

COUPONS

PROCESS & SYSTEMS

Industrial Accelerator Program

*peaksaver*PLUS

HEATING & COOLING INCENTIVE

DEMAND RESPONSE

RETROFIT PROGRAM

COLLABORATION VALUE EFFECTIVENESS

SMALL BUSINESS LIGHTING

FRIDGE & FREEZER PICKUP

AUDIT FUNDING

EXISTING BUILDING COMMISSIONING

HIGH PERFORMANCE NEW CONSTRUCTION

NEW HOME CONSTRUCTION

Monitoring & Targeting

Energy Managers

2011-2014

Conservation Results Report

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Message from the Vice-President, Conservation and Corporate Relations

The Independent Electricity System Operator (IESO) is pleased to provide the 2011-2014 results report outlining our successes from Ontario's energy saving and demand management programs and other conservation activities.

The results demonstrate the efforts of all Ontarians in participating in initiatives to improve the efficiency of their homes or business operations and the commitment from all sectors in pursuing energy efficiency to help save on annual electricity costs and help the province reduce its demand for electricity. The results achieved clearly demonstrate the collaborative approach between the IESO, Local Distribution Companies (LDCs) and customers in the delivery of programs.

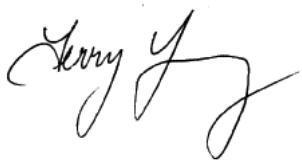
Since 2006, Ontario has saved 9.9 billion kilowatt-hours (kWh) of electricity through both programs and changes to codes and standards.

Between 2011 and 2014 the suite of saveONenergy programs exceeded the provincial energy saving target, achieving 6,553 gigawatt-hours (GWh) of energy savings, and achieved 70 percent of the peak demand reduction target, generating 928 megawatts (MW)¹ of demand reduction for the province.

Energy-saving efforts are also seen in the piloting of new innovative technologies, programs and projects brought forward through the collaboration of our partners and customers. These initiatives provide further opportunities to promote energy efficiency in communities across the province.

The IESO is committed to continuing to collaborate with our partners to create cost-effective programs to meet provincial and local energy needs. We look forward to working together in the new Conservation First Framework – encouraging collaboration and building on past experiences to bring new innovative ideas and solutions to help customers better manage their overall energy costs.

I hope you enjoy reviewing this report.



Terry Young
Vice-President
Conservation and Corporate Relations
Independent Electricity System Operator

¹ LDC savings reported at the household or business (end user) level rather than at the system (generator) level.

Executive Summary

Energy conservation is a key resource in helping customers save energy and helping the province reduce its demand for electricity. Using energy wisely is important as conserving energy is the cleanest and most cost-effective energy resource. The benefits of energy conservation or energy efficiency are seen in a variety of ways. In addition to saving on annual energy costs, customers can experience increased comfort in their homes and improved productivity in their businesses.

On January 1, 2015 the IESO and the Ontario Power Authority (OPA) merged combining the mandates of both. The new IESO reliably operates the electricity grid in real time, as well as puts conservation first to ensure a dependable, sustainable system well into the future.

The IESO works collaboratively with LDCs and other partners to deliver conservation programs throughout Ontario. Its mandate is to ensure residents, businesses, hospitals, schools and others have access to cost-effective tools to help them better manage their electricity use while improving the efficiency of communities across the province.

In January 2011, a suite of programs were introduced under the saveONenergy brand offering energy savings and demand reduction initiatives to residents and businesses across the province. Administered by the LDCs, these programs offered a variety of incentives for energy efficiency and demand response activities.

In addition to saveONenergy programs, information on other initiatives covered in this report include:

- The IESO's Conservation Fund, which supports the next generation of innovative energy solutions by supporting and bringing to market new projects and technologies that contribute to energy savings for the province and inform new policies and programs.
- Codes and standards, which contribute to province-wide energy savings by providing minimum energy performance standards for products and new buildings.
- Time-of-Use rates, which provide customers with a new tool to help manage their annual electricity costs.
- Market research on the engagement of energy efficiency, which provides insight into customer behaviour to help inform new strategies on engaging Ontarians in energy efficiency and other energy conservation activities.

All of these initiatives 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 terawatt-hours (TWh) in reduced electricity consumption by 2032. The government forecasts that to achieve this target, 8.7 TWh of savings need to be achieved between 2015 and 2020 through programs enabled by the Conservation First Framework beginning in 2015. Of the total target, 7 TWh will be delivered through our collaborations with LDCs across the province. The remaining 1.7 TWh will come from the group of large transmission connected consumers. The framework includes cost-effective programs covering all sectors and encourages new opportunities for local, regional and province-wide programs.

Encouraging Energy Efficiency

Since 2006, the province has been successfully engaging customers in the value of energy efficiency through many activities, including the suite of programs launched in 2011 under the saveONenergy brand. The programs contribute to engaging individuals on cost-effective ways to improve their living and work spaces while saving on annual energy costs and helping the province sustain its energy needs and reduce the need to build new generation in the future.

The on-going delivery of energy-efficient tools and resources is needed to ensure all Ontarians are considering energy efficiency today and in the future. The efforts of promoting energy conservation are constant. Energy-efficiency programs like saveONenergy and other conservation activities directly influence consumer behaviour in relation to how they use electricity in their homes and businesses. These programs are imperative to helping customers understand how their actions impact their communities and why it's important to use energy wisely.

Programs targeting homes and businesses across the province are an important resource to improve the efficiency of our communities. Customers can benefit from energy-efficient upgrades in their home and workplace as well as their local hospital, school or arena.

Improving the overall efficiency of business operations can lead to increased productivity and overall comfort of individuals using the facilities and reduced maintenance and equipment costs for business owners. Homes can also benefit from implementing energy efficiency into their daily routine through upgrades to home energy systems to improve air quality and temperature control and replacing inefficient products with more energy-efficient options.

2011-2014 saveONenergy For Home Program Highlights

Residential programs help consumers better manage energy in homes across the province. The 2011-2014 programs included incentives for a range of conservation initiatives, from removing old inefficient appliances to providing coupons that encouraged the purchase of energy-efficient products.

