
2015

Conservation Results Report

Table of Contents

1	Message from the Vice-President, Conservation and Corporate Relations
2	Executive Summary
4	Conservation Program Achievements
7	Program Evaluation and Cost Effectiveness
8	Conservation Fund
9	LDC Innovation Fund
10	Engagement and Awareness
12	Building Capability
15	Conservation Programs Savings to Long-Term Energy Plan Target
17	Appendix
17	Codes and Standards
18	Other Influenced Conservation
18	Cost-Effectiveness Tests
19	Province-wide Programs
20	LDC Local Programs
21	LDC Pilot Programs

Message from the Vice-President, Conservation and Corporate Relations



In collaboration with more than 70 local distribution companies (LDCs), the IESO embarked on a new six-year (2015-2020) Conservation First Framework (CFF) that offers committed funding for conservation and energy efficiency to homes and businesses across the province.

Over the past 10 years, Ontarians have achieved 13.5 billion kilowatt-hours (kWh) of electricity savings through both programs and changes to codes and standards.

A total of 1.3 terawatt-hour (TWh) of energy savings was achieved in 2015, equivalent to powering 142,000 homes for one year. Of the 1.3 TWh of energy savings, 1.1 TWh will persist to 2020. The province is on track to meet the 2020 energy-savings target of 7 TWh through CFF programs and 1.7 TWh through the Industrial Accelerator Program (IAP). These 2015 conservation results demonstrate that Ontario is continuing to build on the foundation of past conservation efforts and is moving towards more cost-effective and deeper energy savings.

Energy efficiency and climate change have never been more prevalent in Ontario than they are now. The provincial efforts in promoting a culture of conservation and providing valuable, cost-effective support and resources to homes and businesses are contributing to customers realizing energy-efficiency benefits that go beyond cost savings to improved business operations and more efficient homes.

The IESO works with its partners to promote, monitor, and plan for conservation – as it is the most cost-effective resource to help meet the province's energy needs, as well as one that delivers other non-energy related benefits. In 2015, conservation was delivered at a program cost to consumers of under four cents per kWh. For every dollar invested in energy efficiency programs, Ontarians have saved two dollars in avoided energy costs.

In addition to the energy-efficiency programs delivered through the LDCs, the IESO is committed to encouraging new, innovative solutions and technologies that will help us meet our targets. Communities and customers across the province are benefiting through investments in new program ideas and other energy-management initiatives that provide effective and long-term results on a regional or local scale.

The IESO is committed to working together to achieve the goals of the CFF and IAP and I encourage all partners, stakeholders and customers to continue to provide feedback on Ontario's conservation efforts. It is through ongoing participation and collaboration that we will ensure value for customers while providing a reliable and sustainable system for future generations.

I am pleased to share the 2015 conservation report with you and look forward to next year's results.

Sincerely,

A handwritten signature in dark ink, appearing to read "Terry Young". The signature is fluid and cursive, with a large "Y" and "Y" at the end.

Terry Young

Executive Summary

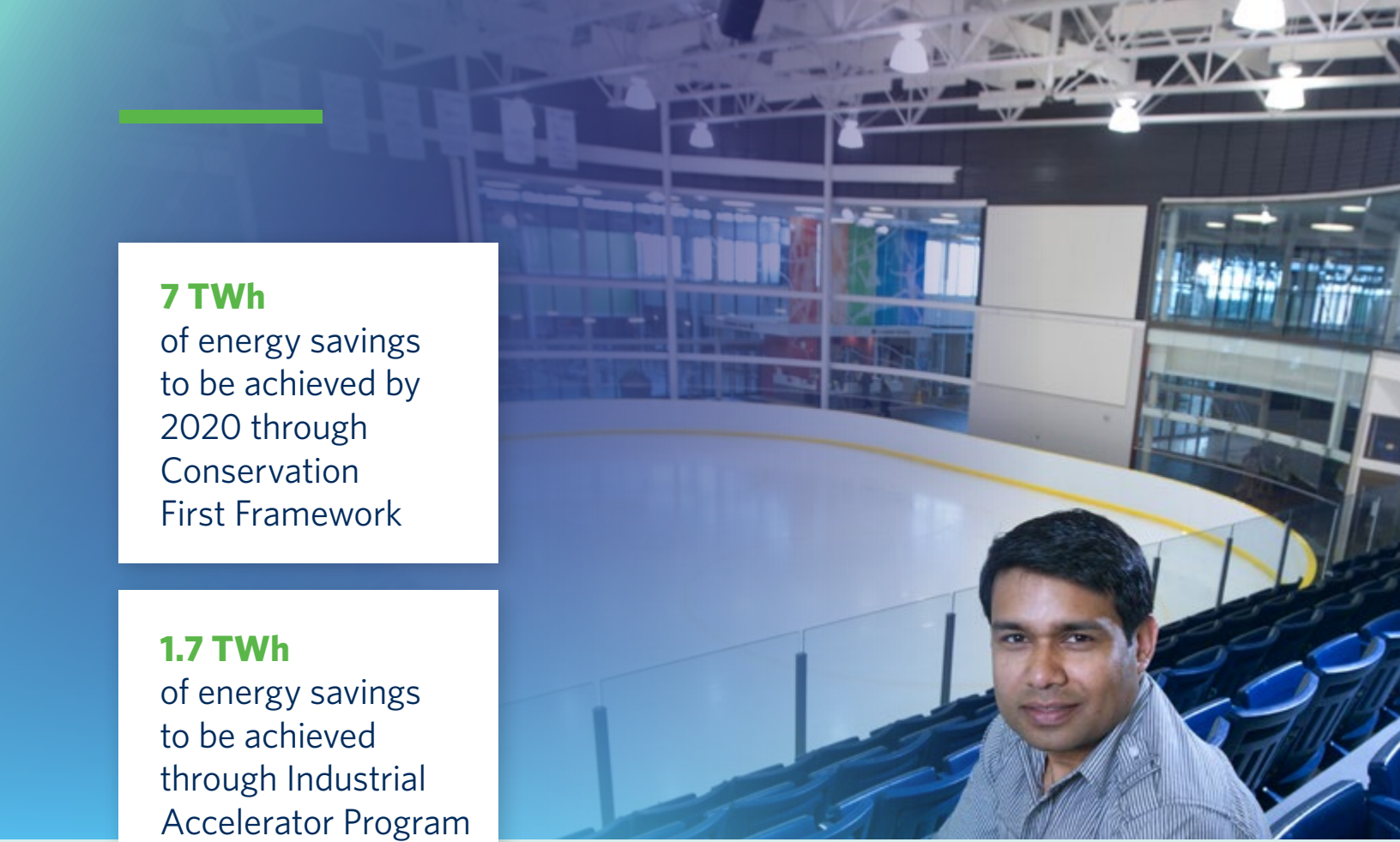
The IESO guides the province's electricity conservation efforts and works collaboratively with Local Distribution Companies (LDCs) and other industries to ensure Ontarians have reliable, clean and cost-effective sources of energy today and in the future.

