Chapter 4. Strengthening our Commitment to Energy Conservation & Efficiency

Ontarians can be proud of what we have accomplished with conservation and energy efficiency. Between 2005 and 2015, we conserved 13.5 TWh of electricity, enough to have powered the cities of London, Kingston, Ottawa and Peterborough in 2015 – that's X.Y million people

But that's just one way of measuring conservation. Another method is to measure how much we reduced the peak demand for electricity, and in 2015 we reduced demand by 4,439 MW. That's equivalent to more than the peak demand of the City of Toronto in 2015.

Commented [LT1]: Can this be quantified with a number.. savings?

Energy efficiency is becoming more part of our everyday lives. According to the IESO's 2015 study on the province's conservation efforts, businesses are becoming more productive by investing in energy-efficiency upgrades, and residents are choosing to install energy-efficient equipment in their homes, some of them with the help of Ontario's suite of residential and business conservation programs. (see below).

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

With the *Long-Term Energy Plan* in 2013, the government put conservation and energy efficiency at the centre of its energy policy. The Ministry of Energy and its agencies have been implementing the *Conservation First* policy ever since.

Conservation and energy efficiency require a sustained commitment if we are to achieve persistent savings over the long-term. Looking forward, Ontario will enhance its *Conservation*

First commitment to support affordability and choice for people, businesses and communities, and to align with Ontario's climate change objectives.

[CALL OUT BOX: Conservation and Energy Efficiency]

Electricity

- The province has historically avoided $2 in added costs to the electricity system every time $1 has been invested in energy efficiency.
- Conservation costs about $40 per megawatt hour (MWh), which is cheaper than most forms of new supply.

Natural Gas.

- An investment of about $790 million in efficiency programs between 2000 and 2014 saved about $4.3 billion for natural gas ratepayers. **[NTD: To add equivalency]**
- In 2014, these programs cost about 3.0 cents per cubic metre saved. **[NTD: to add benchmark against price of natural gas]**

Getting More from Conservation

Ontario has a healthy supply of energy, with any added demand for electricity not expected to materialize until the mid-2020s. In this context, Ontario will continue to drive towards the long-term target established in the 2013 LTEP of 30 TWh of savings in 2032, using conservation, energy efficiency programs and improved efficiency standards. Ontario and its agencies will continue to assess the potential that is achievable, and explore making increased investments in conservation. These will take into account the reductions in energy use achieved through Ontario's *Climate Change Action Plan*.

The IESO and the OEB are currently conducting mid-term reviews of the *Conservation First Framework* and the *Demand Side Management Framework* for natural gas distributors. They are looking at the distributors' 2020 targets for conservation savings, program budgets and whether programs are meeting customer needs.

Demand Response

Demand response (DR) refers to voluntary programs that reward electricity customers for reducing their electricity demand during peak periods. This enhances the reliability of the system, as well as reducing system costs and GHG emissions. Examples of DR are when a factory temporarily halts a process, or a group of residential consumers reduce their use of air conditioning when demand is high.

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The IESO has successfully transitioned DR away from contract-based procurements to a competitive auction. The two DR auctions held in 2015 and 2016 reduced the cost of providing DR by 15% **[NTD: TBC]**. As part of the transition, the IESO is now using DR to respond to system needs better. In addition to reducing peaks in electricity demand, DR can now be used during the shift from periods of low demand to high demand.

Commented [CR2]: Or "as electricity demand increases or decreases during the day"?

The 2013 *Long-Term Energy Plan* set a long-term target to use DR to reduce 10% of the province's peak electricity demand in 2025. As Ontario transitions to a more competitive market, Ontario will eliminate this long-term target for DR. The Ministry will work with the IESO to grow the DR auction into a technology-neutral capacity auction, so that DR resources can compete directly with traditional generation.

The IESO is also assessing the impact the Conservation First Framework and Industrial Accelerator Program have on electricity planning and Ontario's climate change objectives, including considering the role of distributor peak demand targets in meeting local and regional needs.

Expanding the Scope of Conservation

Ontario is expanding the scope of conservation to ensure that all participants in the energy sector put *Conservation First* and help Ontario reach its greenhouse gas reduction targets.

