
Energy Conservation, Efficiency and Demand Management

Foundational Briefing
November 2017

CONFIDENTIAL DRAFT

Outline

Context

- Conservation First
- Energy conservation and how it is achieved
- Conservation in Ontario's electricity supply mix
- Conservation is a low cost resource
- Conservation success in Ontario
- Conservation in 2017 LTEP

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Emerging Initiatives

Demand Model

Transactive Energy

Context

- i. Conservation First
- ii. Energy conservation and how it is achieved
- iii. Conservation in Ontario's electricity supply mix
- iv. Conservation is a low cost resource
- v. Conservation success in Ontario
- vi. Conservation in 2017 LTEP

Conservation First

- On October 26, 2017, Ontario released its third Long-Term Energy Plan, *Delivering Fairness and Choice*.
- *The 2017 LTEP* builds on the Conservation First policy outlined in the 2013 LTEP. Through this policy, the government committed to ensuring that conservation will be considered first before building new generation and transmission facilities, and will be the preferred choice wherever cost effective.
- The Conservation First policy in the 2013 LTEP was informed by strong stakeholder support for the *Conservation First White Paper*, released in July 2013. The White Paper put forward a renewed vision for conservation in Ontario and committed to expanding and enhancing the province's conservation efforts.



Energy Conservation

- Conservation provides multiple benefits to Ontarians, including:
 - Helping families and businesses manage their energy bills.
 - Reducing the need to build expensive energy infrastructure, mitigating upward pressure on energy prices.
 - Reducing greenhouse gas emissions and air pollution.
- Forecast conservation reductions of 30 terawatt hours expected to offset almost all of the growth in electricity demand to 2032.
- Energy efficiency and conservation is achieved through a combination of conservation programs, and improved building codes* and efficiency standards for equipment/appliances.

Savings related to conservation can be measured in two ways:

1. Reduction in overall energy consumption- Terawatt hour (TWh) for electricity savings, cubic metre (m³) for natural gas savings and relevant measurement units for other fuels.
2. Peak demand savings- reducing the total supply of electricity during peak periods of electricity demand. This metric is only applicable to electricity given the variable nature of electricity consumption and relatively limited storage options.

* Regulated by the Ministry of Municipal Affairs

How is Energy Conservation Achieved?

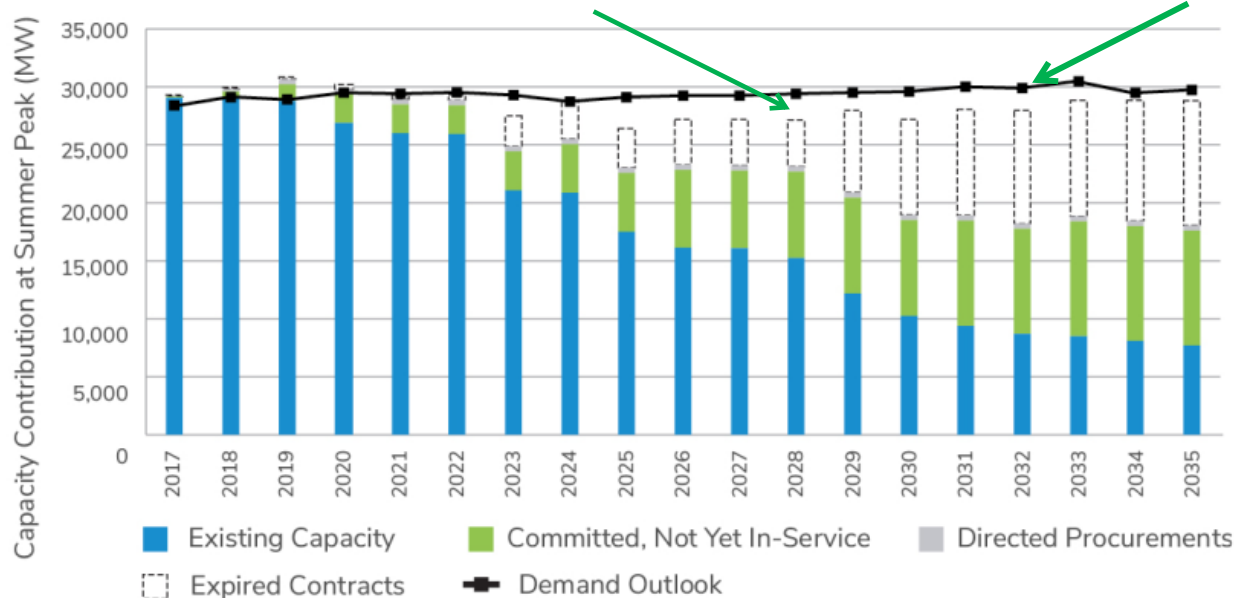
- Conservation can be achieved in a number of ways:
 - **Energy Efficiency:** Using less energy to provide the same service. This is achieved through more energy efficient technology, such as LED lighting. Building codes and product efficiency standards help improve the energy efficiency of new buildings and appliances.
 - **Demand Response/Demand Management:** Reducing or shifting consumption away from system peak times (e.g. using Time-of-Use pricing with smart meters and initiatives like the Demand Response Auction).
 - **Behavioural Changes:** Increasing awareness and encouraging different behaviour to reduce energy use (e.g. through social benchmarking).
 - **Customer Based Generation:** Enabling customers to generate energy on-site for their own use to reduce strain on the electricity grid and encourage clean or more efficient generation (e.g. through net metering installations).

Conservation in Ontario's Electricity Supply Mix

- 2017 LTEP projected that conservation initiatives will offset almost all of the growth in electricity demand between 2017 and 2035 (30.7 TWh in 2035).
- Conservation is the cleanest and most cost-effective way to meet the province's energy resource requirements. Investing in conservation reduces the need to build more expensive generation and transmission, mitigating upward pressure on electricity prices.

Demonstrates additional resources required to meet demand. Options to meet this need include additional conservation, demand response and clean imports.

Demand forecast has been adjusted to include conservation savings



Source: IESO

Conservation Success in Ontario

- Ontario has already made great strides in building a culture of conservation. This is one of the reasons Ontario is in a strong supply situation today.
- From 2006 to 2015, Ontarians conserved:
 - 13.5 TWh of electricity- enough to power the cities of London, Kingston, Ottawa, Peterborough and Thunder Bay in 2015
 - 4,439 MW of peak demand-equivalent to the peak demand of the city of Toronto in 2015.
- From 2006 to 2015, Ontarians also conserved 1,700 million m³ of natural gas from natural gas efficiency programs alone – equivalent to the natural gas used by ~800,000 homes in a year, or taking about 750,000 cars off Ontario's roads for one year.
- Through conservation programs offered by natural gas, local electric utilities and the IESO, customers are achieving real savings.

