). The freeze on new DR3 contracts as of March 2014 also reduced peak demand savings from this group of customers. The Industrial Accelerator program for large industrial customers continued to disappoint. The Ministry of Energy set a target for 300 MW of peak demand savings from Industrial Accelerator, but demand savings at the end of 2015 (from all years of this program's operation) stood at only eight MW. Onerous contract requirements and delays in processing applications were identified as key barriers. Many additional studies for industrial projects have been undertaken and will hopefully lead to energy savings in future years as projects are completed.

2011-2014 Conservation Program Spending

Conservation program spending by the IESO and individual LDCs totalled $421.3 million in 2014, and $1,277.9 million over the 2011-2014 period. Spending on conservation programs is recovered from all electricity ratepayers through a small portion (about four per cent in 2014) of

the Global Adjustment charge on electricity bills. Conservation spending accounts for about 2 per cent of the overall electricity bill.[24]

Spending by program is shown in Figure B.6. The bulk of the spending went to the Business and Consumer programs.

Table B.5: 2014 Conservation Results by Program for Transmission-Connected Customers

Initiative	2014 Participation	2014 Incremental Energy Savings (from new activity in 2014) (GWh)	2014 Peak Demand Savings (from new activity in 2014) (MW)
Industrial Accelerator	8 projects	13.5	1.5
Demand Response 2	2 facilities	0	64.6
Demand Response 3	56 facilities	0	126.6
Residential Demand Response (*peaksaver*)*	67,347 devices	0.01	33.1
All Programs for Transmission-Connected Customers		**13.5**	**225.8**

Notes: * Savings from customers who enrolled in the *peaksaver* initiative prior to 2011 that have not converted to the *peaksaver*PLUS initiative offered by LDCs are counted in this category. This initiative was for distribution-connected customers, but is placed here because it has no LDC involvement and does not contribute to LDC conservation targets.

Source: Independent Electricity System Operator

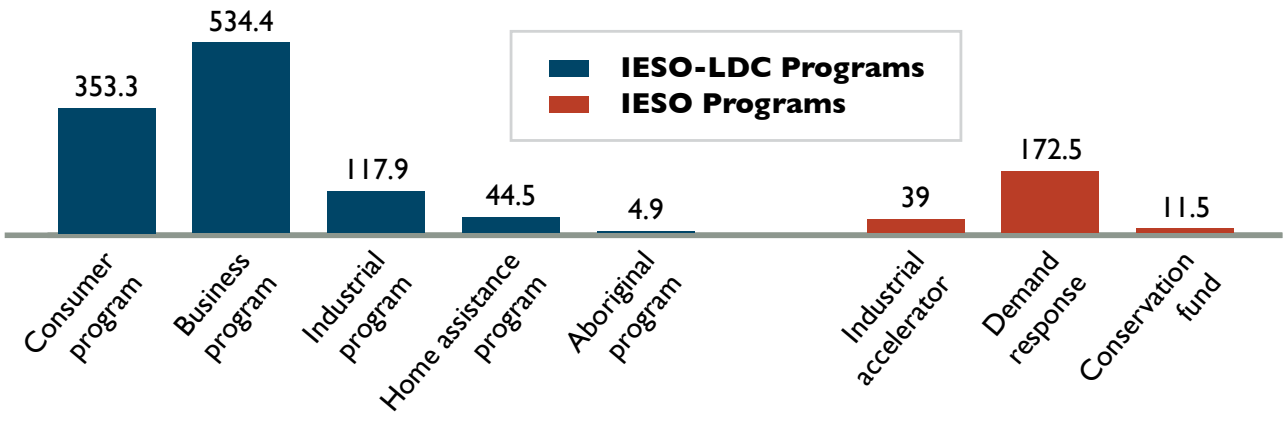

Figure B.6: Conservation spending by program ($M), 2011-2014

Source: Independent Electricity System Operator

Spending by type of expense is shown in Figure B.7. Approximately three-quarters of conservation spending flowed to participants in conservation programs as benefits or financial incentives, while the other one-quarter was spent on program administration by the IESO and LDCs. The IESO has responsibility for functions such as program evaluation, tracking of results, and province-wide marketing, while LDCs are responsible for local marketing. Either the IESO or the LDCs may be responsible for technical assistance, customer support, and other program delivery functions (this varies depending on the specific conservation program), and both groups have a role in program design.

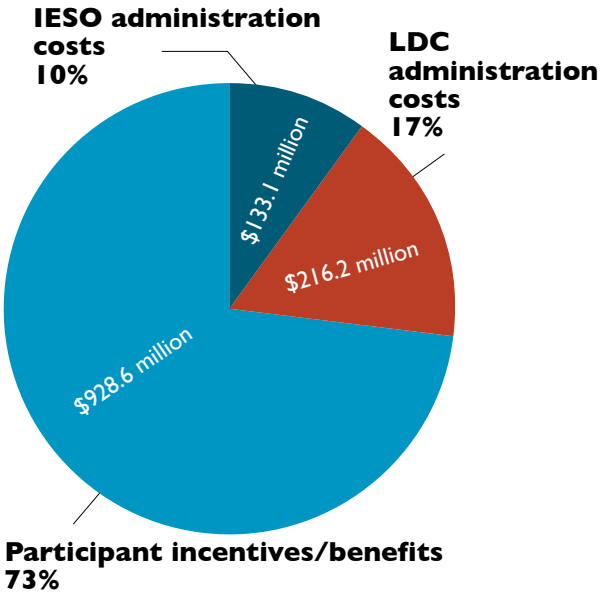

Figure B.7: Conservation spending by expense type ($M), 2011-2014

Source: Independent Electricity System Operator

Additional Expenses

The costs shown above for conservation programs do not include two additional categories of expenses:

- **Smart meters**: Although time-of-use pricing is considered a conservation initiative, the cost of smart meters (which are needed for time-of-use pricing, but serve additional functions) are not included here and are included in distribution rates, not in the Global Adjustment.
- **Performance Incentives for LDCs**: Based on their conservation spending and results, some LDCs were eligible for one or two financial incentives for their role in conservation program delivery. These two incentives are not included in the spending figures in the previous section.
  - *A performance incentive for achieving at least 80 per cent of both the energy and peak demand targets.* Twelve utilities reached this level and are eligible for performance incentives (if approved by the OEB), as shown in Table B.2. The sum of performance incentives for the twelve utilities (assuming Board approval) is only approximately $1.7 million.
  - *A cost-efficiency incentive for underspending the allocated conservation administration budget.* Utilities spending between 80 per cent and 100 per cent of their budget were eligible to keep a portion of the unspent funds advanced to them by the IESO. This incentive is not tied to performance, so long as the LDC made commercially reasonable efforts to reach its conservation targets. In aggregate, utilities underspent their four-year conservation administration budget by $41.2 million, and were eligible to retain

$26.7 million of these funds. Most, but not all, utilities were eligible for at least a small cost-efficiency incentive. The ECO had previously expressed concern that this incentive might work at cross purposes to the performance incentive, and cause some LDCs to limit their efforts. There is no evidence to suggest that this occurred, but the fact that the final cost-efficiency incentives paid out to utilities were much higher than performance incentives does suggest that these incentives were not optimally designed to encourage utilities to seek the highest amount of possible savings. In the 2015-2020 framework, the incentive structure has been changed – utilities will only be eligible for a cost-efficiency incentive if they meet or exceed their conservation target.

