

Pathways to Decarbonization

Backgrounder

- Ontario has one of the cleanest electricity systems in North America, accounting for roughly three per cent of all provincial emissions.
- Governments, businesses and homeowners are shifting from fossil fuels to electricity for building heating, transportation, and industrial processes and other energy uses. At the same time, jurisdictions around the world are evaluating ways to eliminate carbon emissions from the production of electricity.
- As Ontario's system operator and planner, the IESO brings a perspective of reliability and affordability to the decarbonization effort. The Ontario Minister of Energy asked the IESO to evaluate a moratorium on procurements of new natural gas generating stations in Ontario and to develop a pathway to zero-emissions in the electricity sector.
- The outcomes of the two scenarios—Moratorium and Pathways—illustrate the cost, scale and pace of change, as well as the dependencies that will need to be considered as part of decarbonization efforts. These are not energy plans and instead provide a foundation for formal planning activities and action.
- The IESO's Pathways to Decarbonization report will inform the work of the provincial Electrification and Energy Transition Panel and its Cost-Effective Energy Pathways Study to plan for the long-term reliability and affordability of Ontario's clean energy supply.

Moratorium Scenario

Explores when Ontario can put a moratorium on new natural gas generation.

- A moratorium could be possible after 2027, once new supply is in place to meet mid-decade needs.
- By 2035, the system could be less reliant on the natural gas fleet, lowering emissions by 60 per cent below the IESO's original forecasts with an additional 5,300 MW of non-emitting supply in place. For example, the scenario included 1,000 MW in new capacity from small modular reactors and an additional 2,200 MW of demand reduction.
- Requires investments of approximately \$26 billion in programs and new infrastructure.

Pathways Scenario

Explores how Ontario can reach a zero-emissions electricity grid reliably and cost-effectively.

- Speculates high levels of electrification in the economy and a demand forecast with an average annual growth rate of 2.7 per cent for 2023-2050.
- Ontario's electricity system sees winter capacity needs almost triple what they are today.
- Adds 65,000 MW of new non-emitting supply including solar, wind, hydro, storage and nuclear, almost triple the amount of non-emitting resources from 2021. This includes an assumption that 15,000 MW of hydrogen could be available to replace natural gas generation.
- Uses 11,300 MW of demand savings from energy efficiency and demand response.
- Requires considerable contributions in terms of capital, labour and siting, including:
 - A six-fold increase in the 14,000-strong labour force currently working on electricity infrastructure projects.
 - An area of almost 14 times the size of Toronto needed for all incremental infrastructure, including new transmission lines to connect new non-emitting supply to population centres.
 - An estimated cost of \$375-\$425 billion to effectively double the size of the system.

Stakeholder Engagement

Stakeholders and communities played a critical role in shaping the assumptions used in the analysis.

- Approximately 320 attendees participated in two webinars with more than 50 feedback submissions received on preliminary assumptions posted for input.
- More than 30 meetings were held with more than 70 organizations and representatives of municipalities, businesses, local distribution companies, environmental/sustainability organizations, communities, research and academia, and energy consultants. In addition, this work has been significantly informed by the expertise and advice received from members of the IESO's Stakeholder Advisory Committee.