Between 2011 and 2014, residential programs saved 1,169 GWh of energy and 253 MW of demand in the province. This is the equivalent to powering approximately 122,000 homes for one year.

The **Coupons** program offers in-store and online coupons to help customers save on a wide range of energy-efficient products including light-emitting diode (LED) bulbs, power bars and more. Over 9.8 million products have been purchased with LEDs accounting for more than 4.9 million.

The **Fridge & Freezer Pickup** resulted in more than 130,000 appliances being collected from households across the province and recycled in an environmentally friendly manner. The program offered a free pickup of older secondary refrigerators, freezers, window air conditioners and portable dehumidifiers. The success of this program was demonstrated in fewer eligible appliances remaining in Ontario by 2014, as demonstrated by a decline in participants.



Over 9.8 million
products
purchased using
saveONenergy
coupons

The **Heating & Cooling Incentive** resulted in over 389,000 installations of energy-efficient heating, ventilation and air conditioning (HVAC) systems -- making it easy for homeowners to improve the overall efficiency of their systems. The initiative was successful through the participation of approved Heating, Refrigeration and Air-conditioning Institute qualified contractors promoting the incentives to customers. Participation increased 22 percent from 2011 to 2014.

The **peaksaverPLUS** program helped residents better manage their electricity use during periods of peak demand through the installation of load control devices that automatically reduced electricity from certain appliances, such as air conditioners. The **peaksaverPLUS** program was a successful tool in helping to get energy-saving information into the hands of customers across the province. The program included energy displays that helped drive participation and build awareness of energy efficiency in Ontario.

To address the needs of all electricity consumers, programs are available for low-income households and Aboriginal communities across the province. Energy and demand savings from these programs are included in the province-wide results. These programs focus on engaging with the community to address specific electricity needs and offer energy-efficiency programs tailored for their use. The participation and savings achieved can be found in the Appendix.

2011-2014 saveONenergy For Business Program Highlights

Business programs are available to all sectors across Ontario to help customers reduce operating costs and save energy. The saveONenergy business programs were the main driver of savings from the 2011-2014 programs accounting for 58 percent of the overall energy savings achieved.

Between 2011 and 2014, Business programs saved 4,077 GWh of energy and 389 MW of demand in the province.

The **Retrofit** program was a strong performer during the 2011-2014 period and the dominant source of savings for the business program, contributing to 78 percent of the annual savings. The program provides commercial businesses with incentives to help with upfront costs of purchasing energy-efficient equipment such as lighting, motors and variable frequency drives and for installing new control systems to improve the overall efficiency of buildings.



**Retrofit program
contributed 78%
of total business
program savings**

The **Small Business Lighting** program resulted in the installation of over 97,000 LEDs, helping small businesses improve the quality and efficiency of their lighting. The 2011-2014 province-wide program successfully reached approximately 45 percent of small businesses with general service accounts of less than 50 kW in Ontario. The program will be redesigned as a new province-wide program in the 2015-2020 Conservation First Framework.

The **New Home Construction** program encourages new home builders to build energy-efficient homes that provide home buyers with the benefits of increased comfort and energy-efficient features. Participation increased by 87 times from 2011 to 2014 with the most significant increase happening from 2013 to 2014.

Process and Systems helps organizations with complex systems and processes to identify, implement and validate energy-efficiency projects from start to finish. The Process and Systems programs helps industrial or institutional organizations find energy efficiencies that may not be as straight forward as a retrofit project.

Other business programs contributing to the 2011-2014 savings include; the Audit Funding program helping businesses identify the potential for energy savings in the operations and equipment; Existing Building Commissioning offers incentives for new commercial, institutional and industrial buildings to implement energy-efficient equipment; and Demand Response reducing the demand for electricity. Savings and participation information for all programs can be found in the Appendix.

Industrial Accelerator Program

The Industrial Accelerator Program (IAP) has been engaging transmission-connected customers in energy-efficiency programs since 2010. To date, more than 70 percent of these customers have participated in an element of the program. The program lays the foundation for conservation projects, by raising customer awareness of the possibilities that exist to improve their operations and to study the efficiency of projects that go into service.

While many energy-efficiency projects got off the ground and were brought into service in the 2011-2014 timeframe, the majority of IAP projects were to study and provide a detailed review of potential projects. The IESO will be working hard to convert these into viable project applications in the 2015-2020 timeframe.

Value of Conservation

The IESO is building a culture of conservation and ensuring the success of conservation and energy efficiency through its market research activities, marketplace training and capability building activities, piloting of new programs through the Conservation Fund, and through the evaluation, measurement and verification of all conservation programs.

Engagement of Energy Efficiency

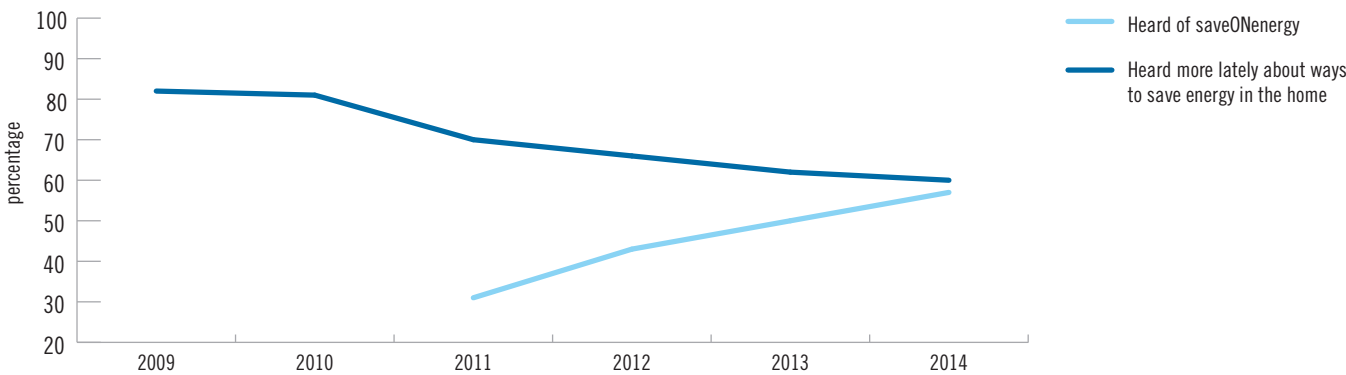
The IESO conducts market research to monitor consumer behaviour towards energy conservation and identify key influencers driving the culture of conservation across the province.

