IESO & OEB Foreword to the 2019 Achievable Potential Study

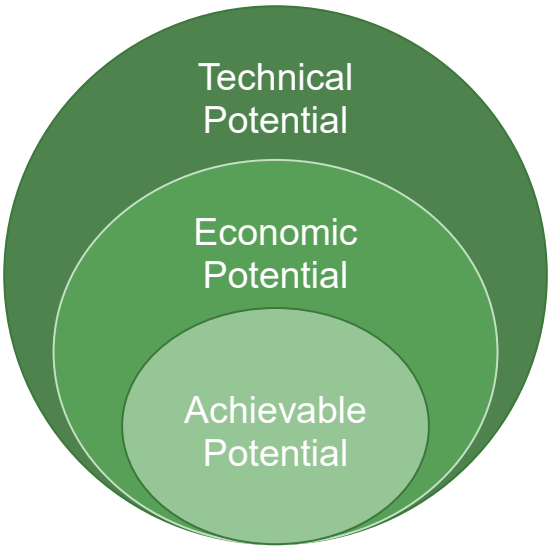
September 30, 2019

The Independent Electricity System Operator (IESO) and the Ontario Energy Board (OEB) are pleased to share the 2019 Integrated Ontario Electricity and Natural Gas Achievable Potential Study (2019 APS) final report. Initiated in early 2018, the report represents considerable time and effort contributed not only by individuals across our organizations and at Navigant Consulting Ltd. (Navigant Consulting), but also from stakeholders. These included the Advisory Group, experts and interested members of the public who reviewed the inputs and results of the study and shared their valuable insights. The IESO and OEB want to thank everyone who contributed to this project for their hard work and thoughtful perspectives.

What is an Achievable Potential Study?

A conservation achievable potential study is a quantitative analysis of how much energy (electricity and/or natural gas) can be saved through the implementation of energy efficiency measures within a given geographical area (such as a province). The analysis usually includes three main potential screens:

1. **Technical potential** is the total energy savings resulting from the implementation of all technically feasible energy efficiency measures, regardless of cost effectiveness or market acceptance.
2. **Economic potential** is the total energy savings resulting from the implementation of all measures included in the technical potential that also pass cost effectiveness screening (that is their benefits exceed their cost), regardless of market acceptance.
3. **Achievable potential** is the total energy savings taking into account realistic adoption rates of cost-effective measures over the study period considering a number of factors including market barriers, customer payback acceptance, perception of non-energy impacts and awareness of energy efficiency measures.



Context

In 2014, the IESO and OEB received separate directives from the Minister of Energy to undertake achievable potential studies every three years for electricity and natural gas, respectively. Both organizations conducted separate 2016 achievable potential studies,

but coordinated assumptions where appropriate. Since these studies were completed, a growing shift toward more dual-fuel measures and whole home and business programs has driven the need for further integration between the electricity and natural gas sectors. As a result, the IESO and OEB conducted an integrated study for the 2019 APS that considers natural gas, electricity and dual-fuel energy efficiency measures as well as fuel switching measures. The integrated study ensures alignment of measure inputs and forecasting assumptions across fuel types and estimates savings potential from both fuels along with their greenhouse gas (GHG) impacts.

The **Independent Electricity System Operator (IESO)** operates Ontario's power grid 24 hours a day, 365 days a year, ensuring Ontarians receive a reliable and cost-effective source of power when and where they need it. It works with sector partners and engages with communities across Ontario to plan and prepare for the province's electricity needs now and into the future.

In March 2019, the IESO was directed to centrally deliver energy-efficiency programs on a province-wide basis with a focus on business and industrial programs and continued support for low-income and Indigenous communities. As a result, the IESO implemented an Interim Framework in April 2019 for energy-efficiency delivery that will continue until December 31, 2020.

Later this year, the IESO will release an annual planning outlook that will report on electricity system demand and supply resources available over the next 20 years. The 2019 APS will provide valuable information regarding the quantity, type and location of energy efficiency resources available to address near and long term system needs and help inform future energy efficiency policy and/or frameworks in Ontario.

The **Ontario Energy Board (OEB)** is the independent regulator of Ontario's electricity and natural gas sectors, with a broad mandate to regulate in the public interest. The OEB has developed regulatory frameworks for the demand-side management (DSM) activities of natural gas utilities since 1993, the most recent being the 2015-2020 DSM Framework. The OEB also reviews and approves DSM plans for use by Ontario's natural gas utilities whose DSM activities are funded through rates.

The 2016 province-wide natural gas achievable potential study completed by the OEB was used as a reference in the OEB's mid-term review of its 2015-2020 DSM Framework. In 2019, the OEB initiated its consultation process to develop a new framework to replace the 2015-2020 DSM Framework, noting the Government of Ontario's commitment to cost-effective conservation of natural gas as confirmed in the "Preserving and Protecting our Environment for Future Generations: A Made-in-Ontario Environment Plan," policy proposal posted to the Environmental Registry of Ontario, November 28, 2018.[1] The OEB expects that the results of this 2019 APS will be an important reference during the comprehensive review of the 2015-2020 DSM Framework for the purposes of establishing a new framework for the future.