London & Middlesex Housing Corporation

With incentives from Union Gas, this housing corporation has found a rooftop energy savings ally, Heat Recovery on the Make Up Air, resulting in:

- 55% reduction in natural gas use
- Four-year cost savings of \$94,720
- \$14,000 in energy efficiency incentives from Union Gas
- Greenhouse gas savings – 140 tonnes per year

Home Depot

With saveONenergy incentives, the company implemented 191 conservation projects province-wide, resulting in:

- Reducing energy consumption by more than 29 million kilowatt-hours since 2012 – enough electricity to power more than 3,000 typical Ontario homes for a year.

Tim Horton's

With saveONenergy incentives, the company renovated 245 restaurants including switching to LED lighting and installing white roofs, resulting in:

- An estimated four million kilowatt hours of electricity savings through combined conservation efforts.

2017 Long-Term Energy Plan Conservation Initiatives

2017 LTEP Commitment: Strengthening Commitment to Energy Conservation and Efficiency

- Affordability and choice for people and communities
 - Getting more without increased costs for ratepayers
 - Integrating conservation and climate change programs
- **Key conservation initiatives in the LTEP include:**
 - Reaffirming commitment to long-term electricity conservation target and continuing to assess achievable energy conservation potential
 - Advancing energy efficiency standards:
 - Regulating water efficiency of products that consume both energy and water; setting or updating energy efficiency standards for key electrical equipment in drinking water and wastewater treatment plants
 - Enabling demand response to compete with other resources
 - Providing choice through information, tools and access to data
 - Expanding the Green Button initiative province-wide
 - Requiring energy and water benchmarking for large private sector buildings
 - Exploring how to increase access to energy efficiency financing
 - Expanding the scope of conservation (energy efficiency on the distribution system)
 - Improving availability of conservation programs for Indigenous people
 - Aligning with climate change objectives
 - Phasing out incentives for behind the meter generation using supplied fossil fuels
 - Coordinating and exploring integration of conservation and climate change programs

LTEP Implementation and Amending Direction/Directive

Legislated Process, Electricity Act, 1998

The Minister of Energy may issue Cabinet-approved directives to the IESO and/or OEB setting out the government's requirements for LTEP implementation and the date by which the IESO and/or OEB must submit an implementation plan to the Minister.-

LTEP Directive to IESO:

- Report on options to improve conservation programs and access for Indigenous people (align with the Mid-Term Review of Conservation First Framework).

LTEP Directive to OEB:

- Examine opportunities to modernize the electricity sector, including energy efficiency measures on the distribution system (e.g., in-front-of-the-meter conservation).
- Move forward with implementation of RPP Roadmap, including new pricing structures and energy literacy.

Amendments to 2014 CFF and IAP Directions to IESO and Directive to the OEB:

- Phase-out incentives for behind the meter generation (BMG) that uses supplied fossil fuels.-
- Allow LDCs to count electricity savings from in-front-of-the-meter conservation projects toward CDM targets.

Status of Conservation Initiatives

1. Product Efficiency Standards
2. Conservation Programs
3. Electricity and Natural Gas Conservation Frameworks
4. Green Investment Fund Retrofits
5. Support for GreenON
6. Affordability Fund
7. In-Front-of-the-Meter Conservation
8. Investor Confidence Project
9. Time-of-Use
10. Demand Response
11. Access to Data Initiatives (a. Green Button, b. BPS, c. EWRB & d. HERD)
12. Municipal Energy Plans
13. Energy Conservation Education and Awareness

1. Product Efficiency Standards

Overview

- Energy efficiency standards for products and appliances are among the most cost-effective approaches to improving energy efficiency and reducing greenhouse gas emissions.
- LTEP 2017 reaffirmed Ontario's commitment to continue to show leadership in regularly updating its energy efficiency regulation by setting/adopting energy efficiency standards for products and appliances using electricity, natural gas, oil and propane and found in residential, commercial and industrial sectors. LTEP also committed to exploring opportunities to set or update energy efficiency standards for key electrical equipment in drinking water and wastewater treatment plants.
- Ontario has been regulating the efficiency of products and appliances for almost 30 years, and currently regulates over 80 types of products - more products than any other jurisdiction in Canada (including Natural Resources Canada).
- Since 2012, Ontario has updated its energy efficiency regulation 8 times with new and enhanced efficiency standards for over 60 products and has implemented water efficiency standards for products which consume both energy and water. Setting water efficiency standards will further contribute towards reducing energy and water consumption and GHG emissions in Ontario.
- Amendments to the energy efficiency regulation, implemented after 2012, are estimated to result in approximately 20 TWh of electricity savings (equivalent to taking 2 million homes off the grid) and 29 petajoules (PJ) of natural gas and oil savings (equivalent to energy used by 360,000 homes) in 2032. This would reduce GHG emissions by 8 mega tonnes (MT) carbon dioxide equivalents (CO₂e) in 2032, equivalent to taking 1.8 million vehicles off the road in that year.

*Note: 8 MT CO₂e is based on natural gas conversion factor from MOECC (based on United Nation Framework Convention on Climate Change 2016 Canadian National Inventory Report data) and electricity conversion factors from the IESO.

1. Product Efficiency Standards (cont'd)

Overview (cont'd)

- On January 1, 2018 a regulatory amendment including new and revised/enhanced efficiency requirements for 12 products will become effective. The amendment is estimated to result in around 10.2 PJ/year (2.83 TWh/year) of electricity savings in 2032 (equivalent to taking approximately 300,000 homes off the grid) which would reduce GHG emissions by 0.9 Mt of CO₂ in 2032, equivalent to taking approximately 210,000 vehicles off the road in that year.
- Ontario actively participates and co-chairs energy efficiency working groups established to support the goals of the Canadian Energy Strategy (CES) and the Energy and Mines Ministers Conference (EMMC) to advance energy efficiency efforts in Canada.
 - Work has been initiated with other provinces and the federal government on national harmonization and advancement of efficiency standards across Canada and collaboration on market transformation initiatives for space and water heating technologies and residential windows.