Factors such as support for sustainability through province-wide programs, and customer willingness to invest in energy-efficient products for the home have been making a positive contribution to engagement with energy efficiency. Others such as the effect of a low profile for energy efficiency have been reducing awareness causing overall engagement to decline slightly.

Monitoring the evolution of the culture of conservation helps inform strategies for increasing engagement in energy efficiency and one strategy for this has been promoting saveONenergy as a credible voice of energy conservation and efficiency. This had contributed to the recognition of the brand itself even though engagement in the public profile has decreased slightly over the past five years.

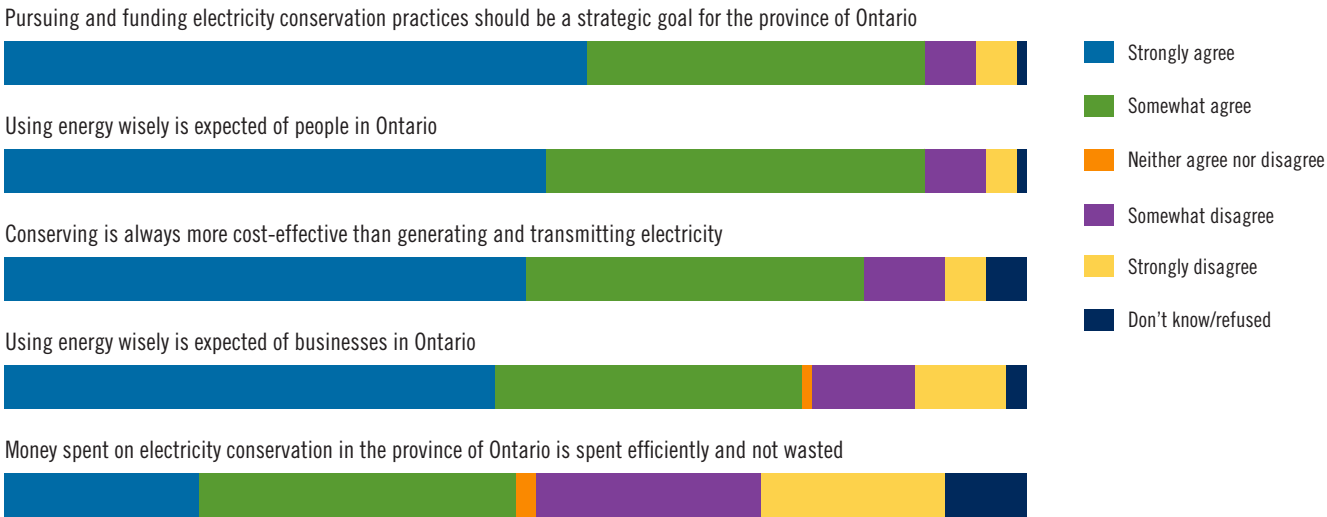


Comparing the Profile of Energy Efficiency with Awareness of saveONenergy



Individuals have expressed a need for understanding how they can benefit from saving energy, how their electricity use compares to others within their community and how it impacts the overall consumption in the province. The insights gathered as shown in the graph below will help inform future saveONenergy program and marketing efforts.

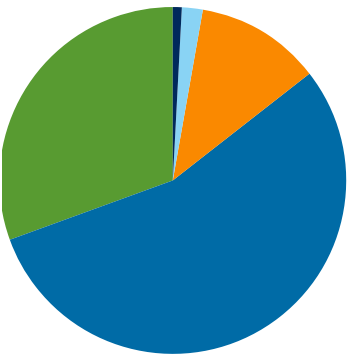
Ontarians Agree That Energy Conservation should be a Strategic Goal for the Province



Findings within the business sector suggest that the opportunity to increase engagement is to relate energy efficiency to core business operations and strategies. Businesses respond to benefits that will help them achieve their overall organizational goals, and the savings realized by participating energy efficiency programs can improve the overall operations.

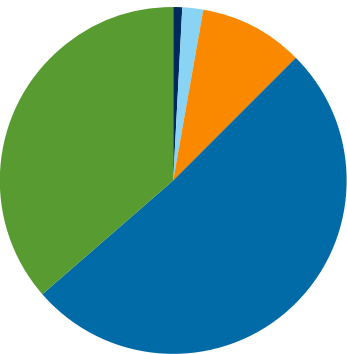
Electricity Management Attention and Knowledge Among Business Customers

Attention Paid to Reducing Electricity



- Very knowledgeable
- Somewhat knowledgeable
- Only a little bit knowledgeable
- Not at all knowledgeable
- Don't know

Knowledge about Reducing Electricity



- A great deal of attention
- Some attention
- Little attention
- No attention
- Don't know

Verification of Savings

All energy efficiency and demand response programs funded through the IESO in 2011 to 2014 were evaluated using the IESO’s Evaluation Measurement & Verification (EM&V) protocols, which are widely regarded as an industry best practice. The IESO uses independent evaluation third-party program evaluators to verify and assess the resource savings, cost-effectiveness and market impacts of each program. Detailed evaluation reports are produced by the program evaluators and help enhance current program offers and inform future conservation programs.

Detailed EM&V reports can be viewed on the IESO website at www.powerauthority.on.ca/opa-conservation/conservation-information-hub/evaluation-measurement-verification/reports

Evaluating Cost Effectiveness

Cost-effectiveness tests evaluate the benefits and costs of Ontario's conservation efforts. Two tests, the Total Resource Cost (TRC) and the Program Administrator cost (PAC) test, along with the levelized delivery cost metric, have been used to assess the cost-effectiveness of all programs. For a program to be considered cost effective, the net benefits must be greater than total costs.