[1] The plan includes a GHG emission reduction scenario of 18 MtCO2e by 2030, 18% of which could come from the gradual expansion of natural gas conservation programs offered by Ontario's natural gas utilities.

Study Objectives

The main objective of the 2019 APS is to identify and quantify energy savings (for both electricity and natural gas) and GHG emission reductions, and associated costs, attainable from energy efficiency and conservation resources for the period 2019-2038.

The 2019 APS is intended to provide data and analysis to inform the development of future conservation policy and/or frameworks; program design, implementation and evaluations; long-term resource planning; and system operations.

As the first integrated achievable potential study in Ontario, the 2019 APS also aimed to capture the dynamic relationship between electricity and natural gas use in order to better support emerging whole home and business energy efficiency measures and programs.

Development of the Study

A number of key parties were involved in the 2019 APS.

- The IESO and the OEB, referred to as the **Project Team**, provided day-to-day oversight and direction for the project.
- The Project Team established an **Advisory Group** made up of local distribution companies, natural gas utilities, customers/customer associations, and other relevant stakeholders to provide advice on development of the project and review project milestones. Representatives from the Ministry of Energy, Northern Development and Mines; Ministry of Environment, Conservation and Parks; and the Office of the Auditor General were observers in the Advisory Group.
- The Project Team also established an independent, third-party **panel of experts** of four professionals to review consultant materials, provide technical guidance and ensure the project was conducted according to industry best practice.
- **Navigant Consulting** was selected by the Project Team to develop the study methodology and undertake the analysis.

Navigant and the Project Team carefully considered input from the Advisory Group provided over 13 meetings and worked to reach agreement with members on study method and assumptions wherever possible. The Advisory Group provided input on a number of matters—such as measure savings assumptions and applicability, data availability, scenario development, and customer adoption rates – that impacted the final 2019 APS results.

To ensure the 2019 APS methodology aligned with best practices in achievable potential studies, the Project Team also sought the advice of the independent expert panel of third-party consultants. Additionally, the Project Team held five public webinars to solicit input from the general public on the study approach and key assumptions. This inclusive and collaborative process brought greater transparency to the design, methodology, and assumptions used for the study.

Summary of Results

The 2019 APS determined that both fuels have significant cost-effective energy-efficiency potential in the near and longer term.

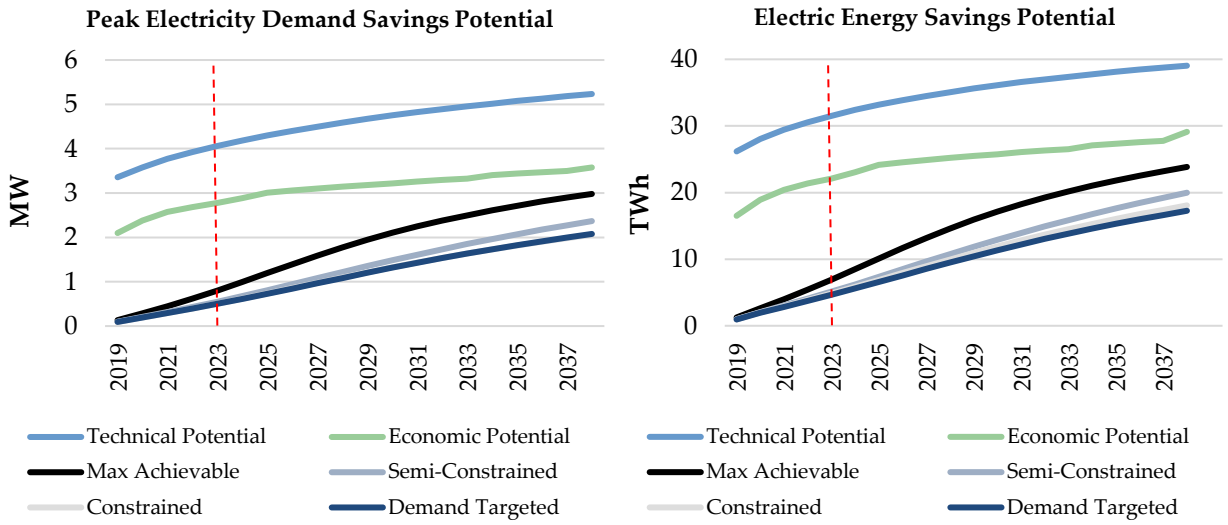
Electricity

All scenarios modeled as part of the 2019 APS show significant and sustained achievable potential for energy efficiency across all sectors. Depending on the type and level of customer incentives provided, peak demand[2] savings potential ranges from 500 to 800 MW in 2023 and from 2,000 to 3,000 MW in 2038.[3] Once planned savings from the past and interim conservation frameworks in 2019-2020 are removed (approximately 200 MW by 2023), between 300 and 600 MW in 2023 of new peak demand savings is expected to be available.