Next Steps

- **January 1, 2018** – Amendment 23 to Ontario's energy efficiency regulation will go into effect, introducing new and updated efficiency standards for 12 electrical products.
- **Winter 2017** – Initiate work on identifying and evaluating products to include in next amendment to efficiency regulation.
- **Winter 2017** - Initiate procurement for a study to help inform a regulatory proposal for updated energy efficiency standards for key energy-using products and equipment found in drinking water and wastewater treatment plants.

2. Conservation Programs For Home

- A sample of energy conservation programs for residential consumers:

SAVE_{ON} ENERGY
POWER WHAT'S NEXT

save_{ON}energyTM
HEATING AND COOLING
INCENTIVE



ENBRIDGE



uniongas
An Enbridge Company

WE PAY. YOU SAVE.
THE HOME WEATHERIZATION PROGRAM



LEARN MORE ABOUT ENERGY EFFICIENCY WHERE YOU LIVE

Visit SaveonEnergy.ca/Consumer as your guide to discover even more ways to maximize energy savings and lower household costs.

Download coupons at saveonenergy.ca and save on a wide range of energy-efficient products

Try our Tips Tool at saveonenergy.ca

Contact your local hydro company to find out about more programs in your area

Follow us for the latest updates on rebates and home energy savings

HOME ENERGY CONSERVATION INCENTIVE PROGRAM
With funding from Ontario's Green Investment Fund

This home energy incentive program is brought to you by a partnership between your gas company, Save on Energy, and the Ontario Green Investment Fund.

SAVE_{ON} ENERGY
POWER WHAT'S NEXT

ENBRIDGE
Life-Smart Energy

uniongas
An Enbridge Company

Ontario

Save on Energy is a member of the Independent Electricity System Operator (IESO). Subject to additional terms and conditions. Subject to change without notice.

2. Conservation Programs for Business

- A sample of electricity and natural gas conservation programs for businesses:



Uniongas
A Spectra Energy Company

Incentives
Explore energy programs that help save on costs and meet your energy-management goals.

- [Space Heating](#)
- [Water Heating](#)
- [Cooking](#)
- [Custom Engineering Projects](#)

Commercial Incentives and Services

Enbridge offers a variety of solutions to meet your specific Commercial energy needs to help you reduce your energy consumption and improve your bottom line.



RETROFIT INCENTIVES



RUNITRIGHT PROGRAM



OZONE LAUNDRY



BOILER PROGRAMS



SHOWERHEAD REBATE PROGRAM




save on energy™
FOR BUSINESS

Small Business Refrigeration Incentive: Up to \$2,500 in refrigeration upgrades

Small Business Lighting: Up to \$2,000 in new energy efficient lighting

Audit Funding: Up to 50% of the cost of an energy audit to identify opportunities for energy efficiency upgrades and eligible incentives

Retrofit: Up to 50% of project costs for upgrading old or inefficient equipment

Process System Upgrades: Up to \$50,000 for engineering studies and up to 70% of capital costs for energy efficiency upgrades

Others: Existing Building Commissioning, Energy Managers, New Home Construction, Training and Support

3. Electricity Conservation Framework

Overview

- Launched January 1, 2015, the **Conservation First Framework (CFF)**, overseen by the Independent Electricity System Operator (IESO), governs the delivery of electricity conservation and energy efficiency programs and provides the funding, guidelines and certainty needed for LDCs to deliver conservation programs to their customers.
- The CFF is expected to achieve **7 TWh of savings in 2020**, assisting the province in achieving its long-term conservation target of 30 TWh in 2032.
 - \$2.7 billion from electricity ratepayers is planned to be spent on conservation programs under the CFF between 2015-2020 to achieve this target.
 - Programs are required to be cost-effective; exceptions are for educational programs, and programs targeted to on-reserve First Nation customers and low-income customers.
 - The CFF builds on the success of current programs and supports the development of new programs to meet local needs and offer more choice for consumers.
- In addition to the CFF, **the Industrial Accelerator Program (IAP)** is expected to achieve **1.7 TWh** of savings from transmission-connected industrial and commercial customers.
 - IAP is delivered by the IESO and designed to assist eligible transmission-connected companies to fast track capital investment in major energy conservation projects, and provides access to experienced Energy Managers.
 - Underspending in the \$660 million IAP budget, which was established in March 2010, will be used to fund the Industrial Accelerator Program over the 2015-2020 period.
- In December 2016, the IESO published final 2015 CFF results. LDCs delivered 1,281 GWh in electricity savings (79% from business programs), and 49 GWh through IAP.

3. Electricity Conservation Framework (cont'd)

Overview (cont'd)

- All 68 LDCs covered under the CFF have 2015-2020 CDM plans in place, which outline how LDCs will meet their conservation targets through province-wide, regional and/or local programs.
- The IESO invests in **energy-efficiency innovation** through three funds:
 - Conservation Fund open to all sectors to develop new programs (~\$9.5 million per year)
 - LDC Innovation Fund to support pilot and market testing (\$70 million from 2015-2020), and
 - Collaboration Fund to encourage LDC and gas utility collaboration (\$25 million, 2015-2020)
- Electricity utilities have proposed **approximately 40 unique program types under the CFF** in their conservation and demand management (CDM) plans (pilots are funded using the LDC Innovation Fund).
- Examples of **new regional and local conservation programs** being offered by LDCs include:
 - Under Toronto Hydro and Enbridge's collaborative Local Adaptive Thermostat Program, a customer can receive a \$50 rebate from Toronto Hydro and a \$50 rebate from Enbridge towards the cost of a smart thermostat (typical cost is \$250).
 - Home energy report / social benchmarking programs offer customers information using various platforms to help manage their energy usage and costs. Hydro One, Hydro Ottawa, Toronto Hydro and Alectra (including Collus Powerstream) are currently delivering these programs (15 LDCs have social benchmarking programs in their CDM plans).

3. Electricity Conservation Framework (cont'd)

Overview (cont'd)

- In June 2016, the IESO completed an **Achievable Potential Study** for electricity conservation in Ontario, which will inform regional and long term planning as well as the mid-term review of CFF..
- In November 2016, the IESO began a **mid-term review** of the CFF and IAP, looking at overall and LDC CDM targets and budgets, how the programs are meeting customer needs, and alignment with the Climate Change Action Plan. The review is required to be completed by June 1, 2018.