The IESO evaluated the success of its 2011-2014 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 low income programs to the highly cost effective business programs. This approach takes into consideration the fact that some programs are pilot projects intended to garner learnings that can be applied to future programs, while other programs are intended to realize broader benefits, such as assisting low-income households.

The TRC assesses costs and benefits from a societal perspective. It includes the participant and program administration costs, the verified net electricity savings, as well as other resource savings such as natural gas and water.

Net benefits are defined as "avoided costs". This represents the benefit of preventing or deferring the provision of an extra unit of supply. Supply costs include generation, transmission and distribution costs. Subtracting the costs from the benefits provides the net benefits.

The PAC test measures the benefits and costs of conservation efforts from the perspective of the program administrator. It includes the incentive and program administration costs and the verified net electricity savings.

The net benefit of each test may be expressed either in absolute terms (where the net benefit is the difference between the present value (PV) of both the benefits and the costs) or as a ratio (where the net benefit is determined by dividing the PV of the benefits by the PV of the costs). A net benefit ratio greater than 1.0 indicates that benefits exceed costs from the perspective of each particular cost-effectiveness test.

Cost- Effectiveness Component Inputs

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

The tables below represents the 2011-2014 cost effectiveness of LDC and non-LDC delivered programs. Cost effectiveness is considered on a portfolio wide basis.

Total Resource Cost Test (net benefit to society)

Program	Benefit (\$)	Costs (\$)	Ratio
Consumer Program	578,478,622	445,581,511	1.3
Low Income Program	24,483,785	39,341,559	0.6
Aboriginal Program	2,811,583	2,560,853	1.1
Business Program	1,420,636,536	1,115,194,314	1.3
Industrial	94,177,246	108,028,952	0.9
Non-LDC Demand Response	36,746,000	22,685,654	1.6
Non-LDC Industrial Program	9,302,317	15,818,377	0.6
Totals			
LDC Portfolio	2,120,587,772	1,710,707,189	1.2
LDC & Non-LDC Portfolio	2,166,636,088	1,749,211,220	1.2

Program Administration Cost Test (net benefit to program administrator)

Program	Benefit (\$)	Costs (\$)	Ratio
Consumer Program	597,929,518	364,493,557	1.6
Low Income Program	24,481,035	39,593,746	0.6
Aboriginal Program	2,810,945	2,560,853	1.1
Business Program	1,451,071,373	524,883,777	2.8
Industrial	94,177,246	70,014,933	1.3
Non-LDC Demand Response	36,746,000	34,842,619	1.1
Non-LDC Industrial Program	9,285,676	19,506,673	0.5
Totals			
LDC Portfolio	2,170,470,117	1,001,546,867	2.2
LDC & Non-LDC Portfolio	2,216,501,793	1,055,896,159	2.1

More information on calculating cost effectiveness may be found in the Appendix.

The Minister of Energy's March 31, 2014 Direction regarding the 2015-2020 Conservation First Framework mandates a positive cost-benefit analysis of each CDM plan and each Province-Wide CDM Program and Local Distributor CDM Program utilizing the OPA's (now IESO's) Cost Effectiveness Guide. Programs targeting on-reserve First Nation customers, low-income customers and designed for educational purposes are evaluated but need not demonstrate a positive cost-effectiveness.

Building Awareness and Capability in the Marketplace

The IESO focuses on building the energy-efficiency capabilities of LSCs and channel partners to drive saveONenergy program participation, realize energy savings and build the culture of conservation in Ontario.

Between 2011 and 2014, many initiatives existed to engage and support the marketplace in energy efficiency and energy conservation activities. These activities are important for continuing to encourage innovative ideas and increasing expertise within the electricity industry.

Marketplace Training

Capability building and training activities evolved during the 2011-2014 period, focusing more on the behavioural impacts on energy use, providing more access to technical expertise, building relationships with key partners and customers, and supporting LDCs in the delivery of programs to customers. Key highlights include:

- Increased marketplace access to technical expertise through the sponsorship of Energy Managers. Energy Managers are making a significant and cost-effective contribution to Conservation and Demand Management in Ontario and it is through initiatives like Energy Managers, that individuals are able to make more strategic energy management decisions and implement a comprehensive plan to effectively reduce their overall energy consumption. In 2011-2014, Energy Managers included:
 - Embedded Energy Managers (working with an individual customer)
 - Roving Energy Managers (connecting with customers in a defined geographic area)
 - Energy Efficiency Services Providers (market-sector focused energy managers)
- The IESO worked to enhance the skills and promote certifications for Energy Managers such as Certified Energy Managers certification (mandatory for IESO-funded Energy Managers) and Certified Measurement and Verification Professional certification. Commissioning Agent training and Energy Management Training was also provided.
- Building capability through training and engagement with key channel partners and customers to develop and maintain relationships with associations, contractors and transmission-connected customers, municipal customers and others.
- Evolved IESO's relationship with LDCs from transactional to collaborative through supporting LDCs in the delivery of conservation programs to customers. The IESO delivered LDC support services, dedicated account managers, tailored training sessions and webinars.



Over 5,000 individuals have participated in training programs between 2011 and 2014 offered across the province. These programs and courses include:

- Building Operator Certification
- HVAC Installation Optimization
- Energy Management Training
- Certified Measurement & Verification Professional Training
- Certified Energy Manager Training
- Commissioning Agent Training
- Low-Rise Residential Builder and Construction Trades Training
- Compressed Air Challenge – Compressed Air Training
- Dollars to Sense Energy Management Workshops

More information about these training offerings can be found in the Appendix.