Many opportunities exist in the marketplace to help all Ontarians use energy more wisely and help reduce energy costs. Conservation programs are available to residents and businesses across the province and include energy-saving initiatives that cost-effectively reduce the demand for electricity, while providing customers with information to help them make wise energy-efficient investments. Through these investments, customers will experience the many benefits that energy efficiency has to offer and will contribute to more sustainable communities by reducing the need to build new generation in the future.

Through the Conservation First Framework (CFF), the IESO and LDCs have collaborated to design and deliver new local, regional and provincial programs that provide LDCs with more flexibility in program design and offer customers more choice. 2015 was a transition year in ensuring that all projects through the 2011-2014 framework were complete, existing province-wide programs were enhanced, and new programs were developed for implementation in 2015-2016. The CFF includes a 7 terawatt-hour (TWh) energy-savings target to be achieved by 2020, and each LDC has been assigned individual targets contributing to the overall provincial target. An additional 1.7 TWh are to be achieved through the IESO's Industrial Accelerator Program (IAP), which offers energy-efficiency incentives to transmission-connected customers.

The objectives of the CFF aim to provide more flexibility for LDCs in the design and delivery of conservation programs to their communities. LDCs submitted Conservation and Demand Management (CDM) plans to the IESO outlining their energy conservation activities in a six-year plan. Details included target and funding information, any new and ongoing programs being delivered, and a choice of funding models. All plans have been approved by the IESO and all proposed programs in each LDC's CDM plan were evaluated for cost-effectiveness prior to being approved. All approved CDM plans can be found on the IESO website.

To support LDCs in the design and delivery of conservation programs, the IESO established the Conservation First Implementation Committee (CFIC) consisting of members from the LDCs, government, and other utilities to guide the success of the framework. The committee also oversees LDC working groups, which are responsible for designing, improving, and providing input into the management of province-wide conservation programs. Working groups and the CFIC share the goal of program design and delivery that offer value and integrate both customer and market needs.



7 TWh

of energy savings
to be achieved by
2020 through
Conservation
First Framework

1.7 TWh

of energy savings
to be achieved
through Industrial
Accelerator Program

A mid-term review of the CFF is planned for completion by June 2018. The review will help identify challenges and opportunities for 2018-2020, focusing on conservation targets and budgets, lessons learned about LDC funding models, customer needs, program effectiveness (including LDC and IESO services), conservation integration with regional planning, CFF alignment with Ontario's 2016 Climate Change Action Plan (CCAP) initiatives, and post-2020 approaches to energy efficiency. A multi-stakeholder advisory group will be formed as part of the engagement to ensure that all interested parties have meaningful opportunities to provide feedback for consideration.

By the end of 2015, there were 12 province-wide programs delivered by LDCs across the province and 10 pilot programs and 5 local programs were approved. All savings achieved from these pilots and programs count towards individual LDC and provincial energy savings targets.

In addition to the province-wide, local and pilot programs the IESO encourages other conservation activities through its collaboration with industry partners on the delivery of training initiatives and its support of new innovative technologies and ideas through the Conservation Fund. A variety of training initiatives currently exist in the marketplace to help build capability and awareness of energy efficiency in the sector. These training initiatives help drive participation in Save on Energy programs and provide a platform for building relationships with key partners and customers to help further influence energy efficiency activities in Ontario.

To measure the success of our conservation efforts the IESO evaluates all conservation programs through its Evaluation, Measurement and Verification process, which assesses the resource savings, cost-effectiveness, and market impacts of each program. The IESO also measures engagement in energy efficiency through its regular market research with partners and customers to gauge satisfaction of current programs and effectiveness of other conservation initiatives such as province-wide advertising. Monitoring behavior towards energy conservation and identifying the key influencers helps inform future program design and initiatives.

The IESO's efforts in supporting LDCs in the delivery of conservation programs, building capability and awareness of energy efficiency, making investments in new innovation, and conducting market research contribute to a sustainable future and promote a culture of conservation across the province. As our communities grow, we must continue to engage and seek input from all stakeholders on Ontario's energy conservation activities.



Conservation Program Achievements

Conservation programs help Ontarians better understand what energy-efficient options work best for them. The benefits of participating in energy efficiency initiatives go beyond cost savings to improving day-to-day operations in businesses and contributing to better quality homes. These initiatives are just a few examples of how Ontarians are contributing to sustainable communities across the province.

The IESO approved 40 LDC CDM plans in 2015, which included the approval of five new local programs. Approved local programs include initiatives such as a business refrigeration incentive, a First Nation conservation initiative, and three social benchmarking initiatives. There were also 10 pilot programs approved in 2015 through the LDC Innovation Fund – providing LDCs with opportunities to better target initiatives that meet the energy needs of their communities.

Province-wide programs delivered by LDCs include incentives for lighting upgrades, purchasing energy-efficient products, and replacing inefficient equipment. Through the LDC working groups the IESO and LDCs have been working to enhance the suite of province-wide conservation programs to improve the customer experience and ensure that each program offering has measures and incentives that offer the most benefits to participants.