Next Steps

- **Ongoing to end of 2020:** LDCs will continue to design, apply for and launch new pilots and programs. IESO will continue to offer IAP.
 - A Conservation First Implementation Committee (CFIC), co-chaired by IESO and Toronto Hydro and including electricity and gas utilities, is meeting regularly to provide oversight to electricity utility Working Groups, through which new province-wide programs are developed.
- **January 2018:** Launch of IESO-delivered, enhanced Home Assistance Program, as required through August 4, 2017 direction from the Minister.
- **February 2018:** IESO Indigenous Conservation Programming report on options to improve conservation programs to be submitted to ministry, as per LTEP Directive to IESO.
- **March 2018:** IESO to submit Mid-Term Review report and recommendations to the ministry.
- **June 1, 2018:** CFF and IAP MTR complete.
- **July 1, 2018:** Behind the meter generation projects using supplied fossil fuels no longer eligible for incentives under the CFF and IAP to align with CCAP (2017 LTEP policy).

3. Natural Gas Conservation Framework

Overview

- The Demand Side Management (DSM) Framework is established and overseen by the OEB.
 - Launched December 22, 2014, the six-year DSM Framework, governs the delivery of natural gas conservation and energy efficiency programs and provides the funding, guidelines and certainty needed for natural gas utilities to deliver programs to their customers.
 - The DSM Framework provides proven, established and rigorous oversight for the delivery of natural gas energy efficiency programs, with an emphasis on delivering cost-effective programs.
- The OEB approved DSM plans/programs for Enbridge and Union Gas on January 21, 2016, following a hearing process that permitted stakeholders to provide input and ask questions about the plans.
 - **Budgets:** 2015-2020 total budgets are more than double historic spending (Enbridge- ~\$70 million per year: Union - \$60 million per year)
- In July 2016, the OEB released an “Achievable Potential Study” for natural gas utility DSM programs. The study results confirm there is significant potential for incremental cost-effective natural gas conservation and energy efficiency beyond current activity levels.

DSM Framework (2015-2020)

- Doubles budgets – total budget of approximately \$825 million* has been approved – bringing Ontario’s total spending on natural gas conservation programs in-line with leading U.S. jurisdictions, allowing natural gas utilities to pursue greater levels of natural gas savings.
- Encourages coordination and integration of natural gas with electricity conservation programs.
- Extends programs for low-income consumers across the province

*Includes \$125 million in maximum shareholder incentive (\$10.45 M/utility/year).

3. Natural Gas Conservation Framework (cont'd)

Overview (cont'd)

- The OEB encouraged Enbridge and Union Gas to meet with the IESO with the objective of developing and jointly implementing conservation programs with electricity utilities.
- On June 20, 2017, the OEB issued a public letter initiating the mid-term review of the DSM Framework. The review is expected to be complete by December 1, 2018. The review is looking at gas utility budgets and targets, how the programs are meeting customer needs, and interactions with Ontario's cap and trade program.

Next Steps

- **Ongoing** – Enbridge and Union Gas offering and refining DSM programs.
- **December 1, 2018** – OEB to complete a formal mid-term review of the DSM Framework.

4. Green Investment Fund

Home Energy Audit and Retrofit Programs

Overview

- In November 2015, Ontario announced in its Fall Economic Outlook and Fiscal Review Statement the creation of a \$325 million Green Investment Fund (GIF).
 - GIF is a down payment on the province's cap and trade program to strengthen the economy, create jobs and reduce greenhouse gas (GHG) emissions.
 - GIF includes a number of funding commitments to support implementation of Ontario's Climate Change Strategy.
- In February 2016, Ontario announced a \$100M investment from the GIF to expand the home energy audits and retrofit programs delivered by Enbridge Gas Distribution and Union Gas. The \$100M GIF investment:
 - Expands Enbridge and Union's existing home audit and retrofit programs, the Home Energy Conservation (HEC) and Home Reno Rebate (HRR) programs respectively, to residential customers across Ontario including those outside of Enbridge and Union service territories that use natural gas, oil, propane and wood for primary heating.
 - Will help a total of approximately 37,000 additional homeowners conduct audits to identify energy-saving opportunities and then complete retrofits.
 - Save an estimated 1.6 million tonnes of GHG emissions.
- ENERGY signed Transfer Payment Agreements with Enbridge and Union, and provided funding for these programs as one-time transfer of funds (~\$58M to Enbridge, ~\$42M to Union) with programs offered from 2016 to 2019. Union's participant target is 12,000 and Enbridge's participant target is 25,000.

4. Green Investment Fund

Home Energy Audit and Retrofit Programs (cont'd)

Overview (cont'd)

- On October 31, 2016 the Premier, ENERGY and MOECC Ministers along with senior executives from Enbridge and Union participated in the province-wide launch of the home energy audits and retrofit program expanded through the Green Investment Fund.
- As of May 29, 2017, the Enbridge and Union Gas programs were further enhanced through the IESO Whole Home Pilot program to include homes heated with electricity and additional electricity incentives.
- ENERGY staff continue to meet regularly with Enbridge and Union as they deliver the programs to 2019. ENERGY, Enbridge and Union also continue to engage with relevant stakeholders, including the three additional gas utilities in Ontario (Kitchener, Kingston and Natural Resource Gas Limited); the Canadian Propane and Oil Associations, and the Hearth, Patio and Barbecue Association.
- As of September 30, 2017, the utilities have reported over 7,000 participants.
- Based on strong program participation Union projects that it will need to close its program to new participants by February 2018. To ensure program continuity, Union is requesting additional funds to accommodate an additional 4,000 participants.