Electricity conservation should not be limited to the actions customers take in their homes or businesses; we need to make smart choices at all levels. That means embedding *Conservation First* in the management of the entire electricity system. Innovative technologies can cost-effectively reduce line losses and optimize voltage levels on distribution networks, lowering the demand for electricity and peak demand.

Several pilots across North America have demonstrated the potential benefits of deploying energy efficiency technologies on distribution networks. A recent Ministry study estimated that energy efficiency technologies can be cost-effectively deployed on 30 per cent of Ontario's electricity distribution networks[1]. Ontario's Smart Grid Fund and Conservation Fund have funded, or are funding, pilots.

The Ministry and its agencies will encourage distributors to increase the energy efficiency of their networks, by allowing them to count the electricity savings from these technologies towards their targets for electricity reduction in the *Conservation First Framework*. The OEB will also explore ways to further encourage distributors to pursue energy efficiency on their distribution networks.

[1] Navigant Study

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[CASE STUDY/VISUALS - a graph with the 30 TWh target and the progress to date.

[CASE STUDY: Toronto Cecil Transformer Station
Message: Conservation first before infrastructure investments
Content: Description of project's benefits and innovation and quote from Toronto Hydro CEO]

CASE STUDY: Enbridge Gas – KI industry
Message: Conservation helping industrial consumers
Content: Description of savings

Raising the Bar for Energy Efficiency

Ontario continues to play a lead role in improving the energy efficiency of equipment in our homes, offices and factories. Since 2013, Ontario improved or set new energy efficiency standards for over 60 products. The gains in energy efficiency have not only been enduring, but economies of scale have lowered the cost of the technologies, ensuring they become more popular, affordable and widely available.

Setting efficiency standards for equipment found in drinking water and waste-water treatment plants

Now that the *Green Energy Act, 2009* has been amended, the Ministry of Energy Plan is regulating the water efficiency of products that consume both energy and water. It also intends to set or update energy efficiency standards for key equipment using electricity in drinking water and waste water treatment plants. This will reduce one of the largest uses of electricity by municipalities and help them save on their electricity bills. (*Note: for consideration by comms – see below information for a call out box with an example of estimated water savings due to new water efficiency standards)*

(Note: a graph to be added with a call out box with an example of estimated portion of electricity use by municipalities – consider adapting info graphics from Chapter 2 of ECO's 2017 Conservation report – Every Drop Counts)

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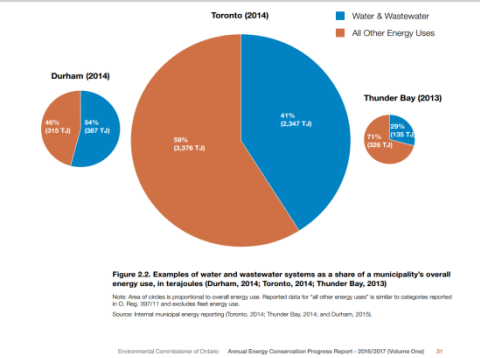

Figure 2.2. Examples of water and wastewater systems as a share of a municipality's overall energy use, in terajoules (Durham, 2014; Toronto, 2014; Thunder Bay, 2013)

Note: Area of circles is proportional to overall energy use. Reported data for "all other energy uses" is similar to categories reported in O. Reg. 397/11 and excludes fleet energy use.

Source: Internal municipal energy reporting (Toronto, 2014; Thunder Bay, 2014; and Durham, 2015).

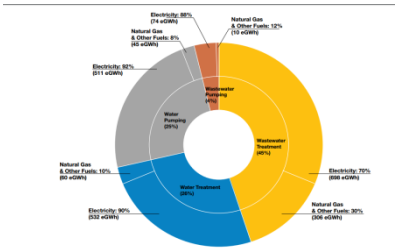

Figure 2.4. Ontario municipal water system electricity and natural gas consumption by facility type, in equivalent gigawatt hours (2011)

Source: Ministry of Energy, O. Reg. 397/11, 2011 normalized data.