Program Cost-Effectiveness

The cost effectiveness of province-wide conservation programs from 2011 to 2014 is shown in Table B.6. Two cost-effectiveness tests are used. Both tests compare the lifetime program benefits (primarily from cost savings due to reduced electricity consumption) and costs, but from different perspectives. The Total Resource Cost test considers the impact on all parties, including electricity ratepayers and conservation program participants. The Program Administrator Cost test considers the costs and benefits from the perspective of the program administrator (the IESO).[25] For both tests, a ratio of greater than one indicates that the conservation program benefits exceed the costs.

The overall portfolio of conservation programs has been cost-effective using either test, which is a requirement of the conservation framework. Most conservation programs (where a "program" is defined as all of the initiatives available to a given sector) have also been cost-effective, with the exception of the Industrial and Low Income programs. However, the cost-effectiveness of individual initiatives within programs (not shown) varies widely. Many individual initiatives were not cost-effective (from a Total Resource Cost perspective); however, these initiatives accounted for only about one-quarter of overall conservation spending from 2011 to 2014.[26] In some cases, the initiatives that are not cost-effective serve as "loss leaders" – e.g., the Energy Audit initiative funds building energy audits and may not be cost-effective on their own, but hopefully lead participants to undertake cost-effective conservation projects through the Retrofit initiative. In other cases, an initiative can fail cost-effectiveness testing if it has incurred upfront administrative costs, but has not (at least yet) delivered the energy savings that were expected (e.g., Industrial Accelerator).

While overall cost-effectiveness of the conservation portfolio did not change greatly in 2014, several initiatives showed improved cost-effectiveness. Both the Direct Install Lighting initiative and the Bi-Annual Retailer Event benefited due to the increased interest in LED lighting, and the industrial conservation program for smaller distribution-connected customers (Process & Systems) showed improved results, as more projects were completed.

These cost-benefit analyses do not include a value for the non-energy benefits of conservation (e.g., environmental benefits due to reduced greenhouse gas emissions). Cost-effectiveness analysis of conservation programs in the new 2015-2020 framework will include a value for non-energy benefits, per direction from the Minister of Energy[27], which will improve the benefit:cost ratios.

The "levelized" delivery cost of conservation is also shown in Table B.6. For energy efficiency programs, this is the cost (from the program administrator's perspective) of saving a unit of electricity through conservation programs, which allows comparison with the cost of generating the same unit of power. For demand response programs, the levelized cost is the cost of reducing a unit of peak demand, which can be compared with the cost of building a new generating plant to meet peak demand. The levelized cost of energy efficiency programs from 2011 to 2014 was 3.7 cents per kilowatt-hour, which is much lower than any new form of electricity generation.

Transition to the Conservation First 2015-2020 Framework

A new six-year conservation framework spans the years 2015 to 2020. 2015 was a year of transition between the two frameworks. The change was

Table B.6: Cost-Effectiveness of 2011-2014 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	1.3	1.6	4.8	13,857 (*peaksaver* PLUS)
Business	1.3	2.8	3.1	Not applicable
Industrial	0.9	1.3	4.0	11,162 (Demand Response 3)
Low Income	0.6	0.6	11.4	Not applicable
Aboriginal	1.1	1.1	7.7	Not applicable
Total - All Distribution-Connected Programs	**1.2**	**2.2**	**3.6**	**13,334**
IESO-Only Demand Response	1.6	1.1	Not applicable	8,418
IESO-Only Industrial Accelerator	0.6	0.5	11.2	Not applicable
All Transmission-Connected and Distribution-Connected Programs	**1.2**	**2.1**	**3.7**	**12,062**

Notes: 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. Levelized delivery cost is calculated from the program administrator's perspective, and excludes incremental customer costs of conservation measures.

Source: Independent Electricity System Operator

largely invisible from the perspective of customers. Throughout the year and into 2016, LDC-IESO working groups reviewed and updated the suite of province-wide conservation programs. Programs from the old framework were rolled over into 2015, to bridge the period until new program rules were available. Most programs from the 2011-2014 framework will continue, with a few exceptions, such as the Appliance Retirement Initiative (Fridge and Freezer Pick-up), which was not extended on a province-wide basis due to its poor cost-effectiveness results and a market approaching saturation. It may be revisited as a local program, where market need still exists. The IESO-delivered Aboriginal Conservation Program ended on December 31, 2015, but a First Nations Conservation Program will be offered by Hydro One (beginning in mid-2016), which serves the majority of Ontario's First Nation communities. Other continuing programs will be updated with a view towards improving efficiency and cost-effectiveness. New local, regional and pilot programs will also begin rolling out in 2016. Conservation savings achieved by LDCs in 2015, whether from old or new programs, will count towards their 2015-2020 targets.

Each LDC was required to submit a conservation plan to the IESO for review by May 1, 2015. Each LDC's plan outlines how it proposes to achieve its target, including the mix of conservation programs it intends to offer, and proposed budgets. The IESO reviewed the submitted conservation plans for reasonableness and cost-effectiveness. At the time of writing, plans had been approved for all LDCs except for the three Five Nations LDCs (Attawapikstat Power, Fort Albany Power, and Kashechewan Power). Once an LDC's conservation plan is approved, the LDC can access the funds it requires to deliver programs under the new framework (with the exception of custom programs, which still require individual review and approval by the IESO).[28]

One major change in the new framework was the decision to transition demand response programs away from LDCs to the IESO, who will be responsible for meeting a 2025 demand response target. This transition was essentially complete by the end of 2015.[29] Demand response resources are unique among conservation measures because their electricity use can be controlled in real time. They can therefore be treated similar to electricity generators, and can participate in the real-time IESO electricity market and be considered as a supply resource by the IESO for power system planning purposes, making the IESO a natural host for demand response.

The transition was a two-step process. Participants in the Demand Response 3 program were transferred to the IESO's Capacity-Based Demand Response Program, which honoured existing contracts, but integrated demand response providers into the real-time market. In particular, participants were required to reduce their electricity consumption when the wholesale electricity price was expected to exceed a certain threshold. This threshold was not exceeded in 2015, so demand response resources were not activated.