Businesses are becoming more productive through investments in energy-efficient upgrades. Business sector participants saved 1,013 gigawatt-hours (GWh) of energy for the province, accounting for 79 percent of the overall energy savings achieved in 2015. Businesses undertook more than 13,000 projects through the Retrofit Program and completed over 18,000 projects through the Small Business Lighting Program. Other highlights include: 12 Process and Systems Upgrades projects, four of which were behind-the-meter generation, and 424 projects were completed through the Energy Managers program. Through this program, energy managers offer customers the opportunity to fund an in-house energy management resource to help identify smart energy-efficient investments.

Residents are making better choices on energy-efficient purchases for their homes. Residential sector participants saved 268 GWh of energy for the province, accounting for 21 percent of the overall energy savings achieved in 2015. Customers across the province redeemed more than 4.1 million coupons in 2015, resulting in over 6.4 million energy-efficient products purchased – more than 5.4 million were for LEDs alone. In addition, there were more than 122,000 installations through the Heating and Cooling Program.

Business

1,013 GWh
of **energy savings**
achieved

18,000 +
projects completed
through the
**Small Business
Lighting Program**

424
projects completed
through the
**Energy Managers
Program**

13,000 +
projects taken on
through the
Retrofit Program

Residential

268 GWh
of **energy savings**
achieved

4.1 million
coupons redeemed
across the province

6.4 million
energy efficient
products purchased

122,000 +
installations through
the **Heating and
Cooling Program**

Through recommendations from customers, stakeholders, LDC working groups, and the evaluation, measurement and verification (EM&V) process, program enhancements are continuously implemented to help meet the needs of customers across the province. Key enhancements to business sector programs include improving the application process and adding new LED measures to the Retrofit Program. In addition, the Small Business Lighting Program was redesigned in 2015 as a new province-wide program. These changes enabled greater participation by expanding eligibility to businesses with an average annual demand of less than 100 kW from 50 kW and increasing the incentive from \$1,500 to \$2,000. Key enhancements to residential sector programs include exploring new incentives in the Heating and Cooling Program and adding new measures to the Coupons programs.

Through the IAP, 49 GWh of annual electricity savings were brought into service in 2015.

2015 was a year of transition for IAP, with a new mandate introduced on June 23, 2015. The mandate brought a new incentive stream consisting of an Energy Manager program for IAP customers. The Energy Manager stream was also quite active, with eight positions contracted in, covering about one-eighth of the IAP's customer base. The IESO was active in engaging customers to bring potential projects beyond the study phase and into project applications, and the program has seen more than 70 percent of all eligible customers participate in at least one of the incentive streams.

The total cost to deliver programs in 2015 was \$461 million; of that total incentive costs were \$346 million. To support LDCs in the delivery of conservation programs, the IESO provides central services to evaluate, promote, and research Ontario's conservation efforts. These services include EM&V, province-wide marketing, market research, capability building (including training), IESO infrastructure, and technical support. In addition, the IESO delivers a \$70 million LDC Innovation Fund to support innovation of new energy-efficient technologies and a \$25 million LDC Collaboration Fund to support program design and delivery among LDCs and working groups.

2015 Conservation Program Savings, Costs, and Participation

	Energy Savings (GWh)	Delivery Costs (\$M)	Incentive Costs (\$M)	Participation
Residential Sector Programs				
Coupons Program	156	9.8	28.9	6,460,758 products
Heating and Cooling Incentive	56	6.0	52.4	122,389 installations
New Home Construction Program	6	1.3	1.7	4,012 projects
Fridge and Freezer Pick-up Program	6	1.4	1.4	14,733 appliances
Peaksaver PLUS	0.3	7.1	12.4	530,963 devices
Business Sector and Industrial Programs				
Retrofit Program	673	31.9	91.7	13,358 projects
Small Business Lighting Program	50	10.3	29.2	18,643 projects
High Performance New Construction Program	22	3.6	10.3	168 projects
Existing Building Commissioning Program	1	0.7	0.6	11 buildings
Process and Systems Upgrade Program	123	12.6	56.2	12 projects
Industrial Accelerator Program	49	3.7	14.3	16 projects
Educational, Aboriginal, and Low-Income				
Home Assistance Program	16	5.2	16.8	16,526 homes
Aboriginal Conservation Program	4	1.6	5.8	1,586 homes
Audit Funding Program	26	2.2	3.6	358 audits
Energy Manager Program	36	4.5	5.2	424 projects
Monitoring and Targeting Program	1	0.4	0.3	2 projects
Program Enabled Savings	16	0	0	14 projects
Other				
Conservation Fund Pilots*	37.8	1.4	0.5	-
LDC Innovation Fund	-	0.8	-	-
LDC Collaboration Fund	-	0.1	-	-
IESO Central Services	-	2.2	-	-
2011-2014 Legacy Framework Projects	-	11.3	14.2	-
Total	1,281	115.0	345.5	

*Strategic Energy Management Pilot – Commercial, Strategic Energy Management Pilot – Industrial, Pay-for-Performance Pilot, Social Benchmarking Pilot



Program Evaluation and Cost Effectiveness

All programs funded through the IESO are evaluated by independent third-party program evaluators through its EM&V Protocol and Requirements. The evaluation process also provides valuable input into the overall performance of conservation programs, contributing to design enhancements and the creation of new incentives. Evaluation reports for the 2015 programs are available on the IESO website.

Two tests are used to evaluate the benefits and costs of Ontario's conservation efforts. The Program Administrator Cost (PAC) test measures the benefits (avoided energy and resource costs) and costs (all costs associated with delivering a program) from the perspective of the program administrator. The Total Resource Cost (TRC) test measures the benefits and costs from a societal perspective. For a program to be considered cost-effective, the benefits of the program must outweigh the costs at a ratio of greater than 1.0.

In addition to the TRC and PAC tests, the Levelized Unit Electricity Cost (LUEC) is used in comparing energy-efficiency programs with other electricity supply resources. This metric expresses delivery costs (all costs associated with designing, delivering and evaluating a program) as per unit of energy saved (expressed as \$/MWh) on an annualized basis.