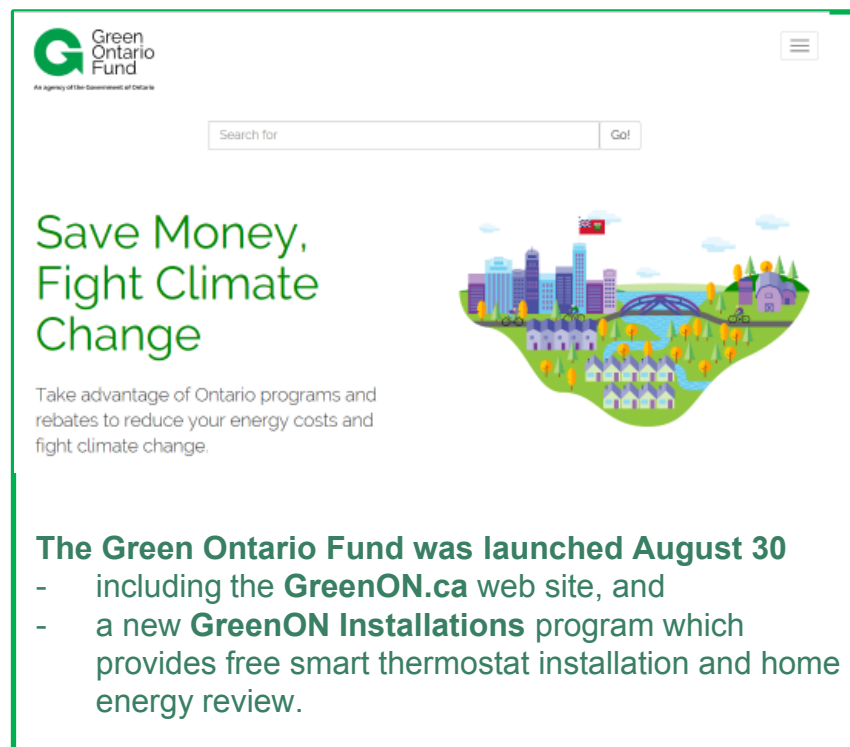
Next Steps

- **Winter 2017/2018:** Seek approval for funding from MOECC to extend Union's enhanced HRR program to 2019 and ensure the continuity of a province-wide multi-fuels program.

5. Support for GreenON Program Development

Overview

- The 2016-2020 CCAP proposed that the 'green bank' would help households understand existing incentive programs, provide low-interest financing and support large commercial and industrial GHG reducing projects.
- Per the May 2016 CCAP Cabinet Minute, ENERGY is working with MOECC to support establishment of the Ontario Climate Change Solutions Deployment Corporation (OCCSDC) (public-facing name now "Green Ontario Fund").
- GreenON is providing:
 - One-window service to Ontarians seeking support, information and access to all GHG-related programs in the province (including existing programs under the CFF and DSM Framework);
 - Oversight of competitively contracted program delivery.
- On February 13, 2017, the Minister of Energy wrote a letter to IESO requesting that the IESO support the implementation and early adoption of Green Ontario Fund services.



The screenshot shows the Green Ontario Fund website. At the top left is the logo for the Green Ontario Fund, with the text "An Agency of the Government of Ontario" below it. To the right of the logo is a search bar with the placeholder text "Search for" and a "Go!" button. Below the search bar, the main heading reads "Save Money, Fight Climate Change" in green. To the right of this heading is a colorful illustration of a city skyline with houses in the foreground. Below the heading, a paragraph states: "Take advantage of Ontario programs and rebates to reduce your energy costs and fight climate change." At the bottom, a section titled "The Green Ontario Fund was launched August 30" lists two bullet points: "including the **GreenON.ca** web site, and" and "a new **GreenON Installations** program which provides free smart thermostat installation and home energy review."

5. Support for GreenON Program Development (cont'd)

Overview (cont'd)

- In April, 2017, IESO and MOECC executed a Service-Level Agreement, for IESO to support development/implementation of GreenON (including website, customer support, and program design).
- On August 4, 2017, the Minister of Energy issued an amending direction to the March 31, 2014 Minister's direction establishing the 2015-2020 CFF to enable IESO to enter into an agreement with MOECC to support the design and delivery of GreenON programs, and, among other things, to:
 - Make reasonable efforts to avoid marketplace confusion and make prudent use of funds by avoiding duplication, and
 - Ensure there are cost-effectiveness thresholds or requirements and EM&V of the associated energy savings.
- IESO and MOECC executed a collaboration agreement in October 2017.
- On August 30, 2017, Ontario announced Green Ontario Fund launch, including website (GreenON.ca) and first program: GreenON Installations (free smart thermostat and home energy review).

Next Steps:

- **Ongoing:** ENERGY, IESO, and MOECC are working through considerations for potential incentive stacking and harmonization between conservation and Green Ontario Fund programs.
- **December 2017:** Program launches: GreenON Rebates (low-carbon technology) for homes, including smart thermostat rebates (\$100); GreenON Support (recommendations report based on GreenON Installations home energy review).
- **In 2018:** Other programs to meet CCAP commitments introduced, including for businesses, low income and indigenous communities.

6. Affordability Fund

Overview

- Established in March 2017 as part of Ontario Fair Hydro Plan.
- Funded by Ontario Government - \$100 million from tax base, and governed by an **independent trust** – social service and utility sectors.
- Administrative support is being provided by Hydro One through an administrative services agreement with the trust.
- Consultations on program design took place in the summer and the Fund officially launched on October 24, 2017.
- Eligible customers will benefit from energy efficiency upgrades to home to reduce their electricity bills over the long-term.
- Designed as additional tool for utilities to assist customers in need of support, who do not qualify for the Home Assistance Program (HAP).
- Measures to align with HAP and dependent on level of burden a customer experiences and whether home is electrically-heated.:
 - Energy efficient measures (e.g., power bars, block heater timers, LEDs)
 - Energy efficient appliances (e.g., refrigerator, window AC)
 - For electrically heated homes, comprehensive draft proofing, insulation, etc. and heat pumps



Affordabilityfund.org
or 1-855-494-FUND

Next Steps

- December 2017:** Affordability Fund Trust expects to enter into agreements with interested electricity distributors (Hydro One will deliver in service areas of those distributors who do not apply)
- Ongoing:** The Fund will have an iterative design process to support continuous improvement, and will revisit design elements every 6 months and measures every 3 months

7. In Front of the Meter Conservation

Overview

- In Front of the Meter Conservation (IFMC) technologies reduce line losses and optimize voltage levels on the distribution system. They can cost-effectively save electricity, reduce peak demand and defer infrastructure upgrades.
- Several pilots across North America have demonstrated the potential benefits of deploying IFMC technologies, and the Smart Grid Fund and the Conservation Fund have supported pilots in Ontario.
- ENERGY procured a study to explore IFMC barriers, opportunities, costs and benefits in Ontario.* The study found that the most barriers in Ontario are financial and regulatory and that IFMC can be cost-effectively deployed on approximately 30% of Ontario's distribution systems.
- 2017 LTEP announced a policy to address the key barriers, where LDCs can count electricity savings from distribution-rate funded IFMC projects towards their CDM targets under the 2015-2020 Conservation First Framework.

Next Steps

- The IESO is working with the OEB to implement this policy and provide further guidance to LDCs, such as on updating CDM plans to include IFMC projects, and describing the process for Evaluation, Measurement and Verification (EM&V).