As existing demand response contracts expire, they will not be renewed under the previous terms. Instead, the IESO will procure demand response with the price set through a competitive auction, held annually. The first Demand Response auction was completed in December 2015, securing approximately 400 MW of demand response capability from seven participants. By 2018, all Demand Response 3 contracts will have expired. The amount of demand response that the IESO procures through future auctions will depend on the needs of the electricity system, and the cost of acquiring additional demand response capacity in comparison with alternative resources, such as gas-fired generation.

B.2 Final 2011-2014 Electricity Conservation Results for Each Local Distribution Company

Utilities achieving more than 80 per cent of both their peak demand and energy targets, eligible for performance incentives from the OEB.

Utilities achieving more than 80 per cent of their energy target, but less than 80 per cent of their peak demand target.

Utilities achieving less than 80 per cent of their energy target, at risk of compliance action from OEB.

Table B.7: 2014 Electricity Conservation Results for Each Local Distribution Company

	Target 1: Energy Savings				Target 2: Peak Demand Reduction			
	Target		Achieved		Target		Achieved	
LDC	2011-2014 Cumulative Energy Savings Target (GWh)	LDC's Share of Aggregate Provincial Energy Target (per cent)	2011-2014 Cumulative Energy Savings (GWh)	Amount of 2011-2014 Energy Target Achieved (per cent)	2014 Peak Demand Reduction Target (MW)	LDC's Share of Aggregate Provincial Peak Demand Target (per cent)	2014 Peak Demand Reduction (MW)	Amount of 2014 Demand Target Achieved (per cent)
Algoma Power Inc.	7.37	0.12%	4.5	60.5%	1.28	0.10%	1.1	83.2%
Atikokan Hydro Inc.	1.16	0.02%	0.9	79.1%	0.20	0.02%	0.1	32.8%
Attawapiskat Power Corporation	0.29	0.00%	0.1	43.5%	0.07	0.01%	0.0	10.5%
Bluewater Power Distribution Corporation	53.73	0.90%	45.2	84.1%	10.65	0.80%	6.0	56.6%
Brant County Power Inc.	9.85	0.16%	9.4	95.0%	3.30	0.25%	1.6	49.7%
Brantford Power Inc.*	48.92	0.82%	82.5	168.6%	11.38	0.86%	9.1	79.7%
Burlington Hydro Inc.	82.37	1.37%	85.3	103.5%	21.95	1.65%	13.4	60.9%
Cambridge and North Dumfries Hydro Inc.	73.66	1.23%	120.5	163.6%	17.68	1.33%	11.9	67.4%
Canadian Niagara Power Inc.	25.08	0.42%	20.7	82.5%	6.40	0.48%	3.5	54.6%
Centre Wellington Hydro Ltd.	7.81	0.13%	10.7	137.2%	1.64	0.12%	1.7	100.9%
Chapleau Public Utilities Corporation	1.21	0.02%	2.2	179.3%	0.17	0.01%	0.2	123.3%
COLLUS Power Corporation	14.97	0.25%	13.6	90.7%	3.14	0.24%	1.8	56.3%

(continued)

Table B.7: Continued

LDC	Target 1: Energy Savings				Target 2: Peak Demand Reduction			
	Target		Achieved		Target		Achieved	
	2011-2014 Cumulative Energy Savings Target (GWh)	LDC's Share of Aggregate Provincial Energy Target (per cent)	2011-2014 Cumulative Energy Savings (GWh)	Amount of 2011-2014 Energy Target Achieved (per cent)	2014 Peak Demand Reduction Target (MW)	LDC's Share of Aggregate Provincial Peak Demand Target (per cent)	2014 Peak Demand Reduction (MW)	Amount of 2014 Demand Target Achieved (per cent)
Cooperative Hydro Embrun Inc.	1.12	0.02%	1.5	137.1%	0.34	0.03%	0.2	64.4%
E.L.K. Energy Inc.	8.25	0.14%	8.0	96.9%	2.69	0.20%	1.0	37.8%
Enersource Hydro Mississauga Inc.	417.22	6.95%	464.3	111.3%	92.98	6.99%	69.4	74.6%
ENTEGRUS*	46.53	0.78%	50.9	109.4%	12.12	0.91%	6.4	53.2%
ENWIN Utilities Ltd.	117.89	1.96%	153.9	130.5%	26.81	2.02%	17.5	65.4%
Erie Thames Powerlines Corporation	22.97	0.38%	38.8	168.8%	5.22	0.39%	3.2	61.2%
Espanola Regional Hydro Distribution Corporation	2.76	0.05%	3.4	124.1%	0.52	0.04%	0.3	60.3%
Essex Powerlines Corporation	21.54	0.36%	23.3	108.0%	7.19	0.54%	3.2	44.4%
Festival Hydro Inc.	29.25	0.49%	45.6	155.9%	6.23	0.47%	5.3	85.8%
Fort Albany Power Corporation	0.24	0.00%	0.1	43.9%	0.05	0.00%	0.0	11.5%
Fort Frances Power Corporation	3.64	0.06%	4.3	118.4%	0.61	0.05%	0.5	81.8%
Greater Sudbury Hydro Inc.**	43.71	0.73%	42.6	97.5%	8.22	0.62%	4.3	52.6%
Grimsby Power Inc.	7.76	0.13%	10.6	137.1%	2.06	0.15%	1.1	55.4%
Guelph Hydro Electric Systems Inc.	79.53	1.33%	130.9	164.6%	16.71	1.26%	20.0	119.8%
Haldimand County Hydro Inc.	13.30	0.22%	15.3	114.8%	2.85	0.21%	1.7	61.1%
Halton Hills Hydro Inc.	22.48	0.37%	23.3	103.6%	6.15	0.46%	2.9	46.5%

(continued)