The IESO evaluates the success of its conservation programs by looking at the performance of the entire portfolio. The portfolio includes a combination of programs with varying degrees of cost effectiveness, from less cost-effective programs delivered to low income customers to the very cost-effective business programs. The bulk of the savings generated from the portfolio (75 percent)

come from highly cost-effective programs. This approach reflects the need to serve all customer types, and takes into consideration the fact that some programs are pilot projects intended to garner lessons that can be applied to future programs, while other programs are intended to realize broader benefits, such as assisting low-income households.

2015 Cost Effectiveness Ratio

	TRC	PAC	LUEC (\$/MWh)
Residential Sector Programs	3.59	2.20	36.27
Commercial and Industrial Sector Programs	1.00	1.95	33.56
Educational, Aboriginal and Low-Income Programs	0.85	1.15	61.35
Portfolio Total	1.27	1.95	35.37

More information on program cost effectiveness can be found in the appendix.

Conservation Fund

The IESO's Conservation Fund has been bringing new innovative programs and technologies to market for over 10 years. Since 2011, the fund has committed \$22 million of support to more than 55 projects, leveraging an additional \$37 million in partner support. In 2015, eight projects were approved contributing to the overall energy savings for the province and generating new innovative conservation solutions for the future. A complete list of Conservation Fund projects can be found on the IESO website.

Electrale Innovation - Hydraulic Air Compressor (HAC) Demonstrator Project

Demonstrating an industrial-scale Hydraulic Air Compressor to prove its energy efficiency credentials.

This project will measure and verify the electricity savings of new HAC technology on an industrial scale. It is primarily for deep mining applications and will provide new opportunities for large industrial mining customers to learn more about how this technology can increase their energy efficiency. The project will demonstrate the basic commercial readiness of energy-efficient technology with potential applications in the fields of deep mine cooling, carbon capture, air conditioning and general industrial gas compression.



PowerStream - Residential Solar Storage Pilot (POWER.HOUSE)

Evaluating the conservation, electricity system, and utility business benefits of residential solar storage systems in Ontario.

This project provides an opportunity for an LDC to evaluate and quantify the various benefits (e.g. conservation, distribution system, provincial grid and utility business benefits) that residential solar storage can provide in an Ontario context. PowerStream has installed 20 residential solar storage units in its service area. Reports on conservation outcomes, electricity system benefits and LDC business models will be produced and shared publicly with all LDCs in the province.

LDC Innovation Fund

In 2015, the LDC Innovation Fund provided funding (\$70 million over six years) to LDCs, offering a new platform for pilot programs to be implemented in communities across the province and providing an opportunity for these pilots to develop into local, regional or province-wide programs.

Toronto Hydro's PUMPSaver Pilot

This pilot was designed to identify opportunities to optimize hydronic systems for medium to large multi-unit residential buildings and commercial facilities. Opportunities for projects and direct installation of equipment to replace balancing valves with variable frequency drives will help to reduce energy consumed by hydronic pump motors. Participation consisted of 10 buildings, six multi-unit residential buildings and four hospitals centres. The pilot demonstrated support of the energy savings and direct-install delivery model for this type of retrofit. The pilot concept has been transitioned to an approved local program that is now in market.

Canadian Niagara/Eastern ON/Algoma Residential Direct Mail Pilot

Canadian Niagara Power, Eastern Ontario Power and Algoma Power, with service provider, Ecofitt, developed a home energy kit pilot through the LDC Innovation Fund called "My Energy Kit". The pilot was implemented to test out market response to receiving free energy saving measures via a direct mail delivery model. Residential customers were offered a package of measures to be ordered online after filling out a survey about measures currently in their home. After completion of the on-line assessment, the LDCs mailed kits directly to residents with the measures to be self-installed. The suite of energy-efficient products included items to target lighting, plug load, weatherization measures and domestic hot water measures (for electric hot water heat). Preliminary market research conducted by the service provider indicated that 97 percent of customers were satisfied with the program and 69 percent of customers would have paid a portion of the retail price to participate. Canadian Niagara Power is currently investigating opportunities to develop a local program based on the success of this pilot. Verified savings results will be available in 2017.

Engagement and Awareness

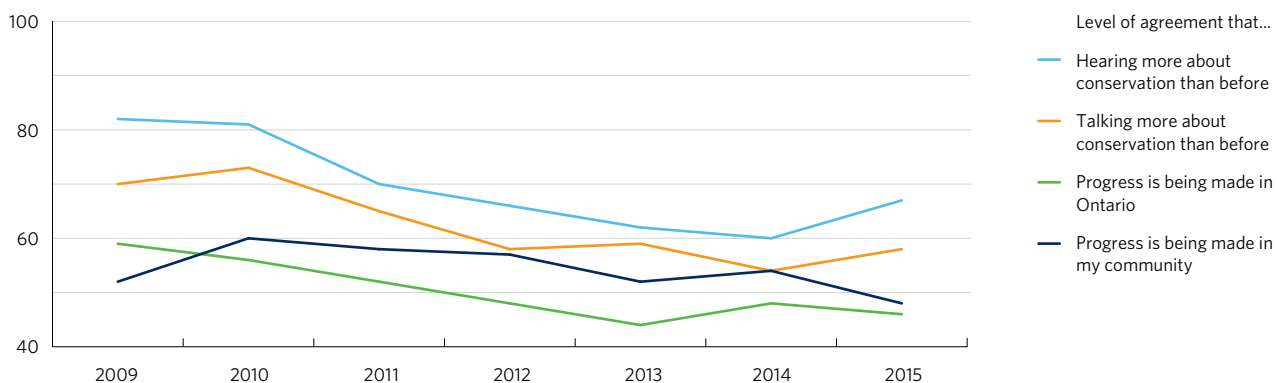
The IESO measures the effectiveness of its outreach efforts through regular market research activities, including customer and partner surveys, measuring the effectiveness of advertising campaigns and other feedback mechanisms such as focus groups. Measuring the overall engagement with energy efficiency provides the IESO and its partners with meaningful information to help design conservation programs and deliver incentives based on the energy needs of all Ontarians.