Note: "Other fuels" includes diesel and fuel oil; they make up a small fraction of energy use in the sector. Renewable energy use is not included in this chart as it is not reported in O. Reg. 397/11 data.

> *"Municipal water and waste-water services are typically one third to one-half of a municipality's total electrical use, so there is potential for reductions in both costs and emissions."*
> CCAP 2016, pg. 83

Setting efficiency standards for net zero homes and buildings

With advanced standards for space and water heating equipment, new and existing homes and buildings could significantly reduce their energy use and greenhouse gas emissions. High-efficiency and low carbon technologies can lead to net zero carbon emission homes and buildings.

In collaboration with other provinces and the federal government, Ontario is exploring opportunities and strategies to support net-zero carbon emission buildings by developing markets for high efficiency products and appliances. This would enable potential future regulation of these technologies.

Possible graphic/Call out box (note: For consideration by communications - Potential adoption of the Energy Use Comparison **Graph** from NRCan, see below.

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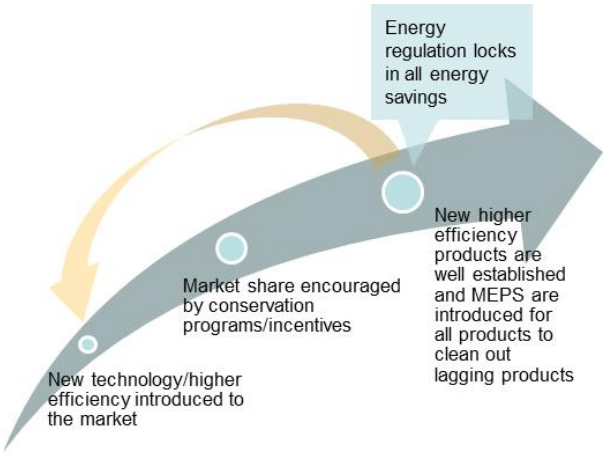
[INFORGRAPHIC – Relationship between Standards and Programs, created by ENERGY **NTD: For Communications to explore simplifying and adding product examples**]



Ensuring a Customer-Centred Approach

The current conservation frameworks encourage electricity and natural gas distributors to collaborate and provide more efficient programs and a streamlined experience for customers. Such partnerships can provide energy consumers with a one-stop approach to meeting their energy management needs. Currently, 46 electricity distributors are involved in joint conservation plans, and are partnering with natural gas distributors to design and develop multi-fuel programs.

The Ministry of Energy is encouraging electricity distributors to develop new and innovative programs for their customers. The IESO helped by launching in 2016 the first full-scale "pay-for-performance" program in North America. The *Save on Energy Multi-Distributor Pay-for-Performance Program* rewards businesses for improving their overall energy performance over a number of years. Businesses are paid for each kilowatt hour they conserve, and are given flexibility on how they achieve those savings. Ratepayers benefit as well: participants are paid for savings at the overall whole building level, reducing program administration costs.

[CASE STUDY: Loblaws Multi-Site P4P
Message: conservation is cost effective and builds capacity
Content: Details of pilot]

Expanding Home Retrofits

As part of its *Climate Change Strategy,* Ontario has invested $100 million from its Green Investment Fund (GIF) to help eligible homeowners who primarily heat with natural gas, oil, propane or wood. They can upgrade their homes, reduce their energy bills and cut greenhouse gas emissions by participating in enhanced residential audit and retrofit programs offered by Enbridge Gas Distribution and Union Gas. Launched province-wide on October 31, 2016, the program is expected to enable about 37,000 additional homes to be audited and retrofitted by

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2019, and cumulatively reduce approximately 1.6 megatonnes of lifetime greenhouse gas emissions. [2]

The home energy audit and retrofit programs were further enhanced in May 2017 to include electricity incentives. Partnering with Enbridge Gas and Union Gas, the IESO is examining whether to expand the program to electrically-heated homes. This 'Whole Home' program is now providing residential consumers with a simple, one-stop approach to energy efficiency improvements.