Table B.7: Continued

LDC	Target 1: Energy Savings				Target 2: Peak Demand Reduction			
	Target		Achieved		Target		Achieved	
	2011-2014 Cumulative Energy Savings Target (GWh)	LDC's Share of Aggregate Provincial Energy Target (per cent)	2011-2014 Cumulative Energy Savings (GWh)	Amount of 2011-2014 Energy Target Achieved (per cent)	2014 Peak Demand Reduction Target (MW)	LDC's Share of Aggregate Provincial Peak Demand Target (per cent)	2014 Peak Demand Reduction (MW)	Amount of 2014 Demand Target Achieved (per cent)
Hearst Power Distribution Company Limited	3.91	0.07%	2.6	67.3%	0.68	0.05%	0.3	50.0%
Horizon Utilities Corporation	281.42	4.69%	302.5	107.5%	60.36	4.54%	48.8	80.8%
Hydro 2000 Inc.	1.04	0.02%	1.7	159.8%	0.19	0.01%	0.2	109.0%
Hydro Hawkesbury Inc.	9.28	0.15%	7.6	82.2%	1.82	0.14%	0.7	39.6%
Hydro One Brampton Networks Inc.	189.54	3.16%	239.4	126.3%	45.61	3.43%	27.9	61.2%
Hydro One Networks Inc.	1130.21	18.84%	898.3	79.5%	213.66	16.06%	167.4	78.4%
Hydro Ottawa Limited	374.73	6.25%	414.9	110.7%	85.26	6.41%	60.1	70.5%
Innisfil Hydro Distribution Systems Limited	9.20	0.15%	7.8	84.4%	2.50	0.19%	1.2	49.3%
Kashechewan Power Corporation	0.33	0.01%	0.1	42.9%	0.07	0.01%	0.0	11.3%
Kenora Hydro Electric Corporation Ltd.	5.22	0.09%	1.9	37.2%	0.86	0.06%	0.3	31.1%
Kingston Hydro Corporation	37.16	0.62%	46.0	123.7%	6.63	0.50%	7.5	112.9%
Kitchener-Wilmot Hydro Inc.	90.29	1.50%	103.0	114.1%	21.56	1.62%	15.8	73.3%
Lakefront Utilities Inc.	13.59	0.23%	10.4	76.9%	2.77	0.21%	1.1	40.2%
Lakeland Power Distribution Ltd.	10.18	0.17%	10.3	101.3%	2.32	0.17%	1.1	45.4%
London Hydro Inc.	156.64	2.61%	194.1	123.9%	41.44	3.12%	19.3	46.6%
Midland Power Utility Corporation	10.82	0.18%	13.6	125.4%	2.39	0.18%	2.1	88.4%

(continued)

Table B.7: Continued

LDC	Target 1: Energy Savings				Target 2: Peak Demand Reduction			
	Target		Achieved		Target		Achieved	
	2011-2014 Cumulative Energy Savings Target (GWh)	LDC's Share of Aggregate Provincial Energy Target (per cent)	2011-2014 Cumulative Energy Savings (GWh)	Amount of 2011-2014 Energy Target Achieved (per cent)	2014 Peak Demand Reduction Target (MW)	LDC's Share of Aggregate Provincial Peak Demand Target (per cent)	2014 Peak Demand Reduction (MW)	Amount of 2014 Demand Target Achieved (per cent)
Milton Hydro Distribution Inc.	33.50	0.56%	30.9	92.2%	8.05	0.61%	3.9	47.9%
Newmarket - Tay Power Distribution Ltd.	33.05	0.55%	36.2	109.5%	8.76	0.66%	4.6	52.9%
Niagara Peninsula Energy Inc.	58.04	0.97%	69.9	120.5%	15.49	1.16%	6.7	43.2%
Niagara-on-the-Lake Hydro Inc.	8.27	0.14%	10.6	128.1%	2.42	0.18%	1.4	56.7%
Norfolk Power Distribution Inc.	15.68	0.26%	14.5	92.2%	4.25	0.32%	1.8	41.8%
North Bay Hydro Distribution Limited	26.10	0.44%	28.0	107.3%	5.05	0.38%	3.5	70.1%
Northern Ontario Wires Inc.*	5.88	0.10%	5.9	100.5%	1.06	0.08%	0.6	54.4%
Oakville Hydro Electricity Distribution Inc.	74.06	1.23%	69.1	93.3%	20.70	1.56%	10.9	52.8%
Orangeville Hydro Limited	11.82	0.20%	10.8	91.1%	2.78	0.21%	1.7	59.9%
Orillia Power Distribution Corporation	15.05	0.25%	34.1	226.9%	3.07	0.23%	2.7	87.4%
Oshawa PUC Networks Inc.	52.24	0.87%	39.5	75.7%	12.52	0.94%	5.7	45.4%
Ottawa River Power Corporation	8.97	0.15%	9.4	105.0%	1.61	0.12%	1.0	62.6%
Parry Sound Power Corporation	4.16	0.07%	2.1	50.9%	0.74	0.06%	0.2	27.0%
Peterborough Distribution Incorporated	38.45	0.64%	35.0	91.0%	8.72	0.66%	7.2	83.0%
PowerStream Inc.***	407.34	6.79%	496.3	121.8%	95.57	7.19%	73.8	77.2%

(continued)

Table B.7: Continued

LDC	Target 1: Energy Savings				Target 2: Peak Demand Reduction			
	Target		Achieved		Target		Achieved	
	2011-2014 Cumulative Energy Savings Target (GWh)	LDC's Share of Aggregate Provincial Energy Target (per cent)	2011-2014 Cumulative Energy Savings (GWh)	Amount of 2011-2014 Energy Target Achieved (per cent)	2014 Peak Demand Reduction Target (MW)	LDC's Share of Aggregate Provincial Peak Demand Target (per cent)	2014 Peak Demand Reduction (MW)	Amount of 2014 Demand Target Achieved (per cent)
PUC Distribution Inc.	30.83	0.51%	30.5	99.1%	5.58	0.42%	3.3	59.5%
Renfrew Hydro Inc.	4.86	0.08%	4.7	96.4%	1.05	0.08%	0.5	52.3%
Rideau St. Lawrence Distribution Inc.	5.10	0.09%	7.3	142.2%	1.22	0.09%	0.7	59.3%
Sioux Lookout Hydro Inc.	3.32	0.06%	1.3	40.0%	0.51	0.04%	0.2	29.8%
St. Thomas Energy Inc.	14.92	0.25%	17.9	119.8%	3.94	0.30%	2.4	61.6%
Thunder Bay Hydro Electricity Distribution Inc.*	47.38	0.79%	47.2	99.5%	8.48	0.64%	5.9	70.1%
Tillsonburg Hydro Inc.*	10.25	0.17%	7.4	71.9%	2.29	0.17%	2.4	104.3%
Toronto Hydro-Electric System Limited	1303.99	21.73%	1582.6	121.4%	286.27	21.52%	206.3	72.1%
Veridian Connections Inc.	115.74	1.93%	106.4	91.9%	29.05	2.18%	16.0	55.0%
Wasaga Distribution Inc.	4.01	0.07%	4.3	107.9%	1.34	0.10%	0.6	42.1%
Waterloo North Hydro Inc.	66.49	1.11%	66.2	99.6%	15.79	1.19%	8.1	51.1%
Welland Hydro-Electric System Corp.	20.60	0.34%	23.9	115.9%	5.56	0.42%	2.7	48.4%
Wellington North Power Inc.	4.52	0.08%	3.3	73.2%	0.93	0.07%	0.5	51.7%
West Coast Huron Energy Inc.	8.28	0.14%	4.0	48.8%	0.88	0.07%	0.5	53.8%
Westario Power Inc.	20.95	0.35%	23.2	110.9%	4.24	0.32%	2.4	57.1%

(continued)