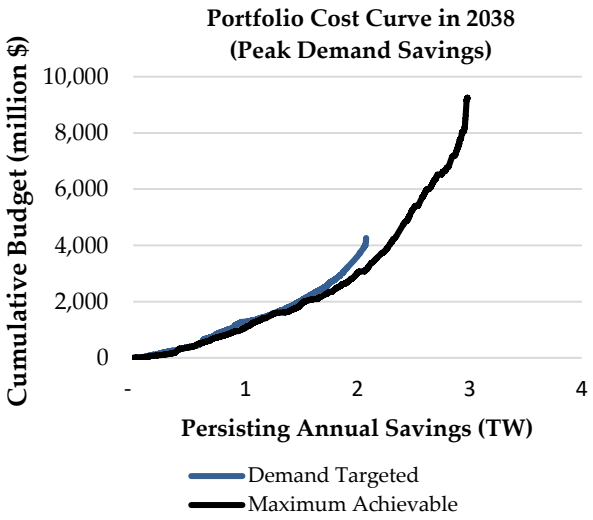
Potential energy savings range from 4.8 to 6.9 TWh in 2023 and from 18 to 24 TWh in 2038. Once planned savings from CFF and Interim Framework programs in 2019-2020 are removed (approximately 2 TWh by 2023) between 2.8 and 4.9 TWh of new energy savings potential is expected to be available in 2023.

[2] Peak demand potential in this study is defined as the average demand reduction during the period from 1pm through 7pm on non-holiday weekdays in June, July and August as per the IESO Evaluation, Measurement and Verification Protocols.

[3] All annual savings potentials reported in the study are based on the cumulative adoption of measures over time (e.g., savings in 2023 represent the potential savings in 2023 of measures adopted in 2019 through 2023).

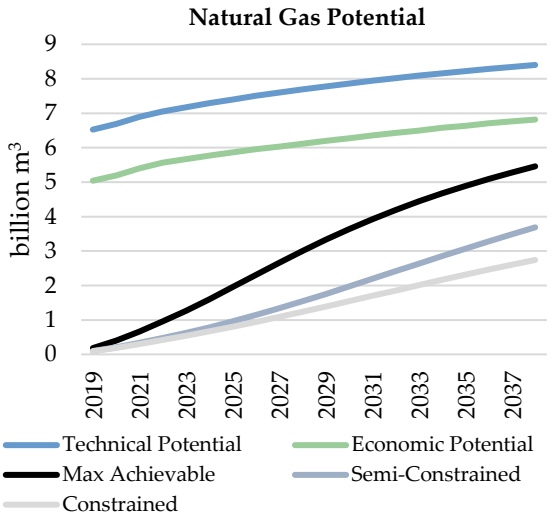


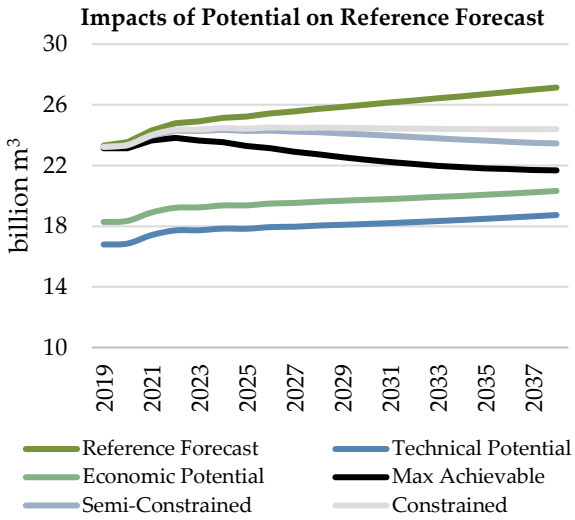
Energy efficiency is expected to continue to be a low cost resource and remains competitive with other resources. Average levelized unit energy costs for energy efficiency incentives at the portfolio level range from 1.5 to 2.7 ¢/kWh in 2023 based on the four scenarios modeled. From a demand perspective, average portfolio level incentive costs range from 86 to 242 $/kW-year for peak demand savings in 2023. Each scenario comprises a unique mix of energy efficiency measures some of which are incented at values above and below the average portfolio energy and demand costs. The 2019 APS provides a wealth of information including cost curves produced as part of the achievable potential modeling, which enable system and program planners to further refine and optimize energy-efficiency measures to align with system needs.



Natural Gas

The 2019 APS has estimated that maintaining current DSM budget levels (Scenario A) would result in annual savings of 542 million cubic metres of natural gas in 2023, 1,542 million cubic metres in 2030, and 2,740 million cubic metres in 2038, equivalent to a 10% reduction in forecast natural gas consumption in the final year of the study. To achieve 25% of the Environment Plan policy proposal 2030 GHG emission reduction scenario for gradual expansion of natural gas conservation programming (Scenario C), DSM costs would be three to four times higher than current budgets. To achieve 125% of that scenario (Scenario B), assuming no budget constraints, DSM costs would be eight to nine times higher.





Next Steps

The IESO and OEB look forward to continuing discussions with stakeholders in the energy efficiency sector, leveraging 2019 APS results and findings to plan for future frameworks and to support other energy efficiency work as appropriate.