



TECHNICAL BACKGROUND

Ministry of Energy

2017 Long-Term Energy Plan: Supply, Demand and Modelling

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Ontario's 2017 Long-Term Energy Plan, *Delivering Fairness and Choice*, provides a road map of the province's energy system over the next 20 years. The Province engaged with people across the province through in-person meetings, online feedback and formal submissions.

Delivering Fairness and Choice focuses on the affordability, use and reliability of a clean energy supply, while offering ways to conserve energy and making it easier for utilities to innovate and invest in modern business and smart grid solutions.

Ontario's Supply Mix

[Insert Balanced Supply Mix Chart here]

- Nearly \$70 billion has been invested in Ontario's electricity system since 2003.
- In 2016, Ontario produced more than 60 per cent of its electricity from nuclear, with renewable resources providing about 30 per cent and emitting generation providing less than 10 per cent.
- Conservation savings achieved since 2006 helped by reducing energy consumption by about 9 per cent in 2016.
- This is a significant transformation compared to 2003, when 25 per cent of generation came from coal. This is due to investments in clean generation and the shut-down of coal-fired generation.

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Supply and Demand Outlook

[Insert Supply And Demand Chart here]

- Ontario's electricity system is well-poised to meet any challenges and pursue any opportunities that may arise over the next 20 years.
- The 2017 LTEP forecasts that electricity demand will be relatively steady over the planning period.
- In the longer term, the Independent Electricity System Operator (IESO) projects an increase in overall demand as electrification of the economy increases. The outlook assumes the equivalent of approximately 2.4 million electric vehicles by 2035 and includes demand from new electrified transit across the province.

- Ontario's long-term target of saving 30 TWh of electricity in 2032 will continue to help offset almost all the forecast growth in electricity demand based on the 2017 LTEP outlook.
- While there is currently an adequate supply of electricity, a shortfall in capacity is expected beginning in the early-to-mid 2020s from the shutdown of the Pickering nuclear generating station and refurbishment outages at the Darlington and Bruce nuclear generating stations.
- The 2017 LTEP supply outlook over the planning horizon maintains the flexibility to respond to future variations in the supply and demand forecasts.
- Ontario is moving away from relying on long-term electricity contracts and is enhancing its market-based approach to reduce electricity supply costs and increase flexibility.
- The IESO has begun a Market Renewal initiative to redesign the province's electricity markets. This is expected to save up to \$5.2 billion between 2021 and 2030, and is a key component of the government's plan to bring down the cost of electricity.

Electricity GHG Emissions Profile

[Insert GHG forecast chart here]

- Ontario's investments in clean generation sources—water, nuclear, wind, solar, bioenergy—along with the elimination of coal-fired electricity generation, have significantly reduced greenhouse gas (GHG) emissions.
- Ontario's electricity sector is forecast to account for only about two per cent of Ontario's total GHG emissions in 2017 and the emissions are forecast to be more than 80 per cent below 1990 levels.
- Emissions are expected to remain well below historical levels and to be relatively flat over the planning period of 2017-2035, with a range of potential emissions outcomes beyond 2023.
- Ontario will continue to look for ways to keep GHG emissions in the electricity sector low, and work with carbon-free generators to meet the Province's emissions targets.

Progress on Residential Electricity Prices

[Insert Residential Price Curve here]

- The residential price outlook in the 2017 LTEP remains below the 2013 LTEP outlook for the full forecast horizon, as a result of Ontario's Fair Hydro Plan, removing costs from the electricity system, the anticipated benefits from implementing Market Renewal initiatives and consumers' more efficient consumption of electricity.
- *Delivering Fairness & Choice* highlights how Ontario's Fair Hydro Plan lowers typical residential electricity bills by 25 per cent and will hold any increases to the rate of inflation for four years. Following the inflationary cap, residential electricity rates increase at an average of about five per cent over the seven-year period from 2021 to 2027, levelling out in the early 2030s.
- For example, the 2013 LTEP forecast that typical residential monthly electricity bills would be \$170 in 2017 and \$200 in 2027. The 2017 LTEP forecasts bills prices to be \$127 and

\$181, respectively, including the change in average consumption from 800 to 750 kilowatt hours per month.

Industrial Prices in-line with Inflation

[Insert Industrial Price Curve here]

- The 2017 LTEP price outlook for large industrial electricity consumers reflects average increases in line with inflation over the forecast period. The actual price paid by a large industrial electricity consumer is dependent on their consumption patterns and can vary among industries and specific consumers.
- Currently, the electricity price for industrial electricity consumers in Ontario is lower than the average price in the Great Lakes region as reported by the U.S. Energy Information Administration.
- Consumers in Northern Ontario that participate in the Northern Industrial Electricity Rate (NIER) Program can achieve even lower rates. Participants in the NIER Program, which is funded through provincial revenues, receive a reduction of \$20 per megawatt hour.

Fuels Use in Ontario

[Insert Fuels Chart here]

- Ontario's fuels sector is multi-faceted in its sources and uses. Natural gas and transportation fuels, such as gasoline and diesel, make up the majority of the province's fuels supply. Fuel consumption has generally declined between 2005 and 2015, largely due to the retirement of coal-fired generating stations.
- The 2017 LTEP recognizes that fuels are an important component of the province's economy and Ontario is committed to decarbonizing the fuels sector.
- Currently, about one-third of Ontario's fuel use is from natural gas and one-third from transportation fuels such as gasoline and diesel. About 10 per cent of the province's fuels are used for non-energy uses such as feedstock for manufacturing.
- Ontario's fuel supply is produced and delivered through a variety of means and markets, including from outside of the province. As such, the government does not have the same policy and planning functions as it does for electricity.
- Nonetheless, Ontario's cap and trade program as well as initiatives in the Climate Change Action Plan will support the transition from conventional fuels to renewable and lower-carbon sources.
- The outlook for fuel supply and demand depends on uncertainties such as policy and program decisions over the next 20 years, along with technological innovation. The government will continue to undertake modelling and analysis to identify opportunities to decarbonize the fuels sector consistent with the provincial target of reducing GHG emissions by 37 per cent from 1990 levels in 2030.

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