Table B.7: Continued

LDC	Target 1: Energy Savings				Target 2: Peak Demand Reduction			
	Target		Achieved		Target		Achieved	
	2011-2014 Cumulative Energy Savings Target (GWh)	LDC's Share of Aggregate Provincial Energy Target (per cent)	2011-2014 Cumulative Energy Savings (GWh)	Amount of 2011-2014 Energy Target Achieved (per cent)	2014 Peak Demand Reduction Target (MW)	LDC's Share of Aggregate Provincial Peak Demand Target (per cent)	2014 Peak Demand Reduction (MW)	Amount of 2014 Demand Target Achieved (per cent)
Whitby Hydro Electric Corporation	39.07	0.65%	32.4	83.0%	10.90	0.82%	6.1	55.5%
Woodstock Hydro Services Inc.	18.88	0.31%	38.1	202.0%	4.49	0.34%	3.1	68.5%
TOTAL (as reported by IESO)								
	6000	**100.00%**	**6553.2**	**109.2%**	**1330**	**100.00%**	**927.7**	**69.8%**
TOTAL (including late adjustments and savings from PowerStream custom program)*								
	6000	**100.00%**	**6560**	**109.3%**	**1330**	**100.00%**	**929**	**69.8%**

Notes:

* Results for marked local distribution companies (LDCs) and overall province-wide totals include minor updates to reflect late adjustments. Results shown here may therefore differ slightly from those reported by individual LDCs or by the Independent Electricity System Operator (IESO).

** Does not include savings from Greater Sudbury Hydro's custom conservation programs. These custom programs were delivered using funding approved prior to 2011, and the Ontario Energy Board has not considered these programs to be eligible to contribute to the 2011-2014 conservation targets. If results from these programs were included, Greater Sudbury Hydro's final results would be 47.0 GWh cumulative energy savings (107.5 per cent of its energy savings target) and 4.4 MW peak demand reduction (52.9 per cent of its peak demand target).

*** Includes savings from PowerStream's custom Business Refrigeration Incentive Program.

Sources: Independent Electricity System Operator, Ontario Energy Board, PowerStream, Greater Sudbury Hydro

B.3 Electricity Policy in 2015

Policy activity in 2015 for electricity proceeded at the steady pace typical of this sector for many of the last few years. In contrast to 2014, activities did not include the overarching or foundational policies that were unveiled in 2014, such as: the updated Long-Term Energy Plan, the Conservation First vision paper, and new regulatory frameworks for conservation by distribution utilities. Rather, the year was dominated by undertaking the low-key tasks of the detailed regulations, guidance and workflows required for 2014's broad strategies and targets.

Industrial Consumers

In 2015, the Northern Industrial Electricity Rate program was made permanent. First announced in 2010 to run three years, and extended in 2012, the program provides lower rates for industries based in Northern Ontario[30] by rebating charges by two cents per kilowatt-hour. Under the terms of the program, participating companies must implement an energy management plan.

Also in the year, the Minister of Energy requested enhancements to another existing industrial rate program called the Industrial Electricity Incentive (IEI). Under the program, Ontario's current surplus supply of power is used to stimulate economic activity and potentially encourage better management of electricity demand through increased off-peak consumption. Responding to the minister's direction, the Independent Electricity System Operator (IESO) awarded several contracts under a newly created stream 3 of the IEI. Stream 3 expanded the program from previous industries like mines and refiners to include additional energy-intensive businesses like data centres and greenhouses. The electricity costs of IEI participants are reduced over a multi-year term in return for building new plants or expanding production at existing ones. For expansion of existing plants, a consumption baseline will be calculated based on a formula set by the IESO and a rate applied to the incremental consumption; new facilities will have a baseline set to zero for calculation of incremental consumption. Participants must provide an energy management plan when applying to the program to ensure that additional power is efficiently used.

In 2015, billing of new program participants of the Industrial Conservation Initiative (ICI) began. Previously in 2014, the rules of ICI program expanded eligibility and more businesses (those in select sectors with a peak demand greater than three, rather than five, megawatts) could apply to participate. Under the program, bills for industrial consumers that reduce their peak demand during high peak hours are lowered through a reduction in their global adjustment charge. The program has delivered significant conservation results; under the old rules when fewer businesses were eligible, the ICI resulted in a province-wide peak reduction of several hundred megawatts, and this amount may increase with more participants.[31]

Residential and Other Consumers

With the intention of helping electricity customers monitor their use and react more quickly to avoid continued high consumption, the Ontario Energy Board (OEB) made changes to the Distribution System Code governing utilities' billing practices. LDCs will be required, starting January 2016, to bill residential and small business customers on a monthly basis using actual, not estimated, meter readings. Prior to the changes, some LDCs billed customers every two or three months and sometimes used estimated consumption amounts.

The OEB also issued a new rate design for the delivery charge portion of a consumer's electricity bill. Under the current design, there is a two-part delivery charge – part fixed and part variable, where the variable distribution charges are tied to the amount of electricity consumed. According to the OEB's decision,[32] delivery charges make up only 20-30 per cent of the total bill. Almost all distribution costs are fixed costs meaning that the cost of the distribution system is largely unaffected by the amount of power flowing through it. Examples of fixed costs are assets like wires, poles, transformers and meters. These have a fixed cost to purchase, install and maintain, and do not increase or decrease if the amount of power a customer uses goes up or down.

The Board's new rate design policy is to increase the amount of costs recovered through fixed charges and reduce those from usage charges. According to Board research, conservation is not affected by a lower variable charge; the electricity commodity charge, which makes up half of the total price of power, provides a stronger price signal to conserve. Furthermore, long-term distribution costs are driven by two main factors: number of customers and the peak demand on the distribution system. The new rate design will be fairer for consumers and provide stability for distributors to invest in new technology like the smart grid.

The new rate design, which will be phased in over four years and fully in effect by 2019, replaces the current mixture of fixed and variable charges with a monthly charge that is fully fixed, regardless of the amount of electricity used. The ECO has previously commented that this approach could reduce the incentive to conserve electricity and result in higher peak demand and higher distribution costs in the long term. A similar approach will be implemented for delivery charges paid by natural gas customers.

Finally, two other changes were made to power bills during the year. On December 31, 2015, the Ontario Clean Energy Benefit expired with the effect that residential, farm and small business customers will no longer receive a 10 per cent reduction on their total bill for the first 3,000 kWh per month consumed. (When the benefit was introduced in 2010, the ECO commented that it was a perverse incentive which rewarded increased consumption.) As a partial replacement, the government announced the Ontario Electricity Support Program, which applies a monthly rate reduction on electricity bills, but is only for low-income customers. Also, the Debt Retirement Charge (0.7 cents per kilowatt-hour in most areas) was removed from residential bills starting January 1, 2016, and will be removed for other classes of customers on April 1, 2018. The impact of this change on power consumption, if any, is unknown, although as a general rule price reductions tend to increase consumption of a good or service.