**The IFMC report conducted by Navigant can be found here: <https://www.ontarioenergyreport.ca/data-catalogue.php#LTEP-supporting-reports>*

8. Investor Confidence Project

Overview

- The Investor Confidence Project (ICP) unlocks access to financing for the building renovation market by standardizing how energy efficiency projects are developed, documented and measured. Individual projects can then be aggregated and traded by institutional investors on secondary markets – just like mortgages or other asset-backed securities.
- ICP was established in 2013 by the Environmental Defense Fund (EDF). In October 2016 EDF entered into a partnership with Green Business Certification Inc. (GBCI), through which GBCI assumed ownership of the ICP Protocols.
 - A number of states including New Jersey, New York, Texas and Connecticut have been encouraging adoption of ICP protocols among financial institutions.
 - In 2015, the European Commission awarded \$3M to establish the European version of the project, ICP Europe. The funds will be used to develop protocols for Austria, Bulgaria, Germany, Portugal and the U.K.
- In December 2016, GBCI invited MaRS to work with them to explore ICP's applicability in Canada.
- March 2017: The Province signed a TPA with MaRS to pilot the ICP Protocols in Ontario and identify how the Protocols can be adapted for the Canadian market.

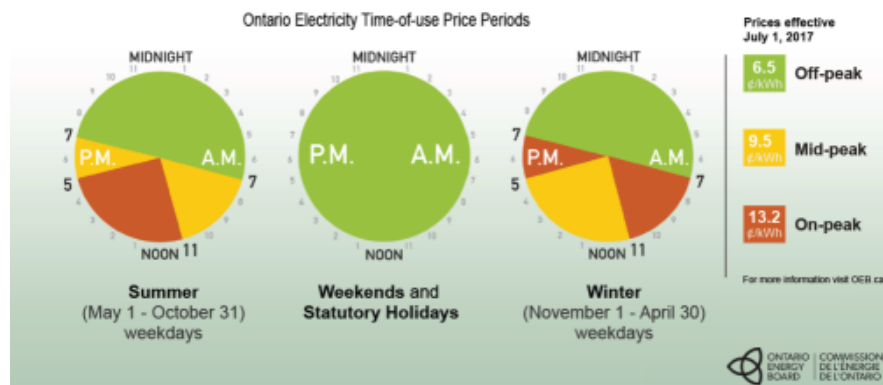
Next steps

- **Early 2018:** MaRS to hold an Open House on ICP for interested stakeholders.
- **Mid-2018:** MaRS to initiate the ICP pilot in Ontario.

9. Time-of-Use Pricing

Overview

- Smart meters have enabled time-of-use (TOU) pricing. In Ontario, TOU pricing applies to all household and small business customers (general service <50kW) on the Regulated Price Plan (RPP).
- TOU rates are designed to reflect the cost of producing it throughout the day.
 - Prices are lower when demand can be satisfied with lower cost sources of generation (nuclear) and rise as demand increases and more expensive forms of generation (natural gas) are called on.
- Based on 12 month projections of demand and supply costs, the OEB sets TOU rates every six months in co-ordination with the main shift in the timing of peak demand from Summer to Winter.
- By encouraging consumers to load shift from peak periods to off-peak periods, TOU is intended to:
 - Assist customers in managing their electricity costs.
 - Help avoid or defer the need for investments in new generation, transmission and distribution by reducing peak demand.
- A study commissioned by the IESO indicated that TOU pricing reduced Ontario's residential electricity consumption during summer peak periods by 1 to 2%, between 2012 and 2014.



9. Time-of-Use Pricing (cont'd)

Overview (cont'd)

- In November 2015, the OEB released a three to five-year roadmap for redesigning the RPP (“RPP Roadmap”):
 1. Renewing RPP Objectives: To place a greater focus on peak demand reduction, efficient system operation and long-run system costs.
 2. Empowering Consumers: By enhancing energy literacy and non-price tools.
 3. Price Pilots: OEB will design and execute pilots to assess customer response to alternative price structures.
 4. Engaging with Low Volume Business Consumers: OEB intends to undertake a significant data collection initiative to better understand the needs of small business consumers.
 5. Working with Government to Reduce Barriers: OEB will work with the government and IESO to reduce barriers to set optimal pricing.
- In order to facilitate the price pilots, Ontario amended O. Reg. 95/05 Classes of Consumers and Determination of Rates on December 19, 2016 to allow the OEB to set different off-peak periods for the purposes of electricity price pilots.
- The OEB has approved RPP Price Pilot proposals from London Hydro, Alectra Utilities, Oshawa PUC Ltd. and Hydro One. These utilities will pilot different innovative TOU price structures, and combined, the four pilots will aim to recruit 22,500 customers.

Next steps

- **First half 2018:** Pricing treatments are expected to start for all pilots.
- **End of 2019:** Pilot results and analysis to be shared with the OEB and made publicly available.
- **2018 – 2020:** OEB is expected to complete all aspects of their Roadmap to redesign the RPP.
- **2020:** OEB to consider pilot results and determine what if any new price plans could be made available to all Ontarians.

10. Demand Response Auction

Overview

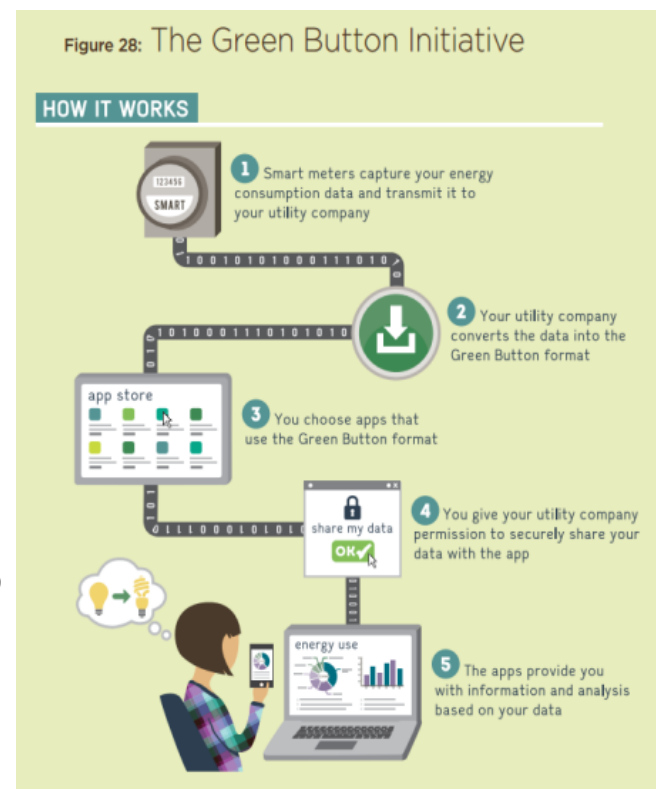
- Demand Response (DR) initiatives provide price or financial incentives to consumers to shift or reduce their electricity usage when needed.
- The IESO has transitioned from securing DR through multi-year contracts to an **annual DR auction**.
 - IESO's second demand response auction in December 2016 procured approximately 455 MW for the summer commitment period (May 2017 to October 2017) and approximately 478 MW for the winter commitment period (November 2017 to April 2018).
 - As of Summer 2017, 687 contributors, including grocery stores, farms, factories and municipal facilities, were providing demand response services through the auction
- The IESO is also running **DR pilot projects** to learn more about the operational capabilities of DR.
- DR auction participation is open to resources with peak load greater than 1 MW (e.g. industrial consumers, aggregators etc.).
- 2017 LTEP indicated that DR capacity realized each year will depend on system needs and the competitiveness of DR with other resources.
- The DR auction is expected to transition into the IESO's incremental capacity auction in 2020, where DR resources will be able to compete directly with traditional supply resources to meet resource needs.