Supporting Innovation

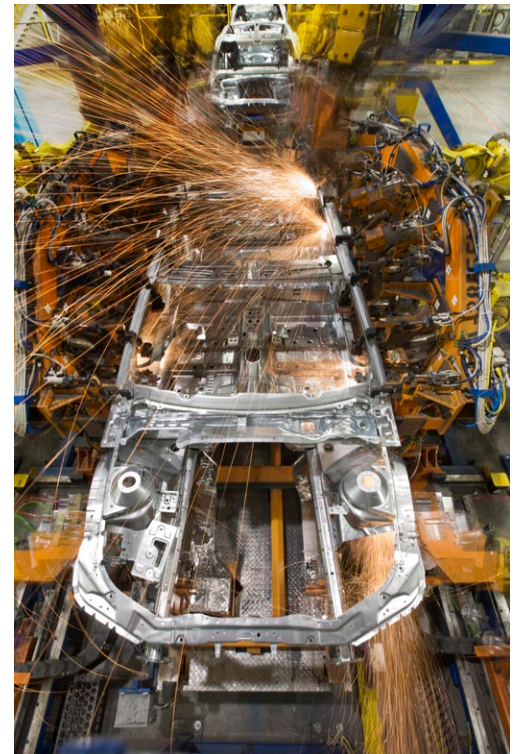
Bringing forward the next generation of innovative conservation solutions through the implementation of new programs, pilots or technologies is imperative to ensuring communities are energy efficient.

Now in its 10th year of operation, the IESO's Conservation Fund supports and brings to market new projects and technologies that contribute to energy savings for the province and to inform new policies and programs.

Pilot projects supported through the Conservation Fund drive the implementation of energy-saving measures and support innovative systems and technologies across the province. The Fund is also helping to transform the market by enabling customers to adopt energy-efficient activities into their daily routine.

Since 2011, the Conservation Fund has committed \$30 million of support to 56 projects. Many projects have moved from the pilot stage to full deployment, generating additional energy savings for the province. These pilot projects also influenced initiatives within the suite of saveONenergy programs. More than 30 funded pilots contributed to the design of 14 saveONenergy programs for 2011-2014, including Small Business Lighting, training and support initiatives, Process & Systems, Coupons, Fridge & Freezer Pickup, and New Home Construction. Informing program evolution is not the only priority of the Conservation Fund; the Fund's other priority is to help the general market test and adopt novel approaches to conservation and demand management that contribute to building a culture of conservation in Ontario.

Beginning in 2015, under the new Conservation First Framework, LDCs now have the opportunity to submit proposals for funding pilots through a new LDC Innovation Fund. The fund provides \$70 million for new innovative pilot programs that provide a foundation for implementing new local, regional or province-wide programs.



Conservation Fund Project Highlights

Energy Mapping to Target Savings

Horizon Utility's CDM Electric Energy Density Mapping: City of St. Catharines and City of Hamilton

This project will provide energy mapping data to inform targeted marketing of province-wide programs. It will use electricity-specific data sets and maps to assist Horizon in meeting and exceeding its conservation and demand management (CDM) targets and to develop a methodology for other LDCs to follow and deliver targeted and cost-effective CDM programming as well.

The project will demonstrate how to develop and use geographic information system (GIS) technology to correlate electricity consumption with building square footage to better target conservation opportunities. The pilot's focus is on mapping customer electricity density (kWh/m²).

GIS is a system designed to capture, store, manipulate, analyze, manage and present all types of spatial or geographical data. The pilot will develop the technical tools required to correlate individual customer electricity consumption with individual building attributes (e.g., square footage, age of buildings and additions, air conditioners, heating type, etc.), building end-use simulations and demographic data (e.g., population by neighbourhood, number of households, family size, average income). This data will be combined in a GIS to create a centralized database.

Partners: Niagara Region, City of Hamilton, Environics Analytics, Natural Resources Canada, Municipal Property Assessment Corporation and Teranet



Building a culture of continuous conservation in the manufacturing sector

Strategic Energy Group's Continuous Energy Improvement (CEI) – Industrial Pilot

The project supports businesses in adopting a formal continuous improvement process for energy management that can drive lasting change in behaviour and results in persistent energy savings. Specialists assist customers in the consideration of conservation beyond incentive applications and test a new method for influencing management and operation practices.

Each facility establishes a permanent energy team responsible for monitoring and improving energy performance in day-to-day operations while encouraging the incorporation of energy use considerations in larger policies and procedures.

Participants receive energy maps of their facility and updateable tools showing their company's use. They are trained on data collection and understanding the relationship between energy drivers and their facility energy performance.

Partners: Toronto Hydro, Enersource, and Enbridge Gas Distribution

New Conservation First Framework (2015-2020)

The province has implemented a new Conservation First Framework that builds on the successes and lessons learned from the 2011-2014 conservation programs. This new framework provides LDCs with more flexibility on the design of new innovative programs and encourages more collaboration with other utilities to ensure electricity and gas programs are effectively coordinated to deliver more savings to customers and the province.

Under the new framework, the IESO, working in collaboration with LDCs, expects to achieve 7 TWh of energy savings by the end of 2020 with a budget of \$2.2 billion. Another 1.7 TWh reduction is sought through the Industrial Accelerator Program, administered and delivered by the IESO.

LDCs have submitted Conservation and Demand Management (CDM) plans to the IESO for approval, detailing their actions for achieving the targets set out for the six-year period. The IESO will provide LDCs with support for the delivery of new programs and is responsible for evaluation, measurement and verification of all activities to validate the achievement of the 7 TWh target.

The new framework encourages utilities to submit programs of their own design suited to their communities or to the larger region in partnership with other utilities. The IESO is supporting LDC CDM programs in many ways, during their design and throughout their entire lifespan. This includes the sharing of best practices, offering program delivery services that LDCs can elect to use and the building of awareness in the marketplace through marketing and communication. It will also continue to provide centralized customer service and technical support, market research, program evaluation and measurement, and training.

Innovation is key to the success of the new framework – a \$70-million LDC Innovation Fund and a continued \$9.5-million annual allocation to the Conservation Fund outside of the Framework will support this. These funds provide support to LDCs and others in the delivery of pilots and programs that encourage collaboration and strive to meet the local needs of communities across the province.