Energy Efficiency For Your Whole Home Case Study

Incentives from the *Home Energy Conservation Program* allow families like the O'Hara's to reduce their energy bills, increase their home comfort, and cut greenhouse gas emissions. The O'Hara's upgraded their furnace, hot water heater and windows, improving the efficiency of their more than century-old home. They also added basement insulation, and air sealed their home. The upgrades will reduce the O'Hara's consumption of natural gas by 36 per cent, and cut their greenhouse gas emissions by 1.67 tonnes annually. In addition to retrofitting their Home, the O'Hara's also installed a Smart Thermostat, which increases their savings by reducing home temperatures when they are away.

Smart Thermostats

Smart thermostats are the next important technology for homeowners looking to reduce the costs of heating and cooling their homes, and their carbon footprint. Smart thermostats:

- give consumers more information about their energy use;
- use a smart phone app to remotely control the temperature of the home or small business; and

[2] "Helping Homeowners Cut Energy Bills with Retrofits and Renovations." October 31, 2016, https://news.ontario.ca/opo/en/2016/10/helping-homeowners-cut-energy-bills-with-retrofits-and-renovations.html

- allow the temperature to automatically respond to changes in a user's schedule, or seasonal changes.

The Ministry of Energy will work with the IESO to [pending decision].

Innovative Pricing and Flexible Rate Plans

Together with the Ontario Energy Board, the Province is working on giving consumers more choice in their electricity price plans. The OEB is using pilot programs to test innovative time-of-use price structures, as part of its review of the Regulated Price Plan. Ontario is already a world leader in this area, offering time-of-use electricity prices to most of its residential and small business electricity customers.

The pilots will test a variety of innovative price structures, including:

- different ratios between on-peak and off-peak prices;
- different times for on-peak and off-peak periods;
- prices that kick in during critical peaks – the short time periods with extremely high demand; and
- seasonal pricing plans where spring and fall have a flat rate, and summer and winter have on-peak and off-peak price periods.

Some of the pricing pilots will be combined with smart technologies, like smart thermostats, energy use apps, and electric vehicles, to give customers further ability to manage their electricity use.

The pilots will help inform future OEB decisions on potential new price plans that, by 2020, could match a customer's lifestyle and give them more control over their electricity costs.

[CASE STUDY: TOU pilot
Providing consumers choice
Content: a description of existing TOU pilot]

[CALL OUT BOX: EcoSchools]

Ontario EcoSchools brings information about energy conservation to more of the province's students and teachers.

Ontario EcoSchools aims to give all members of the school's community the knowledge, skills, perspectives and desire to act as environmentally responsible citizens. The mission is to nurture environmental leaders, reduce

Commented [CR3]: Think this should move to Chapter 1 or Chapter 3

Commented [LT4]: Agreed. Move to Ch 1

Commented [LT5]: The Minister talks publically about the challenges with this system for varying costumers ie Downtown condo vs rural senior.

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the ecological impact of schools and build school communities that are environmentally responsible.

More than 800,000 students across the province are engaged in the program.[3][4]

With support from the province, the program is expected to grow over the next two years to about 2,000 schools from 62 school boards, reaching approximately 1 million students from kindergarten to grade 12.

Integrating Conservation and Climate Change Programs

Ontario's *Climate Change Action Plan* emphasized the need to increase the use of low-carbon technology, such as solar panels and heat pumps, in Ontario homes and businesses. Several programs to increase energy choices for Ontarians are being introduced this year, funded by the proceeds from the cap and trade program.

A new agency, the ***Green Ontario Fund***, will help Ontarians in moving to a low-carbon technology future. The Green Ontario Fund will offer incentives, financing and services to increase the use of low-carbon technologies that reduce greenhouse gas emissions.

[NTD: TBC], The Green Ontario Fund launched a website to provide a "one-window" approach for Ontarians seeking help, information and access to *Green Ontario Fund* programs, as well as other conservation and renewable energy programs in Ontario.

Under current conservation programs, natural gas-fuelled combined heat and power projects used by companies to generate their own electricity have been eligible for incentives, because of the significant reduction they cause in demand on the electricity grid.