And in 2015, the OEB indicated that changes can be expected in the future to the way in which almost five million residential and small business customers are billed. Under the Regulated Price Plan (RPP) for such customers, consumers are charged for electricity under a time-of-use (TOU) structure whereby electricity used during peak hours costs more than off-peak times. TOU is an important conservation tool because it encourages demand shifting which reduces peak demand and lessens the need for additional generation and transmission facilities in the long term.

In November 2015, the OEB released a roadmap that flagged certain elements of the current structure, including the TOU pricing and time periods, which the OEB intends to redesign over the next three to five years.

To inform its thinking, the OEB commissioned a broad range of research. Two studies were completed on the effects of TOU rates and how pricing and time periods could be improved for conservation purposes. Also, consumer survey research and focus groups analyzed the public's awareness and understanding of TOU rates. A study using a behavioural economics approach experimented with presentation of bill information to test awareness and comprehension of the TOU price structure. And lastly, a review of dynamic pricing schemes in six North American and two international jurisdictions was completed to assess some effective program designs. The Board also considered regulations and features of the allocation of global adjustment and generation costs that may create barriers to an effective RPP.

The RPP Roadmap Responds to ECO Concerns

The OEB's roadmap sets out a five-point plan that is aligned with observations made in previous ECO reports on TOU pricing. For example, it emphasizes using TOU pricing to minimize long-term system costs. The change in philosophy can be seen clearly in the new RPP objectives (changes are highlighted in italics):

- Set prices to recover the full cost of RPP supply, on a forecast basis, from the consumers who pay the prices.
- Set the price structure to reflect *current and future* RPP supply costs.
- *Set the price structure to support the achievement of efficient electricity system operation and investment.*
- Set both prices and the price structure to give consumers incentives and opportunities to reduce their electricity bills by shifting their time of electricity use *and reducing their peak demand.*
- Create *a price structure that is easily understood* by consumers.
- *Provide fair, stable and predictable commodity prices* to consumers.

The report also notes the need to develop a form of TOU pricing for mid-size customers that are too large for the RPP and too small for the ICI – a gap in conservation pricing policy previously noted by the ECO. The report noted that solar power is shifting the daily peak to later in the day; an issue that has been suspected for some time now. The roadmap also points out that government regulation – requiring weekday off-peak prices to begin by 7 p.m. – constrains the Board's ability to adjust rates to target such peaks. Finally, the roadmap contains some novel ideas as to how bills could be presented to ensure better consumer comprehension.

The Roadmap's Five-Point Plan

The synopsis below outlines the roadmap's five-point plan for revision of the RPP.

1. ***Renewing the RPP objectives.***

   The OEB has already updated its RPP objectives to ensure that they reflect current policy objectives regarding peak demand reduction, efficient system operation and meeting long-term costs.

B

2. ***Empowering consumers – Enhancing energy literacy and non-price tools.***

   The public's understanding of TOU pricing is low. To address this, the OEB will: improve the communication on TOU pricing by making changes to the electricity bill; launch non-price pilots on benchmarking and load control to assess if technology gets a bigger response from customers; and gather better consumption data to understand what drives customer behavior.

3. ***Price pilots.***

   The OEB will work with LDCs to undertake several pricing (and non-price) pilots over the next 18 months to understand if there is a more effective pricing alternative to the current TOU structure.

4. ***Engaging with low volume business consumers.***

   Small business consumers are the least engaged in the current TOU structure and limited data exist to understand their consumption patterns. The OEB will examine these consumption patterns to better understand the needs of small business.

5. ***Working with government to reduce barriers.***

   The OEB will work with government and the IESO to address issues such as the inflexibility around the TOU periods and the recovery of Global Adjustment costs.

Long-Term Energy Planning

Bill 135, the *Energy Statute Law Amendment Act, 2015* was introduced on October 28, 2015. The bill amends various laws, and changes the government's authority for electricity planning. It revises the *Electricity Act, 1998* and the *Ontario Energy Board Act, 1998* to repeal the requirement for an Integrated Power System Plan (IPSP). Bill 135 proposes to replace the IPSP with the Long-Term Energy Plan (LTEP) which sets out the objectives for energy and which would be afforded legal clout. (Prior to these proposed amendments, the LTEP was an informal plan, with no statutory authority, that was updated triennially by the government). Prior to issuing a revised LTEP, the IESO will be required to submit and publicly post a technical report on the adequacy and reliability of Ontario's electricity supply. As well, before issuing the LTEP, the Minister will consult stakeholders and publish notice of the consultations on the Environmental Registry. Once a revised LTEP is finalized, the Minister will publicly post it along with key technical data used to develop the plan.

The bill continues the Minister's power to issue directives to the IESO and OEB. On receiving a directive, the IESO or OEB will be required to submit an implementation plan outlining the steps it will take to meet the directive's requirements. The minister can issue directives related to: procurement contracts for electricity supply, conservation, and transmission systems; programs; funding; and, consultation. As with the IPSP, both the LTEP and any directives will be exempt from the *Environmental Assessment Act*.

Conservation First Framework

As required under the Conservation First Framework, all local distribution companies submitted conservation and demand management plans to the IESO. Of the entire group of 75 distributors, about two-thirds plan to meet their assigned targets and a third expect to exceed their targets. Eighty-seven per cent of the planned energy savings are expected to come from programs that are already approved or proposed; where the other 13 per cent will come from remains to be determined.[33] However, the IESO reviewed and approved all but one plan (covering three LDCs) by the end of 2015. A mixture of legacy and new Conservation First Framework programs will be adopted with half of the LDCs planning to launch Conservation First Framework programs in 2015, and the other half in 2016. Eleven pilot programs were approved as of late 2015 and four new local residential programs were under review by the IESO.

The framework does not contain an aggregate or LDC targets for peak demand reduction. The ECO has previously noted that the main responsibility for peak shaving will fall to the IESO and OEB through market-based demand response and TOU pricing.[34] Progress against the 2013 LTEP target of a 10 percent peak reduction in 2025 should be closely monitored. If necessary, the Conservation First Framework should be revised to include a peak reduction goal at the framework's mid-term review in 2018.

In addition to the above-noted policies, there was new activity, as well as action on existing initiatives, that affect the use of energy in buildings. The Ministry of Energy began consultation on a home energy rating and disclosure policy. It proposes to require information on a home's energy efficiency performance to be provided to prospective buyers at the time a home is listed for sale. The ministry also proposed amendments to O. Reg. 397/11, Energy Conservation Plans. Key among these was the exempting of reporting of energy use for water and sewage pumps. The implementation of the regulation, including a review of conservation and demand management plans prepared by broader public sector institutions, is discussed in chapter four of our report.

Amendments to Ontario's regulation governing energy efficiency of appliances and products were made and these are explained in detail in chapter five of this report.