Many pilot programs have been launched in 2015, ranging from direct mail campaigns to more sector-focused programs. Many of these pilots will be completed in 2016, allowing for recommendations on which pilots could evolve into local, regional or province-wide conservation programs in the new framework. Pilots are important in demonstrating energy efficiency as a key resource – energy efficiency can only progress if new ideas and innovative ways of conserving energy are constantly tested and adopted across the province.

Ontario is putting conservation first, and conservation is the first resource considered where cost effective, for meeting Ontario's electricity needs now and in the future. The new framework supports this and was developed through a collaborative and inclusive process. It reflects a continuing evolution of conservation planning and management in Ontario and provides more flexibility and customization for LDCs and consistency for all customers.



APPENDIX

Cost-Effectiveness Evaluation

The Total Resource Cost test looks at cost-effectiveness from a societal perspective that includes all incremental customer equipment costs and program costs. TRC benefits include net verified electricity and other associated savings (i.e., natural gas). This test is described by the following equation:

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 TRC 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.

The Program Administrator Cost test considers cost effectiveness from the perspective of a program administration agency. It includes the incentive costs, program costs and the verified net electricity savings (benefits) of the initiative. This test is described by the following equation:

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 Delivery Cost Metric

Levelized delivery costs reflect the combined program administration and incentive costs required to procure conservation resources, expressed on a levelized basis by spreading these costs over lifetime energy savings (expressed as \$/MWh).

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

Levelized Delivery Cost

Program	Energy Efficiency (\$/MWh)
Consumer Program	47.63
Low Income Program	114.08
Aboriginal Program	76.72
Business Program	31.25
Industrial	39.93
Non-LDC Industrial Program	112.11
Totals	
LDC Portfolio	36.421
LDC & Non-LDC Portfolio	36.986

Time-of-Use Rates

Time-of-use (TOU) rates provide customers with a new way to manage their electricity costs. In Ontario, TOU rates vary depending on the time of day electricity is consumed. Prices are lower when demand can be satisfied with lower cost sources of generation (e.g. nuclear) and rise as demand increases and more expensive forms of generation (e.g. natural gas) are called upon. The goal of TOU rates is to provide an incentive for residential and small business consumers to shift consumption away from periods of high demand (called “on-peak”) to periods of lower demand (called either “mid-peak” or “off-peak”) to help manage demand on the system.

TOU rates are set by the Ontario Energy Board (OEB) for low-volume electricity consumers (households and small businesses) who are under the Regulated Price Plan. Smart meters have enabled time-of-use pricing. Unlike conventional (analog) meters, smart meters not only track how much electricity customers use but also when they use it, providing key information to help consumers manage electricity costs. More than 4.8 million customers in Ontario have smart meters and over 97 percent are on TOU rates.

There are three different TOU rate periods. The OEB evaluates rates twice a year, and, if necessary, the appropriate adjustments are made prior to the winter (November 1) and summer (May 1) seasons. The OEB adjusts rates based on a number of factors, such as the forecasted electricity use, the cost of different sources of electricity over the given period of time, the types of power that will be available and the accuracy of previous projections. Adjustments are due to differences between what was paid to generators and the actual electricity supply costs from the previous season.

In 2012, at the request of the OEB and in collaboration with LDCs, the Ontario Power Authority launched a three-year study evaluating the impact of TOU rates in Ontario. The first year of the study examined the impact of TOU rates from four LDCs. The preliminary results indicated that for the utilities in the study, TOU rates had started to shift demand during peak periods by approximately two to five percent for residential customers. There were no statistically significant impacts for small business customers. Links to these studies can be found online www.powerauthority.on.ca/opa-conservation/conservation-information-hub/evaluation-measurement-verification/reports.

The final year of the study included eight LDCs and over 150,000 customer accounts. The study examined the provincial peak demand impact of TOU rates and examined the impacts from pre-2012 through to 2014. There was significant evidence of load shifting; for the province as a whole, there was a statistically significant reduction in usage during the EM&V² peak of 2.1 percent in the pre-2012 period, 1.89 percent in 2012, 0.82 percent in 2013, and 0.73 percent in 2014 relative to what usage would have been in the absence of TOU. In 2014, nearly 50 MW had been shifted from peak to off-peak periods.

Information on Time-of-Use rate periods can be found at: www.ontarioenergyboard.ca/oeb/_Documents/For%20Consumers/TOU_prices_Winter.pdf

Other Influenced Conservation

Other influenced conservation is the result of conservation activities by organizations and programs not funded by the IESO which result in electricity savings. There has not been a formal verification performed by the IESO. These numbers and the level of accuracy will vary with each organization’s evaluation methodology.

	Energy Savings (GWh)	Demand Savings (MW)
Federal Government ³	91.1	N/A
Gas Utilities	34.9	N/A
Industrial Conservation Initiative ⁴	N/A	975

² The EM&V peak demand period is calculated over June, July and August from 1 p.m. to 7 p.m. This time period is “invisible” to consumers who only see the OEB TOU periods. The EM&V peak demand period straddles two of these periods – the summer on-peak period is from 11 a.m. to 5 p.m. and the summer mid-peak period is from 5 p.m. to 7 p.m. and is a subset of the OEB summer TOU pricing period, which extends from May to October.

³ Includes energy-efficiency training in the buildings sector (Dollars to \$ense); impacts from programming in the industrial sector, including training and the Canadian Industry Program for Energy Conservation; ENERGY STAR® and R-2000 home labeling. It does not include code impacts.

⁴ Formerly referred to as 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.

Codes and Standards

Codes and standards are a powerful, cost-effective tool for achieving energy savings and 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 2014.