In 2015, overall engagement with energy efficiency among the Ontario public was consistent with prior years. Most (88 percent) people believe they know what to do to reduce energy use and believe that their own efforts are worthwhile but only about half

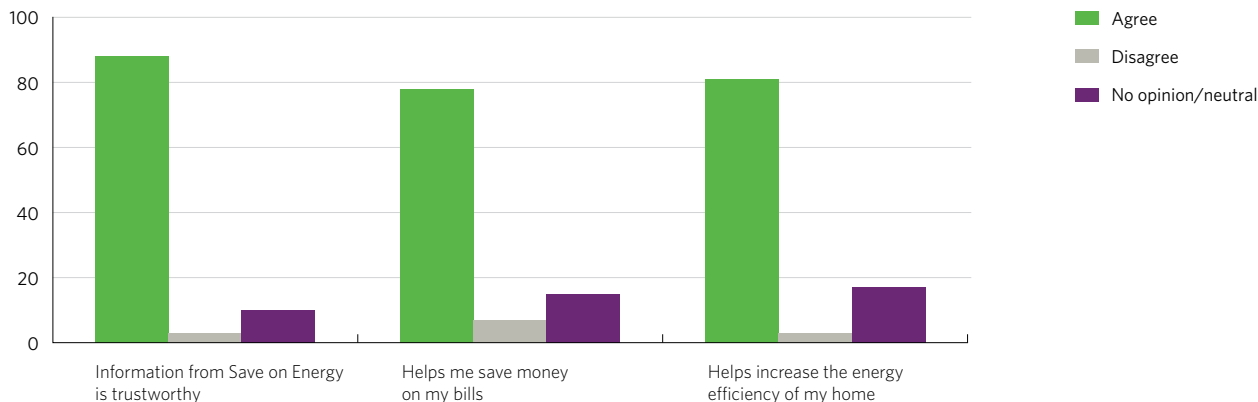
of Ontarians believe progress in using energy wisely is being made across the province. People who know about Save on Energy have a positive impression of the brand, saying that it is trustworthy, helps improve the energy efficiency of their homes and lower their electricity costs.

Visibility of Conservation in Ontario (percent)



Public Opinion of Save on Energy (percent)

Following the advice and participating in the Save on Energy program...



In 2015, 41 percent of Ontario households participated in one or more Save on Energy programs during 2015. One in four participated in multiple Save on Energy programs, a significant increase over 2014. The experience of participating in a program met or exceeded the expectations of 90 percent of residential customers. In fact the majority of customers (7 in 10) said the experience was so good that it made them more likely to participate again, which results in deeper savings, and made it very likely that they would recommend the program to others. This positive word of mouth will result in greater savings.

On the business side engagement is up from 2014 with eight out of 10 business decision makers and influencers being familiar with Save on Energy and agreeing that participation in programs can help their organizations save money. Most (80 percent) business decision-makers and influencers say their senior management pays at least some (50 percent) or a great deal (30 percent) of attention to electricity usage and a strong minority say electricity consumption is becoming a higher priority for their organizations. Just over half of organizations have started implementing a strategy to control energy use and about half say their organizations actively manage consumption. As might be expected education about cost reductions is seen to be the key to increasing engagement in the business sector. Of note, participating businesses receive incentives for roughly half of the eligible projects and more than 90 percent of organizations that participated in the province-wide Retrofit program said the experience met or exceeded their expectations.

One way to increase engagement is to increase the visibility of conservation. Over the 2015/2016 timeframe, the IESO launched a renewed Save on Energy brand combined with a new advertising campaign focusing on building engagement through inspirational and positive messaging around the multiple benefits that come with participating in energy-efficiency projects. The results have already made an impact in shifting people's perceptions and intentions about energy-efficiency programs in Ontario.



Building Capability

The IESO focuses on building the energy-efficiency capabilities of LDCs, channel partners, and electricity customers to achieve greater savings from Save on Energy projects, and to build their capacity to make conservation an integrated part of everyday business. In 2015 efforts were undertaken to expand the reach and scope of the IESO's capability-building initiatives with the objective to support LDCs achieving their CFF target through to 2020.

Expanding the role of capability building requires a solid evaluation methodology to validate the extent to which these initiatives are achieving desired outcomes. To that end, the IESO adopted a new program evaluation protocol for programs where the goal is to change behaviour, rather than equipment. This pioneering methodology was necessary as behaviour change will be a critical objective in meeting CFF targets. This trend is echoed across North America, where utilities are discovering that equipment change outs need to be accompanied by shifts in how that equipment is used. The establishment of this protocol creates the necessary foundation for growth in the role of capability building going forward.

Embedding Energy Management into the way Ontario Does Business

The IESO built capability in 2015 through the Energy Manager Program, which is delivered by LDCs. This program provides funding of up to \$80,000 per year to eligible Ontario industrial, commercial or institutional electricity customers to employ a qualified energy manager. Participating organizations commit to contractually agreed-upon reductions in electricity consumption in exchange for funding.

A key objective of the IESO's energy manager initiative is to see energy management adopted by host companies as a normal part of everyday business, and to demonstrate the value of energy management as a means of controlling variable costs such as those for electricity. By the end of 2015, there were 87 energy managers supported by the IESO and embedded in operations all across Ontario ranging from primary processing industrial operations and high technology processing facilities to university campuses and multi-site retail stores. Collectively, they achieved 358 GWhs in savings for which Save on Energy incentives were provided.

Furthermore, these energy managers helped generate 47 GWh in operational savings for which no incentive is paid. The IESO's 2015 commitment to energy manager funding and support is one of the largest of its kind in North America.

The IESO also provides significant support for the embedded energy managers to build their capabilities to deliver savings. This support comes in many forms, from training incentives, such as for accreditation as a "Certified Energy Manager" or as a "Certified Measurement and Verification Professional", to the hosting of an energy manager network and online hub which enables IESO-funded energy managers to share best practices.

In 2015, the IESO developed a plan to provide additional support tools for funded energy managers in the form of helpdesk and coaching support for complex projects. These additional supports are intended to support energy managers in achieving ambitious targets under the CFF starting in 2016, as the energy manager program is expanded to include energy managers for transmission

connected facilities and multi-site customers. Two types of energy manager were supported in 2015, including embedded energy managers who work with an individual industrial, commercial or institutional customer, and roving energy managers who serve multiple large customers in a defined geographic area.