To help meet Ontario's climate change goals, the province will not allow this type of project to enroll in the conservation programs, effective July 1, 2018. The timeframe coincides with the end of the mid-term review of the *Conservation First Framework* and the *Industrial Accelerator Program*. Customers currently developing such projects can apply until July 1, 2018.

In recognition of their environmental benefit, the installation of renewable energy projects, such as solar thermal water heating or use of biomass fuel for boilers, will continue to be eligible for funding under the *Conservation First Framework* and *Industrial Accelerator Program*. Electricity distributors may also offer incentives for energy storage systems that are integrated with a customer's own renewable energy projects. When added to self-generation, energy storage systems provide reliability and can help customers reduce their grid demand when prices are highest. This can help reduce local and provincial system peaks.

[3] Source: Ontario EcoSchools Annual Report to the Ministry of the Energy 2015-16

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[CASE STUDY: Hydro One Heat Pump Advantage customer
Message: customer choice and helps reduce electricity bills
Content: what is the technology and how a participant benefitted from the program]
[CASE STUDY: Business Refrigeration Incentive - pub
Message: conservation helps manage energy use
Content: Measures and savings of a participating small business]
[CASE STUDY: DSM – Enbridge and University of Toronto
Message: conservation helps manage energy use
Content: details of a natural gas project]

Providing Choice through Information, Tools & Data

Ontario's energy benchmarking and rating initiatives give people and organizations the tools and information they need to understand the energy performance of their homes and businesses, and compare it with similar buildings. They can use this information to manage their usage and costs, and justify investments in energy efficiency. As of March 2017, 18 electricity distributors have social benchmarking programs in their Conservation and Demand Management Plans, with four programs currently available to customers.

Organizations in Ontario's Broader Public Sector must annually report their energy consumption and greenhouse gas emissions. They must also develop 5-year energy conservation and demand management plans to guide their energy savings. The data on usage has been posted on Ontario's Open Data website since 2014.

Building on this success, as well as the lessons learned from similar programs in the United States, Ontario has introduced an Energy and Water Reporting and Benchmarking requirement for large private sector buildings[5]. Starting in July 2018, and to be phased in over three years, owners of large commercial, multi-unit residential and some industrial buildings must annually submit information on their building's use of energy and water and it's GHG emissions. Some of the data will be annually posted on Ontario's Open Data website so owners can compare the energy and water usage of their buildings with that of similar facilities, and identify where improvements can be made.

In order to help households and businesses manage and conserve their energy and water use Ontario's *Climate Change Action Plan* committed to expanding the province's Green Button Initiative. Green Button Download My Data gives households and businesses easy electronic

[5] O.reg. 20.17

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access to data on their electricity natural gas and water consumption. Green Button Connect My Data lets them use it with applications that can help them manage and conserve their energy and water.

Ontario is encouraging utilities to adopt Green Button. London Hydro and Hydro One have both successfully completed pilots. The Ministry completed a cost-benefit analysis in 2016 and consulted with a broad range of stakeholders on a proposal to require Ontario's electricity, natural gas and water utilities to implement Green Button.

Ontario intends to bring in legislation requiring electricity and natural gas utilities to offer the two Green Button programs. In addition, the Ministry will collaborate with key stakeholders to update the guidance documents for the electricity Green Button, and to adapt it for use with natural gas and water.

Since Green Button makes it easier for customers to access and share their data, it has the added benefit of supporting other data-driven conservation initiatives, such as energy reporting and benchmarking, and the use of smart thermostats.

[CASE STUDY: Green Button

Message: government leadership and innovation
Content: Budweiser Gardens accurately forecasts energy usage using event assist. Event Assist will help Budweiser Gardens to better understand their usage so they can cost-effectively analyse energy costs on an event by event basis]

Green Button
Message: government leadership and innovation
Content: Thames Valley District School Board uses Green Button to compare energy profiles of 165 schools, increasing efficiency and minimizing unnecessary costs

Ontario is also exploring how to increase corporate financing for energy efficiency projects. The Investor Confidence Project gives financiers the information and tools they need to assess energy efficiency projects. The Project was established by the Environmental Defense Fund in the United States in 2013, and Ontario is piloting it in Ontario and exploring how it can be adapted for the Canadian market.

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