Ontario's Energy Efficiency Regulation is amended regularly in order to update efficiency requirements and/or test methods for a wide range of products. In December 2014, following a public review period, the Ontario government amended the province's Energy Efficiency Regulation to include new or enhanced minimum efficiency standards for 21 products, such as clothes washers and dryers, microwaves, dishwashers, water heaters, gas heaters, commercial and residential refrigeration equipment, fluorescent and incandescent lighting and televisions. Based on available energy data from Natural Resources Canada, the United States Department of Energy (US DOE) and a third party study, this amendment is estimated to save 1.1 TWh/year of electricity in 2032, equivalent to taking 110,000 homes off the grid. It is also estimated to save 0.19 PJ/year of natural gas and oil in 2032, equivalent to the total energy consumption of 1800 homes. This amendment came into effect on January 1, 2015.

While there were no changes in 2014, Ontario's 2012 Building Code came into effect on January 1, 2014, with certain energy efficiency related provisions coming into force 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 high energy performance integral to its building code.

Initiated in 2014, the IESO, in collaboration with the Ministry of Energy, undertook an analysis of electricity savings from product standards (energy efficiency regulation) in Ontario. The scope of the analysis included:

- A comparison of the IESO's 2013 standards analysis methodology against the U.S. Dept. of Energy (DOE) methodology and provided best-practice recommendations; and
- an assessment of electricity savings for residential and selected commercial product standards (36 residential products and 4 commercial products) from Ontario's Energy Efficiency Regulation (O. Reg. 404/12) 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.

The results of this analysis will be used to inform future IESO and Ministry work including the achievable potential study, conservation planning and program design, load forecasting and resource planning, and the development of the next long term energy plan.

Conservation Programs Savings Results

The tables below outline the participation and net energy and demand savings for the 2011-2014 programs and other initiative during that timeframe.

Initiative	Delivery	Net Demand Savings (MW)				Net Energy Savings (GWh)			
		2011	2012	2013	2014	2011	2012	2013	2014
Residential Programs									
FRIDGE & FREEZER PICKUP	Contractors	4	2	2	2	25	14	9	10
HEATING & COOLING INCENTIVE	Contractors	34	15	21	26	64	25	37	48
peaksaverPLUS®	LDCs	11	53	100	126	0	0	0	0
peaksaverPLUS® (Energy Display)	LDCs	–	–	–	–	–	–	–	–
COUPONS	Retailers	1	0	1	3	23	2	8	35
EXCHANGE EVENT	Retailers	0	1	1	1	0	1	2	2
SPRING & FALL EVENT	Retailers	2	2	1	9	31	31	18	132
Home Assistance Program	LDCs	0	1	3	4	0	6	22	27
Business Programs									
DEMAND RESPONSE 2	Aggregators	69	56	55	66	56	78	76	0
DEMAND RESPONSE 3	Aggregators	315	367	335	334	15	10	7	0
SMALL BUSINESS LIGHTING	LDCs	25	17	20	25	65	63	70	91
peaksaverPLUS® (Small commercial)	LDCs	0	0	1	2	0	0	0	0
peaksaverPLUS® (Small commercial) Energy Display	LDCs	–	–	–	–	–	–	–	–
RETROFIT PROGRAM	LDCs	31	69	69	91	177	355	401	594
AUDIT FUNDING	LDCs	0	2	3	10	0	10	18	48
Existing Building Commissioning	LDCs				1				2
HIGH PERFORMANCE NEW CONSTRUCTION	LDCs	0	2	2	11	0	6	5	36
NEW HOME CONSTRUCTION	LDCs	0	0	0	0	0	0	0	3
PROCESS & SYSTEMS	LDCs	–	–	0	11	–	–	3	78
Monitoring & Targeting	LDCs				0				2
Energy Managers	LDCs	–	1	4	10	–	8	24	85
Industrial Accelerator Program	IESO	0	5	1	2	1	46	8	14
Pre-2011 Projects	LDCs & service providers	48	5	1	2	259	16	4	12
Other Initiatives									
Pre-2011 peaksaver® Residential		100	41	40	33	0	0	0	0
Pre-2011 peaksaver® Business		3	3	3	3	0	0	0	0
Aboriginal Program	LDCs	–	–	0	1	–	–	2	4
Program Enabled Savings	LDCs	–	2	6	12	–	1	17	40
LDC Pilots	LDCs				1				5
Time-of-Use	IESO				59				0
Total		645	643	667	843	717	671	733	1,269

All results with a value of 0 represent a result of less than 0.5 MW/GW

All results presented at the generator level

Adjustments to previous years' results are captured in the year in which the measure was installed

Pre-2011 projects include LDC Custom Programs, Electricity Retrofit Incentive Program, Multi-Family Energy Efficiency Rebates and Toronto Comprehensive. These programs are no longer offered.