Next steps

- **Ongoing** – DR Working Group meetings
- **December 2017** – Third DR auction to take place

11. Access to Data – a. Green Button

- Ontario introduced Green Button in 2012 and was the first jurisdiction in Canada to adopt the standard after it was developed in the US.
- The Green Button standard can empower residential, commercial, institutional and industrial customers to access (i.e., “Download My Data” or DMD) and share (i.e., “Connect My Data” or CMD) their electricity, natural gas and water utility data (consumption, billing, and generation) in an electronic, standardized and secure way.
- When customers share their data with developers they can use innovative software applications that allow them to manage their energy and water usage and bills.
- Adoption of Green Button is currently voluntary for Ontario’s utilities:
 - ~10 electricity utilities representing 60% of residential and small business customers have implemented DMD.
 - London Hydro and Hydro One have implemented CMD for electricity consumption data. Festival Hydro and Whitby Hydro have implemented CMD through London Hydro’s hosted services.
- The 2017 LTEP confirmed the government’s commitment to expanding Green Button province-wide and announced the government’s intention to propose legislation that would, if passed, allow Ontario to require electricity and natural gas utilities to implement Green Button Download my Data and Connect my Data.



11. Access to Data – a. Green Button (cont'd)

- The ministry issued a Request for Bids (RFB) in October 2017 to procure a technical consultant for support in developing Green Button implementation support documents for electricity, natural gas and water utilities.
 - Support documents will support voluntary implementation by water utilities with metering infrastructure.
- On November 14, 2017, proposed legislative amendments to the *Green Energy Act, 2009* (GEA) and *Ontario Energy Board Act, 1998* (OEBA) were introduced, as part of the government's Fall Economic Statement Bill, to enable the province-wide implementation of Green Button.
 - Proposed amendments to the GEA would enable the creation of a regulatory framework, which may include:
 - Requiring electricity and natural gas utilities to make their customers' energy data available to the customers or to other persons authorized by the customers as prescribed in regulation and meet certification requirements as may be prescribed in regulation, by a deadline to be set in regulation.
 - Giving the Ontario Energy Board (OEB) the authority to grant extensions of time to comply with the proposed requirements.
 - Proposed amendments to the OEBA would enable the OEB to use its existing compliance mechanisms to ensure electricity and natural gas utilities comply with the proposed requirements
- On November 29, 2017, the ministry posted a Green Button regulatory proposal on the Environmental and Regulatory registries for public comment.
 - The regulatory proposal proposes July 1, 2020 as the deadline for utility implementation.
 - Stakeholders will have until January 20, 2018 to respond to the proposal.

Next Steps

- **December 2017** – Hire a technical consultant to develop implementation support documents.
- **Early 2017** – Establish electricity, natural gas and water Technical Working Groups and an Umbrella.
- **March 2017 (TBD)**: Seek LRC/CAB approval of regulation.
- **July 1, 2017**: Proposed in-force date of regulation if legislation/regulation passed.

11. Access to Data – b. Broader Public Sector Reporting

Overview

- Ontario Regulation 397/11 Energy Conservation and Demand Management Plans requires Broader Public Sector (BPS) organizations to:
 - Report annually to ENERGY on their energy use and greenhouse gas emissions and publish the reports on their websites, as of July 1, 2013.
 - Develop and publish on their websites a conservation plan every five years, as of July 1, 2014.
- Reporting under the regulation is high. In 2017, 99% (705 organizations) of broader public sector organizations reported to the Ministry. Previous compliance rates have been in the 93% to 98% range. In addition, 82% of broader public sector organizations developed conservation and demand management plans in 2014.
- BPS reporting portal was opened in March 2017 for organizations to report their 2015 energy data by July 1, 2017. ENERGY hosted webinars and conducted additional outreach to assist BPS organizations to report under the regulation.
- ENERGY continues to make the information reported by BPS organizations publicly available on Ontario's Open Data website.
- This allows the public to more easily access all BPS annual energy and GHG reports in one place.
- The Environmental Commissioner's 2015-2016 report, Conservation: Let's Get Serious Annual Energy Conservation Progress Report – 2015-2016, included commentary on O. Reg. 397/11, noting that "mandatory energy reporting in the broader public sector is already producing valuable environmental and financial benefits."

Next steps

- **Fall/Winter 2017**– 2017 raw and weather normalized data, along with the names of the organizations that did not report to be posted on Open Data.

11. Access to Data – c. Large Building Energy and Water Reporting & Benchmarking

Overview

- Energy and Water Reporting and Benchmarking (EWRB) is the ongoing review of a building's energy and water consumption to compare it to its own past performance and the performance of other similar buildings.
- A large building EWRB initiative can help building owners:
 - Better manage energy and water use and costs;
 - Identify best practices and energy and water-saving opportunities;
 - Set goals by providing a benchmark;
 - Evaluate results by comparing to similar facilities across the province;
 - Measure improvement over time; and
 - Value energy efficient and water efficient buildings.
- Disclosure of building data also allows the market to value efficiency in purchasing, leasing and lending decisions.
- On February 6, 2017, Ontario introduced Ontario Regulation 20/17, requiring mandatory energy and water reporting and benchmarking for large private sector buildings (EWRB).
- In September 2017 an EWRB Stakeholder Working Group was created to support EWRB implementation.
- In October 2017, ENERGY's IT Customer Relationship Management (CRM) system to support program administration and Service Ontario's contact centre to handle calls/emails from the public went live. Education and training materials have also been developed.
- In November 2017, a reporting pilot was initiated with approximately 40 buildings.