Building Capability Through Training and Accreditation

The IESO also provided support to eligible electricity customers and channel partners through incentives to achieve various forms of accreditation. Supporting accreditation achieves two key objectives. First, it builds the quality and credibility of trained professionals engaged in energy efficiency related work. Second, accreditation helps to professionalize energy-efficiency-related work. Together, these give customers, their channels, and LDCs added assurance about the energy efficiency services they are provided. From 2011-2015, nearly 6,000 individuals participated in training programs incented or offered by the IESO.

2015

- **Building Operator Certification:**

67 Individuals trained on connecting operation and maintenance activity to energy consumption

- **HVAC Installation Optimization:**

172 Contractors and installers trained on increasing the quality of HVAC installations and maintenance

- **Energy Management Training:**

35 practitioners trained in the building energy management field

- **Certified Measurement & Verification Professional Training:**

51 individuals trained on the practice of energy efficiency measurement and verification

- **Certified Energy Manager Training:**

139 Energy Management professionals trained on energy management practices

- **Commissioning Agent Training:**

15 energy management professionals trained on implementing and managing the whole building commissioning process in new and existing buildings

- **Low-Rise Residential Builder and Construction Trades Training**

- **Compressed Air Challenge – Compressed Air Training**

- **Dollars to \$ense Energy Management Workshops**

Extending the Conservation Sales Force Through Channel Engagement

The IESO continued to build the market's capability in 2015 by providing support to the many delivery channels that influence customer decision-making. Contractors, equipment distributors and retailers all play significant roles in influencing the purchasing decisions of their customers. Channels therefore make strong allies when it comes to driving Ontario's adoption of energy efficiency. The capability of delivery channels that provide lighting products and services in Ontario, for example, is very high. They know the value of energy efficiency and are strong promoters of Save on Energy programs.

The IESO's efforts in 2015 focussed on technologies with significant savings potential, such as variable frequency drives, and compressed air, and the channels involved in their manufacture and distribution. Activities included increasing awareness of Save on Energy incentives, training, supporting LDCs in their channel-partner relationships, and speaking at channel-related events.

For example, in April 2015, 27 representatives from compressed air suppliers from across Ontario attended a three-day compressed air certification program which was very well received and enhanced the participants' abilities to conduct compressed air audits eligible for the Audit Funding program.

The IESO continued to build the market's capability in 2015 by providing support to the many delivery channels that influence customer decision-making.

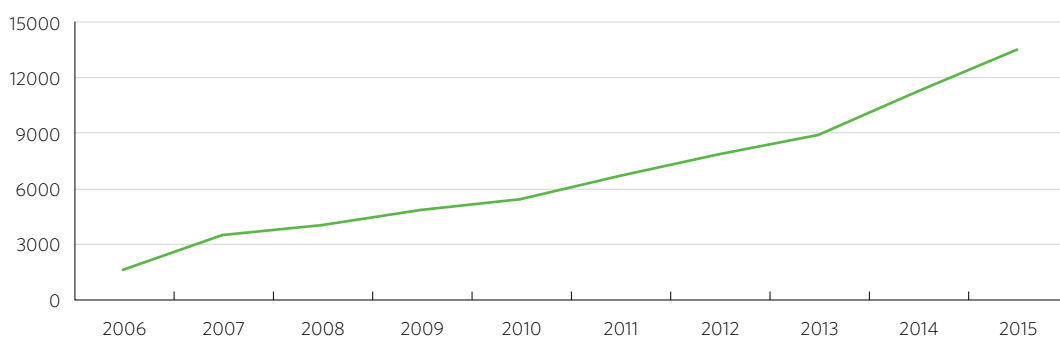


Conservation Programs Savings to Long-Term Energy Plan Target

Savings from the CFF contribute to the overall energy and demand savings for the province's energy target set out in the Long-Term Energy Plan (LTEP). The 2013 LTEP includes a conservation target of 30 TWh in reduced electricity consumption by 2032.

Savings Net Persisting Energy Savings at the Generator Level (GWh)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Energy Efficiency	1,621	3,501	4,037	4,770	5,291	6,631	7,784	8,832	11,271	13,523
Demand Response	0	0	1	89	148	71	88	84	0	7
Total	1,621	3,501	4,037	4,859	5,439	6,701	7,872	8,916	11,271	13,530

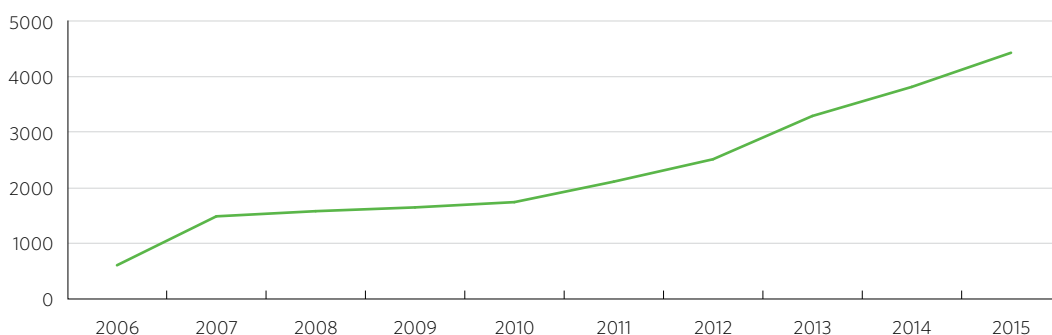


In addition to program savings delivered by the IESO and LDCs, savings from Codes and Standards and activities undertaken by other organizations in Ontario which result in electricity savings also contribute towards the long-term 30 TWh target.