Conservation Program Participation

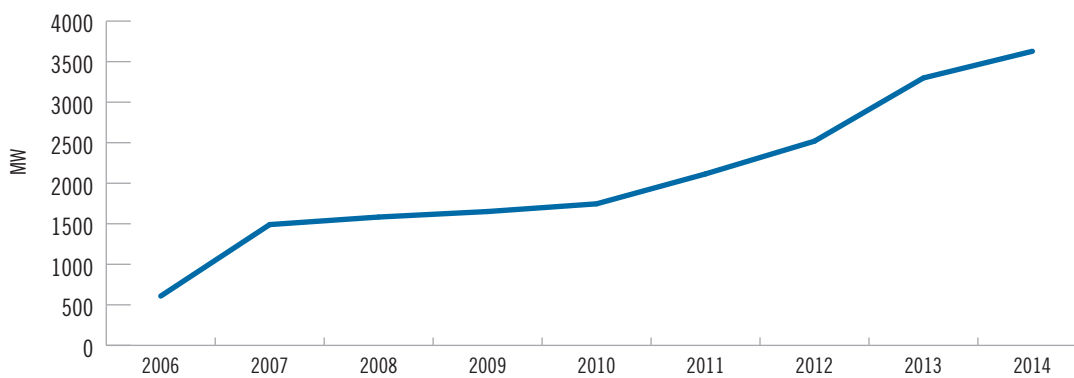
Initiatives	Participation				Metric
	2011	2012	2013	2014	
Residential Programs					
FRIDGE & FREEZER PICKUP	56,110	34,146	20,952	22,563	Appliances
HEATING & COOLING INCENTIVE	92,748	87,540	96,286	113,002	Installations
peaksaverPLUS®	19,550	98,388	171,733	241,381	Devices
peaksaverPLUS® (Energy Display)	–	49,689	133,657	188,577	Devices
COUPONS	567,678	30,891	347,946	1,208,108	Products
EXCHANGE EVENT	3,688	3,836	5,337	5,685	Appliances
SPRING & FALL EVENT	952,149	1,060,901	944,772	4,824,751	Products
Home Assistance Program	46	5,920	29,654	25,424	Homes
Business Programs					
DEMAND RESPONSE 2	2	2	2	2	Facilities
DEMAND RESPONSE 3	476	531	520	572	Facilities
SMALL BUSINESS LIGHTING	20,741	18,691	17,833	23,784	Projects
peaksaverPLUS® (Small commercial)	132	294	1,211	3,652	Devices
peaksaverPLUS® (Small commercial) Energy Display	–	0	378	820	Devices
RETROFIT PROGRAM	2,828	6,481	9,746	10,925	Projects
AUDIT FUNDING	222	357	589	473	Audits
Existing Building Commissioning				5	Buildings
HIGH PERFORMANCE NEW CONSTRUCTION	25	98	158	226	Projects
NEW HOME CONSTRUCTION	27	21	279	2,367	Projects
PROCESS & SYSTEMS	–	–	5	10	Projects
Monitoring & Targeting		1	3	5	Projects
Energy Managers	1	132	306	379	Projects
Industrial Accelerator Program	2	3	3	8	Projects
Other Initiatives					
Pre-2011 peaksaver® Residential	167,770	77,671	69,976	62,872	Devices
Pre-2011 peaksaver® Business	4,657	4,350	4,445	4,475	Devices
Aboriginal Program	–	–	717	1,125	Homes
Program Enabled Savings	33	71	46	43	Projects

Conservation Program Savings to Target

The savings achieved from energy-efficiency and demand-response initiatives contribute to the overall energy target of 30 TWh in energy savings by 2032 set out in Ontario's Long-Term Energy Plan. The tables and graphs below show the province's 2011-2014 savings and progress towards the targets.

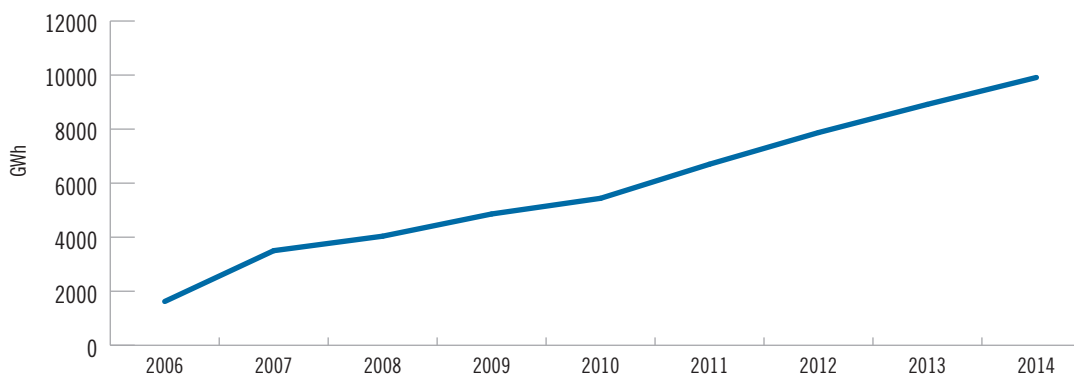
Savings Net Persisting Peak Demand Savings (MW)

	2006	2007	2008	2009	2010	2011	2012	2013	2014
Demand Response	319	710	678	641	545	546	906	1,469	1,539
Energy Efficiency	289	780	905	1,010	1,201	1,569	1,613	1,830	2,089
Total	608	1,490	1,583	1,651	1,746	2,115	2,519	3,299	3,628



Savings Net Persisting Energy Savings (GWh)

	2006	2007	2008	2009	2010	2011	2012	2013	2014
Demand Response	0	0	1	89	148	71	88	84	0
Energy Efficiency	1,621	3,501	4,037	4,770	5,291	6,631	7,784	8,832	9,911
Total	1,621	3,501	4,037	4,859	5,439	6,701	7,872	8,916	9,911



Training Initiatives

The table below outlines the training activities for the 2011-2015 period.

Training	Target Audience	Participation 2011 – 2014	Capabilities for the Marketplace
Building Operator Certification	Individuals in the facility operation and maintenance fields	86	Connecting operation and maintenance activity to energy consumption
HVAC Installation Optimization	Contractors and installers of central air conditioning and heat pump systems and equipment.	2087	Increasing the quality of HVAC installations and maintenance.
Energy Management Training	Junior/intermediate-level (2-5 years) practitioners in the energy management field.	18	Build energy management capacity in Ontario
Certified Measurement & Verification Professional Training	Individuals responsible for energy-efficiency program evaluation and operation	192	To improve the practice of measurement and verification
Certified Energy Manager Training	Energy management professionals	492	To improve the practice of energy management
Commissioning Agent Training	Energy management professionals, project engineers, facility managers	48	Develop the expertise to implement and manage the whole building commissioning process in new and existing buildings
Low-Rise Residential Builder and Construction Trades Training	Home builder executives, sales and marketing staff, construction site management, supervisory, inspection and design staff, contractors	26	Train the residential construction industry in meeting the energy performance standards of the Ontario Building Code/EnerGuide Rating System
Compressed Air Challenge – Compressed Air Training	Plant engineers, maintenance supervisors, other personnel responsible for compressed air systems in an industrial setting	176	Evaluation of compressed air systems
Dollars to Sense Energy Management Workshops	Energy managers, facility managers, plant and process engineers and managers, maintenance supervisors and managers, electrical and mechanical trades people	~2100	Developing the energy management capacities of a broad range of institutional, commercial and industrial organizations.



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