Over the year, several directives were issued that changed how renewable generation is procured in the province, and the ministry also began exploring the possible conversion of the microFIT program to a net metering program.[35] (Behind-the-meter customer-based generation falls under the definition of conservation in the Minister of Energy's direction on the Conservation First Framework). Almost all microFIT program participants generate electricity with solar panels and receive the feed-in tariff rate for solar installations. Three key features that are being considered in converting microFIT to net metering are: the size of generation eligible; the method for determining bill credits; and, whether barriers exist to integrating innovative technical features like storage.[36]

Endnotes

1. Environmental Commissioner of Ontario, report, *Annual Energy Conservation Progress Report - 2010 (Volume One)*, section 5, June 2011, contains more information on the 2011-2014 conservation framework, and how and why it was developed.

   eco.on.ca/reports/2010-energy-report-vol-1-managing-a-complex-energy-system/

2. Environmental Commissioner of Ontario, report, *Annual Energy Conservation Progress Report - 2014*, section 2.4, January 2015, reviews the policy aspects of the 2015-2020 framework.

   eco.on.ca/reports/2014-energy-report-planning-to-conserve/

3. Final conservation results are also reported by the Independent Electricity System Operator, the Ontario Energy Board, and individual LDCs, each with slightly different perspectives. In particular, the individual LDC reports provide more detail on the specific programs offered and operational challenges and lessons learned from promoting and delivering these programs.

   Independent Electricity System Operator, report, *2011-2014 Conservation Results Report*, undated.

   www.ieso.ca/Documents/2011-2014_Conservation_Results_Report.pdf

   Ontario Energy Board, EB-2010-0215 report, *Conservation and Demand Management Report: 2011-2014 Results*, December 2015.

   http://www.rds.ontarioenergyboard.ca/webdrawer/webdrawer.dll/webdrawer/rec/515795/view/CDM%20Summary%20Report_2011%20to%202014%20Results_20151223.PDF

   Ontario Energy Board, website, *CDM Strategies, Board-Approved CDM Programs, Performance Incentive and Annual Reports*, accessed April 2016.

   www.ontarioenergyboard.ca/oeb/Industry/Regulatory%20Proceedings/Policy%20Initiatives%20and%20Consultations/Conservation%20and%20Demand%20Management%20%28CDM%29/CDM%20Code/CDM%20Strategies%20Programs%20and%20Reports

4. Ontario Power Authority, presentation, *Generation and Conservation Tabulations and Supply/Demand Balance, 2013 LTEP: Module 3*, p. 35, January 2014.

   powerauthority.on.ca/sites/default/files/planning/LTEP-2013-Module-3-Supply-Demand-Balance.pdf

5. Demand response programs are essentially "call" options to reduce electricity use for short periods. IESO has tended to use these programs only in extreme conditions for a limited number of hours. As there have been few activations, they deliver little energy savings or greenhouse gas reductions.

6. Ontario Energy Board, report, *Monitoring Report on the IESO-Administered Electricity Markets for the period from May 2014 – October 2014*, figure 1.6, September 2015.

   www.ontarioenergyboard.ca/oeb/_Documents/MSP/MSP_Report_May2014-Oct2014_20151008.pdf

   The per cent of hours that natural gas was on the margin was estimated for the four quarters between November 2013 and October 2014 using this figure.

7. Independent Electricity System Operator, presentation (unpublished), *Overview of Electricity Conservation Program Avoided Costs: Presentation to Environmental Commissioner of Ontario (ECO)*, June 17, 2015.

8. *Ibid.*

9. The IESO has been directed by the Minister of Energy to "consider the system value of the {conservation} measures, including reductions at peak times" – however, in practice, this is only considered at the program screening stage, and is not a performance metric for LDCs.

10. The province-wide results reported in this chapter match those reported by the IESO. Minor updates for 5 LDCs due to late data, and savings from PowerStream's custom Business Refrigeration Incentive are not included, and would increase overall savings by about 0.1 per cent. Province-wide savings including these additional updates are 6560 GWh (109.3 per cent of energy savings target) and 929 MW (69.8 per cent of peak demand target). Results reported for individual LDCs do include these additional updates.

11. Ontario Energy Board, EB-2010-0215 letter, *Re: Conservation and Demand Management Report – 2013 Results*, December 17, 2014.

    www.ontarioenergyboard.ca/oeb/_Documents/EB-2010-0215/Brdltr_2013%20CDM%20Report_20141217.pdf

12. Another reason why the demand peak was so widely missed may be that time of use rates are not yet filling their potential to materially shift consumer demand. As the ECO has reported before, there are several reasons for this, including:

- An insufficient difference between on- and off-peak rates;
- the Minister of Energy's direction that off-peak rates should begin at 7 PM on weekdays, even though the actual system peak continues until later in the evening on hot summer days;
- limited consumer understanding of off-peak rates;
- the fact that many older appliances do not have easy to use delayed operation cycles which would, for example, allow a homeowner to run their dishwasher conveniently in the middle of the night;
- For about 35,000 rural customers, inadequate wireless communications infrastructure means that their installed smart meters cannot transmit data and they therefore cannot benefit from time of use rates.

Most of these are factors beyond the control of the individual LDCs and many are beyond the control of the IESO.

13. Ontario Energy Board, EB-2010-0215 letter, *Re: 2011-2014 Conservation and Demand Management Targets – Reporting and Performance*, August 26, 2015.

www.ontarioenergyboard.ca/oeb/_Documents/Documents/Brdltr_2014_CDM_Report_20150826.pdf

14. Minister of Energy, directive to the Ontario Energy Board, untitled, March 26, 2014.

www.ontarioenergyboard.ca/oeb/_Documents/Documents/Directive_to_the_OEB_20140326_CDM.pdf

Language from the directive is reflected in the license conditions assigned by the Ontario Energy Board to distributors.

15. *Supra*, note 6, displays the percentage of hours that each type of generation was at the margin over a quarterly period (the four quarters from November 2013-October 2014 are used). The estimate of emissions reductions assumes average emissions factors for fossil-fuelled generation (0.39 megatonnes CO_{2eq} for gas-fired generation, and 0.94 megatonnes CO_{2eq} for coal-fired generation), and assumes that the proportional reduction in electricity use due to conservation was the same in all hours.

16. The IESO reduced incentives for the Demand Response 3 (DR3) program in some areas of the province, and later was directed by the Ministry of Energy in March 2014 to institute a province-wide freeze on additional DR3 contracts in March 2014. The province-wide freeze was intended to facilitate the transition of DR away from an LDC program approach to an IESO-administered market approach. These actions had the impact of reducing the 2014 peak demand savings achieved from 2011-2014 conservation programs, but also reduced costs. Minister of Energy, direction to the Ontario Power Authority, *Re: Continuance of the OPA'S Demand Response Program Under IESO Management*, March 31, 2014.

www.powerauthority.on.ca/sites/default/files/news/MC-2014-853.pdf

17. Independent Electricity System Operator, report, *Ontario Reserve Margin Requirements, 2015-2019*, December 2014.

www.ieso.ca/Documents/marketReports/Ontario-Reserve-Margin-Requirements-2015-2019_v1.0.pdf.