Savings Net Persisting Peak Demand Savings at the Generator Level (MW)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Energy Efficiency	289	780	905	1,010	1,201	1,569	1,613	1,830	2,292	2,567
Demand Response	319	710	678	641	545	546	906	1,469	1,530	1,872
Total	608	1,490	1,583	1,651	1,746	2,115	2,519	3,299	3,823	4,439



Appendix

Codes and Standards

Codes and standards are a powerful, cost-effective tool for achieving energy savings and for building a culture of conservation in Ontario. All savings from codes and standards are allocated towards achievement of the provincial conservation target. Several changes to codes and standards occurred in 2015.

Ontario Energy-Efficiency Regulation

Ontario's Energy-Efficiency Regulation is amended regularly to update efficiency requirements and/or test methods for a wide range of products. In December 2015, following a public review period, the Ontario government amended the province's Energy Efficiency Regulation to include new or enhanced minimum efficiency standards for 18 products, such as commercial refrigeration equipment, commercial gas boilers, water chillers, furnace fans, geothermal heat pumps and air conditioners. Based on available energy data from the United States Department of Energy and a third party study, this amendment is estimated to save 2.2 TWh/year of electricity in 2032, equivalent to taking 226,000 homes off the grid. It is also estimated to save 9.7 petajoule/year of natural gas and oil in 2032, equivalent to the total energy consumption of 118,000 homes. This amendment came into effect on January 1, 2016.

In 2015, the Ministry of Energy proposed legislative amendments to the Green Energy Act, 2009 to enable regulating the water efficiency of products and appliances that consume both energy and water.

In 2015, the IESO, in collaboration with the Ministry of Energy, commissioned a study to assess electricity savings from product standards (according to the Energy-Efficiency Regulation) in Ontario. The study was completed in January 2016 and included:

- Best-practice recommendations to update the IESO's 2013 standards analysis methodology, and;
- Electricity savings estimates for selected 40 products (35 residential and 5 commercial) regulated in Ontario with compliance dates between January 1, 2013 and January 1, 2018 as well as for potential future standards for these products beyond 2018 to 2035.

Ontario Building Code 2012

While there were no changes in 2015, Ontario's 2012 Building Code came into effect on January 1, 2014, with certain energy efficiency related provisions becoming effective on January 1, 2014, 2015 and 2017. A brief overview of the over 700 changes is available online. The building code is a forward-looking document, updated approximately every five years, and an important policy tool in implementing key priorities of the Ontario government.

By January 1, 2017, the new building code will require commercial buildings to be 13 percent more energy efficient and houses to be 15 percent more energy efficient than if built to the standards in the 2006 building code. Taking a longer-term perspective, by adhering to the new edition of the building code, new houses will consume only 50 percent of the energy consumed by houses built according to pre-2006 building codes, and large buildings will consume only 65 percent of pre-2006 level buildings.

Ontario is the first jurisdiction in Canada to include limiting greenhouse gas emissions and peak demand on the energy infrastructure as formal sub-objectives in its building code. Together with the increased energy-efficiency requirements of the code, these changes demonstrate Ontario's continuing leadership among its North American peers in making efficient energy performance integral to its building code.

National Energy Code of Canada for Buildings 2015

In 2015, National Research Council Canada published the National Energy Code of Canada for Buildings 2015 (NECB 2015). The NECB 2015 was developed by the Canadian Commission on Building and Fire Codes in collaboration with Natural Resources Canada, which sets out technical requirements for the energy efficient design and construction of new buildings. The NECB 2015 includes over ninety changes improving the overall energy performance of buildings over the NECB 2011 edition.

Other Influenced Conservation

Other-Influenced conservation is the result of conservation activity by organizations and programs not funded through the IESO that result in electricity savings. The IESO has not performed a formal evaluation of this data. The numbers and level of accuracy will vary with each organization's evaluation methodology.

2015 Other Influenced Conservation

	Energy Savings (GWh)	Demand Savings (MW)
Federal Government*	84	25
Gas Utilities	35	11
Industrial Conservation Initiative**	6	1,103
Capacity Based Demand Response Program	0	526

* Includes the estimated impacts in Ontario in 2015 of activities such as energy-efficiency training in the buildings sector (Dollars to Sense training), ENERGY STAR Portfolio Manager Benchmarking tool; impacts from programming in the industrial sector, including training and the Canadian Industry Program for Energy Conservation; ENERGY STAR and R-2000 home labelling. It does not include code impacts.

** Formerly referred to the Global Adjustment Mechanism (GAM) High-5, the components of the Global Adjustment and the allocation methodology are set out in Ontario Regulation 429/04 (Adjustments under Section 25.33 of the Act) made under the Electricity Act, 1998.

Cost-Effectiveness Tests

Component	Program Administrator Cost (PAC) Test	Total Resource Cost (TRC) Test
Energy Avoided Costs	Benefit	Benefit
Additional Resource Savings	-	Benefit
Incremental Participant Costs	-	Cost
Program Administration Costs	Cost	Cost
Incentive Payments	Cost	-
Bill Savings	-	-

Total Resource Cost Test Calculation

TRC Test Net Benefit (\$) = PV avoided supply cost - (PV incremental equipment cost + PV program cost)

Or (to determine net benefit as a ratio):

TRC test (ratio) = PV avoided supply cost / (PV incremental equipment cost + PV program cost)

Incentive costs are not included in the determination of the total resource cost test net benefit because incentives are a transfer of funds from the program-sponsoring organization to participating customers and, consequently, do not directly enhance the aggregate net benefit from a societal perspective.