“When there’s a scoreboard, people play differently”

- Ben Myers, Sustainability Manager, Boston Properties

Next Steps

- **December 2017** – EWRB pilot will end and feedback will be gathered from pilot participants.
- **Early 2018** – Initial communication to building owners to require reporting.
- **July 1, 2018** - First reporting deadline for buildings 250,000 square feet and above.

11. Access to Data – d. Home Energy Rating and Disclosure

Overview

- Home Energy Rating and Disclosure (HERD) involves the evaluation of a home's energy performance, and the disclosure of the performance report or rating to a prospective buyer at time of listing the property for sale.
- The *Green Energy Act, 2009* enables the government to implement a regulation requiring the disclosure of home energy efficiency information at time of sale. This section of the Act has not been proclaimed.
- The Climate Change Action Plan committed to the development of a HER&D program for implementation in 2019 to provide free energy audits for homes listed for sale. Energy audits would be required before a new or existing single-family home can be listed for sale, and the energy rating will be included in the real estate listing.
- In October 2016, ENERGY formed a Stakeholder Working Group to help inform the development of a proposed implementation plan for HER&D program. The Stakeholder Working Group sessions concluded in May 2017.
- As set out in the 2017 LTEP, the Province is examining options to deliver a Home Energy Rating and Disclosure program that would improve customer awareness by allowing homebuyers to compare homes by energy rating and encourage uptake of retrofit incentive programs.

Next steps

- ENERGY will report back to Cabinet in winter 2018.

12. Municipal Energy Plan Program

Overview

- The Municipal Energy Plan (MEP) program helps municipalities develop community energy plans.
- A MEP is a comprehensive plan designed to align energy, the built environment, land use planning, and climate change issues to identify opportunities for community-wide energy efficiency, green energy, greenhouse gas emissions reductions, and economic development.
- The program has two funding streams:
 - Stream 1: Up to 50% of eligible costs to a maximum of \$90,000 to support the development of a full MEP
 - Stream 2: Up to 50% of eligible costs to a maximum of \$25,000 to support an energy plan related initiatives including supporting studies, new energy mapping and additional consultation or enhancement.
- Annual budget for the program is approximately \$1 million.
- To date 24 applications have been approved for funding, representing 37 municipalities across Ontario including:
 - Town of Aurora, Municipality of Bayham, City of Burlington, Town of Caledon, Municipality of Chatham-Kent, Durham Region, City of Greater Sudbury, City of Guelph, City of Kenora, City of Kingston, City of London, City of Markham, Municipality of Middlesex Centre, City of Mississauga, Town of Newmarket, City of Sault Ste. Marie, Municipality of Sioux Lookout, City of Temiskaming Shores, City of Toronto, City of Vaughan, Region of Waterloo, Municipality of Wawa, City of Windsor, City of Woodstock.

12. Municipal Energy Plan Program (cont'd)

Overview (cont'd)

- The Climate Change Action Plan Cabinet Minute noted that:
 - MOECC will work with MMAH and ENERGY to develop a funding program to support the development of climate change action plans, and community energy and GHG reduction plans, in municipalities and report back to Cabinet in 2016 with program details and a proposed path forward for implementation in 2017.
- MOECC launched the Municipal GHG Challenge Fund on August 14, 2017 announcing up to \$100 million of proceeds from Ontario's carbon market in 2017/18 for municipal greenhouse gas reduction projects in the waste, buildings, energy supply, water and/or transportation sectors. Municipalities may request up to \$10 million per project. Municipalities were invited to submit applications for the fund by November 17, 2017. MEP program participation is a path to eligibility for the province's Municipal GHG Challenge Fund.

Next steps

- **Fall 2017**
 - ENERGY is working with MOECC and MMA on the development of MAPP with a target launch of early 2018.
 - ENERGY is participating in the evaluation of applications submitted under the Municipal GHG Challenge Fund.

13. Energy Conservation Education and Awareness

Overview

- Energy conservation education and awareness provides consumers with information to better understand the benefits of energy conservation and empower them to make more informed decisions about their energy usage choices and change behavior.
- emPOWERme – a website established and maintained by ENERGY – provides an overview of Ontario's energy sector and explains how generation, transmission, and distribution networks function together to ensure ratepayers and citizens have access to clean and reliable electricity.
- In Spring 2016, Save on Energy revealed a full brand revitalization and market re-launch, including broad advertising. The new campaign emphasizes how saving energy gives customers new opportunities and successes, and affords electricity utilities more flexibility to communicate with their customers.
- ENERGY is providing multi-year funding (2015/16 – 2018/19) to York University for its Ontario EcoSchools Program ("EcoSchools") to help support the engagement of more EcoSchools, sustain and retain participation of already committed EcoSchools, and create stronger EcoSchools by increasing participation in the highest certification levels. Funding will enable EcoSchools to engage over 2,000 schools from 62 school boards, reaching approximately 1 million students from kindergarten to grade 12.
 - September 1, 2017 - EcoSchools started its third (final) year of the Program (as per the TPA).
 - ENERGY continues to work with EcoSchools to track progress and identify potential communications opportunities.

Next steps

- IESO continues to support retail advertising, providing 'air cover' for local LDC marketing and outreach under the Save on Energy brand and web site
- ENERGY will continue to work with EcoSchools to identify future communications opportunities.

Emerging Conservation Initiatives

Demand Model

Transactive Energy

Emerging Conservation Initiatives

Demand Forecasting Capabilities

- ENERGY staff are working towards increasing capabilities in forecasting long-term energy demand (including electrification scenarios) on an integrated fuel basis by developing a demand forecasting tool.
- Enhanced long term energy demand forecasting capabilities will strengthen ENERGY's analytical capabilities to evaluate cost and green house gas impacts of conservation and demand-side policies.

Transactive Energy

- The 2017 LTEP confirmed the government's intention to explore the potential application of new business models to Ontario's energy sector, including peer-to-peer frameworks for transactive energy.
 - One way to implement transactive energy is through Blockchain, a computer protocol that tracks transactions within a marketplace. Blockchain uses secure, distributed databases to enable the trade of renewable electricity, and peer-to-peer demand response opportunities.
- ENERGY and the IESO are monitoring developments and considering opportunities to pilot transactive energy/blockchain implementations.