The IESO's conclusion is based only on existing resources and planned resources that were already committed (signed contracts) or directed as of May 2014.

18. Actual savings of 309 MW peak demand reduction was achieved from demand response programs, while 416 MW of peak demand reduction from these programs was originally projected.

19. Ontario Energy Board, website, *CDM Strategies, Board-Approved CDM Programs, Performance Incentive and Annual Reports*, accessed April 2016.

www.ontarioenergyboard.ca/oeb/Industry/Regulatory%20Proceedings/Policy%20Initiatives%20and%20Consultations/Conservation%20and%20Demand%20Management%20%28CDM%29/CDM%20Code/CDM%20Strategies%20Programs%20and%20Reports

20. A separate target of 300 MW demand savings was set for the Industrial Accelerator program for transmission-connected customers, with an end date of June 23, 2015. No explicit target was set for the demand response programs for transmission-connected customers, although the Ministry of Energy provided limits on the maximum amount of demand response that the IESO could procure ("up to 500 MW").

21. Environmental Commissioner of Ontario, report, *Annual Energy Conservation Progress Report - 2014*, section 2.7, January 2015.

eco.on.ca/reports/2014-energy-report-planning-to-conserve/

22. *Supra*, note 16.

23. Indeco, report (filed as part of PowerStream's 2014 CDM annual report), *Evaluation of the Business Refrigeration Incentives Program*, April 2015.

www.rds.ontarioenergyboard.ca/webdrawer/webdrawer.dll/webdrawer/rec/498238/view/PowerStream%202014%20Annual%20CDM%20Report_20150930.PDF

24. The total Global Adjustment was forecast by the Ontario Energy Board to be $9.1 billion from November 2013 to October 2014, and $341.5 million was recovered through the Global Adjustment in 2014 for spending on conservation initiatives. The statement that conservation spending counts for about 2% of the electricity bill is based on an estimated total electricity system cost (from 2012) of $18.7 billion:

Ontario Power Authority, presentation, *Cost of Electricity Service 2013 LTEP: Module 4*, p.5, January 2014. powerauthority.on.ca/sites/default/files/planning/LTEP-2013-Module-4-Cost.pdf.

The amount of spending on conservation programs reported for a given year does not exactly match the amount of funds recovered from the Global Adjustment. The difference is largely a timing issue – conservation administration funds are recovered from the Global Adjustment when they are advanced to LDCs, but are not reported in the spending totals until the LDC has spent these funds on conservation activities.

Over the four year period, the amount of reported spending varies for three reasons: Global Adjustment spending in 2011-2014 also includes about $35M spent on residual payments for pre-2011 conservation programs; Global Adjustment spending includes about $41M that had been advanced to LDCs, but not spent as of year-end 2014; and yearly reporting periods are slightly different (Global Adjustment spending year begins on Dec. 26, instead of the calendar year).

Year	Funds Recovered through Global Adjustment	Spending on 2011-2014 Conservation Programs	Variance
2011	328,754,087	269,764,342	58,989,744
2012	333,777,237	237,017,116	96,760,120
2013	345,873,817	349,870,602	-3,996,785
2014	341,523,589	421,284,553	-79,760,964
Total Spending	**$1,349,928,729**	**$1,277,936,613**	**$71,992,116**

25. The main difference between the two calculations is that additional conservation costs paid by participants in conservation programs (e.g. the incremental cost a customer pays for an energy-efficient furnace, net of any incentive received through the program) are included in the TRC test, but not the PAC test. Therefore, the benefit:cost ratios are usually higher in the PAC test.

26. Independent Electricity System Operator, information provided to the ECO in response to ECO inquiry, October 16, 2015; April 18, 2016.

27. Minister of Energy, direction to the Ontario Power Authority, *Re: Amending March 31, 2014 Direction Regarding 2015-2020 Conservation First Framework*, Oct, 23, 2014.

powerauthority.on.ca/sites/default/files/news/MC-2014-2415.pdf

28. Material changes to an LDC's portfolio, programs or budget will require the LDC to submit a revised conservation plan to the IESO for approval.

29. With the exception of the *peaksaver*PLUS demand response initiative for residential customers, for which a strategy has not yet been finalized.

30. Northern Ontario is defined under the program rules as being within the collective territorial Districts of Kenora, Rainy River, Thunder Bay, Cochrane, Algoma, Sudbury, Timiskaming, Nipissing, Manitoulin, and Parry Sound.

31. Environmental Commissioner of Ontario, report, *Annual Energy Conservation Progress Report – 2014*, section 2.7.4, January 2015.

eco.on.ca/reports/2014-energy-report-planning-to-conserve/

32. Ontario Energy Board, EB-2012-0410 report, *Board Policy: A New Distribution Rate Design for Residential Electricity Customers*, April 2, 2015.

www.ontarioenergyboard.ca/oeb/_Documents/EB-2012- 0410/OEB_Distribution_Rate_Design_Policy_20150402.pdf

33. Independent Electricity System Operator, presentation, *Conservation First Framework: Status of LDC CDM Plans*, p. 5, August 13, 2015.

www.ieso.ca/Documents/consult/sac/SAC-20150813-Status-of-LDC-CDM-Plans.pdf

34. Environmental Commissioner of Ontario, report, *Annual Energy Conservation Progress Report – 2014*, section 2.4, January 2015.

35. Ontario's current net metering regulation credits participating customers– mainly homeowners and farms – for excess renewable electricity generation provided to the distribution grid, at retail rates. Renewable generation up to 500 kW in capacity can participate. Program participants are net billed at retail rates based on the difference between the value of electricity exported (i.e., the value of electricity generated and injected into the grid after the participant has met its own consumption needs) and the value of electricity imported (i.e., the value of electricity purchased from the local distribution utility serving the participant).

36. The Ministry of Energy is developing proposals for a new net metering regime – eligibility may be limited to generation of 10 kW or less (as with the microFIT program), however, feedback on extending net metering to larger systems is being given consideration. Guiding principles for the program concept are as follows. It may credit program participants for their exported electricity based on the value of the power to the electricity system; conservation would be considered first by the appropriate sizing of systems to customer needs. Two compensation options were consulted on: one option where payment for electricity exported to the grid might involve the value of the power to the grid in terms of the avoided cost of adding new generation); the value-based payment could include environmental benefits, in addition to the avoided market costs. The second option proposed would involve crediting exports at retail rates and, in certain geographic areas, providing locational benefits (e.g., price adders) which would reflect the benefits provided by net metered generators where the grid is congested or demand growth would mean the addition of wires and transformers. Energy imported would continue to be valued at the retail price that utilities charge ratepayers.