Program Administrator Cost Test Calculation

PAC test net benefit (\$) = PV avoided supply cost - (PV incentive cost + PV program cost)

Or (to determine net benefit as a ratio):

PAC test (ratio) = PV avoided supply cost / (PV incentive cost + PV program cost)

Levelized Unit Electricity Cost

LUEC (\$/MWh) = PV (incentive cost + program cost) / PV lifetime MWh savings

2015 Cost Effectiveness Ratio

	TRC	PAC	LUEC
Residential Sector Programs	3.59	2.20	36.27
Coupons Program	11.21	2.39	23.48
Heating & Cooling Incentive	1.80	2.17	63.17
New Home Construction Program	1.26	1.88	42.12
Fridge & Freezer Pick-up Program	0.52	0.49	109.36
Business Sector & Industrial Programs	1.00	1.95	33.56
Retrofit Program	1.04	2.68	24.30
Small Business Lighting Program	0.77	0.70	106.45
High Performance New Construction Program	2.27	2.51	36.73
Existing Building Commissioning Program	0.21	0.18	360.40
Process and Systems Upgrade Program	0.85	1.20	52.51
Industrial Accelerator Program	0.80	1.26	47.14
Educational, Aboriginal, & Low-Income Programs	0.81	1.07	69.70
Home Assistance Program	1.01	0.88	88.71
Aboriginal Conservation Program	0.86	0.75	105.28
Audit Funding Program	1.07	1.50	37.23
Energy Manager Program	0.72	1.52	47.01
Monitoring & Targeting Program	0.08	0.08	482.49

Province-wide Programs



Province-wide programs are delivered through LDCs under the Save on Energy banner and span across all sectors. These programs offer a variety of incentives for energy-efficient upgrades and purchases. More information on Save on Energy and these programs can be found at saveonenergy.ca.

Residential Sector Programs

Coupons: Offers in-store and online coupons to help customers save on a wide range of energy-efficient products

- The Coupon program has been enhanced to include more energy-efficient products and with new more cost-effective coupon values introduced in 2016

Heating and Cooling Program: Offers incentives for homeowners to improve the overall efficiency of their HVAC systems

New Home Construction: Encourages new home builders to build energy-efficient homes that provide home buyers with the benefits of increased comfort and energy-efficient features

Fridge and Freezer Pick-up Program: Facilitates the removal of older, inefficient appliances including secondary refrigerators, freezers, window AC units and portable dehumidifiers.

- This program was discontinued on December 31, 2015

Business Sector Programs

Retrofit: Offers commercial businesses incentives to help with upfront costs of purchasing energy-efficient equipment to improve the overall efficiency of buildings

- The Retrofit program was enhanced by offering new incentive rates and simplifying the application process

Small Business Lighting: Qualifying businesses receive incentives for energy-efficient lighting upgrades.

- The Small Business Lighting program was re-designed to broaden participation by enhancing the participation criteria

High Performance New Construction: Provides design assistance and incentives for building owners and planners who design and implement energy-efficient equipment in their new spaces

Existing Building Commissioning: Funding is available for hiring an expert to analyze the chilled water system in buildings and to make recommendations for increasing its energy efficiency

Process and Systems: Helps organizations with complex systems and processes to identify, implement and validate energy-efficiency projects from start to finish

Educational, Low-Income, and Pilot Programs

Home Assistance Program (Low-Income): Helps qualified homeowners, tenants and social and/or assisted housing providers improve the energy efficiency of their homes

- Program has been updated to include new measures and a strengthened customer education component was introduced for 2016

Aboriginal Conservation Program

- This program was completed in 2015 after providing energy conservation measures to 45 First Nations communities. LDCs are now delivering local programs to help meet the needs of First Nation and Métis communities

Audit Funding: Offers customers incentives to complete energy audits that assess the potential for energy savings through equipment replacement, operational practices, or participation in demand response initiatives

Energy Managers: Energy managers help companies take control of their energy usage by identifying various options for saving energy in facilities

- The Energy Managers Program introduced two new streams for participation and was opened up to multi-site industrial customers

Monitoring and Targeting: Provides facilities with historical energy consumption performance data to analyze and set energy targets

LDC Local Programs – Approved in 2015

LDC Program Name	Description
Horizon Utilities Home Energy Report	Behavioural program to stimulate residential customers to reduce their electricity use by providing them with insights on the current electrical usage in their home.
Hydro One Home Energy Report	Behavioural program to stimulate residential customers to reduce their electricity use by providing them with insights on the current electrical usage in their home.
PowerStream Home Energy Report	Behavioural program to stimulate residential customers to reduce their electricity use by providing them with insights on the current electrical usage at their home.
PowerStream and Collus Business Refrigeration	Funding provided for free facility audits and refrigeration equipment upgrades to non-residential customers that have commercial product refrigeration.
Hydro One First Nation Conservation Program	Helps qualified on-reserve First Nation customers improve the energy efficiency of their homes and manage their energy use more effectively. In-home energy assessment where participants are also provided with education on home energy management, electricity and natural gas conservation behaviour, time-of-use rates and the new energy-efficiency equipment they receive.

LDC Pilot Programs – Approved in 2015

LDC Pilot Name	Description
Niagara Peninsula Energy Inc. Hotel/Motel	Engagement with hotel/motel sector; to present case for conservation and energy efficiency to drive program uptake in sector.
Canadian Niagara Power/Algoma Power Residential Direct Mail	Provide residential customers with customized Energy Savings Kits to help reduce energy consumption and lower utility bills.
Westario Residential Direct Install	Provide residential customers with free home energy audit, recommendations and direct installation to increase awareness of and help reduce household energy consumption
Toronto Hydro Electric System Limited Joint Low-Income	Toronto Hydro and Enbridge Gas to deliver low-income Home Assistance Program and low-income Home Winterization Program in order to validate cost savings and feasibility of joint procurement of programs.
Horizon Utilities ECM Furnace Fan Residential Upstream	Test upstream sales points and incentive levels required to encourage electronically commutated motors (ECM) fan retrofits as end-of-life replacements and retrofit upgrades for permanent split capacitor (PSC) fans on existing home furnaces.
Hydro One Smart Thermostat Dynamic Electricity Pricing (Residential)	Measure the impact of Energate thermostats with various dynamic rate structures using instantaneous kWh feedback to reduce energy consumption and costs.
Hydro One Heat Pump	Piloting incentives for residential customers to install air source heat pumps to remove need for residential electric space heating.
Hydro One Heat Pump Water Heater	Promoting the use of air-source heat pump water heaters in residential homes in order to provide savings on electricity consumption.
CustomerFirst Home Energy Assessment and Retrofit	Piloting assessor to visit customers to provide a report outlining different options to conserve energy in electrically heated homes.
EnWin Utilities Ltd. Residential Ductless Heat Pump Pilot	EnWin to pilot incentives and financing options for supply and installation of ductless heat pump (DHP) as air source.

