MAY 21, 2025

2025 Annual Planning Outlook

ieso
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Territory Acknowledgement

The IESO acknowledges the land we are delivering today's webinar from is the traditional territory of many nations including the Mississaugas of the Credit, the Anishnabeg, the Chippewa, the Haudenosaunee and the Wendat peoples and is now home to many diverse First Nations, Inuit and Métis peoples. We also acknowledge that Toronto is covered by Treaty 13 with the Mississaugas of the Credit First Nation.

As we have attendees from across Ontario, the IESO would also like to acknowledge all of the traditional territories across the province, which includes those of the Algonquin, Anishnawbe, Cree, Oji-Cree, Huron-Wendat, Haudenosaunee and Métis peoples.

Agenda

This information session provides an overview of the 2025 Annual Planning Outlook (APO) and covers the following topics:

- Demand forecast
- Supply outlook
- Transmission outlook
- Resource adequacy needs
- Operability needs
- Actions to meet system needs
- Capacity expansion scenario, costs and emissions

Purpose of the APO

25-Year Outlook (2026-2050)

- Forecasts electricity demand, assesses reliability of the electricity system, and identifies capacity, energy, transmission and operability needs
- Specifies acquisition targets, mechanisms to meet needs, and provides the sector with insights to guide investment decisions

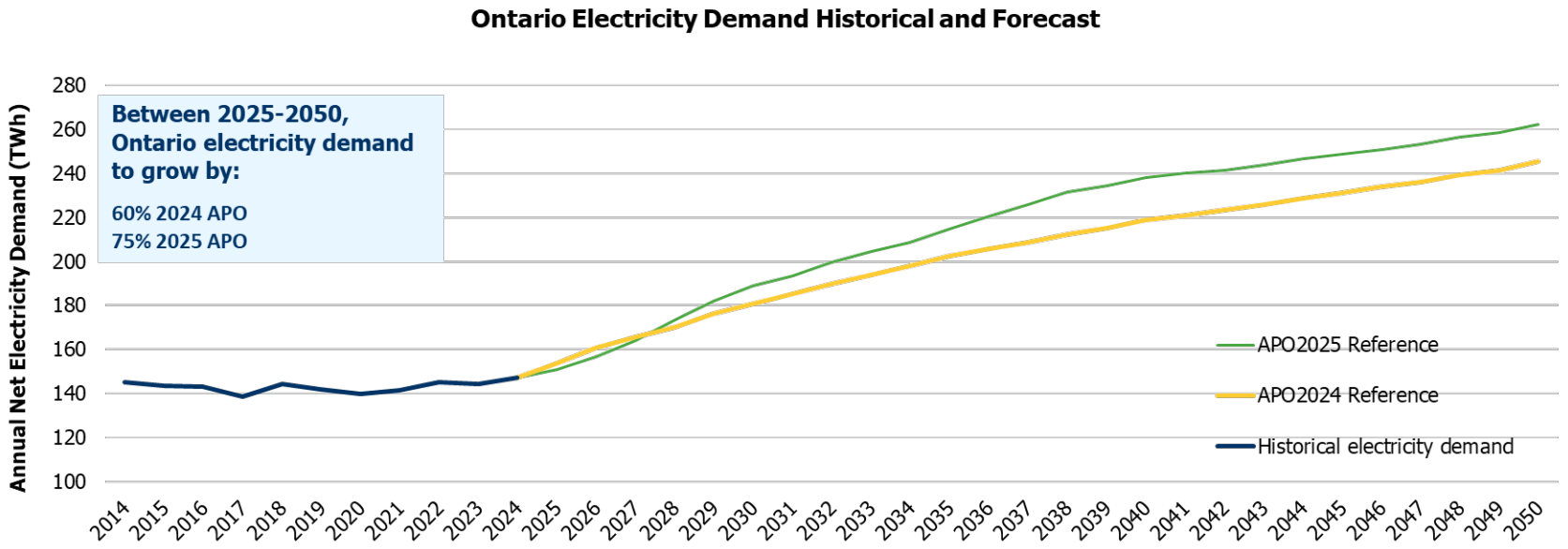
Demand Forecast

Demand Forecast Summary

- The 2025 Forecast has higher demand growth in the near- and medium-term compared to the 2024 Forecast
- Increases in energy demand are attributed to:
  - Inclusion of new large potential and confirmed projects such as data centres, commercial sector building electrification and industrial electric vehicle production and supply chain sub-sector
- Decreases in energy demand are attributed to:
  - Updated electricity Demand Side Management program savings
  - Decreased demand in the agricultural sector
- Significant uncertainties exist with many of these factors

Annual Energy Demand Forecast

- Electricity demand is forecast to grow by **75% by 2050**.



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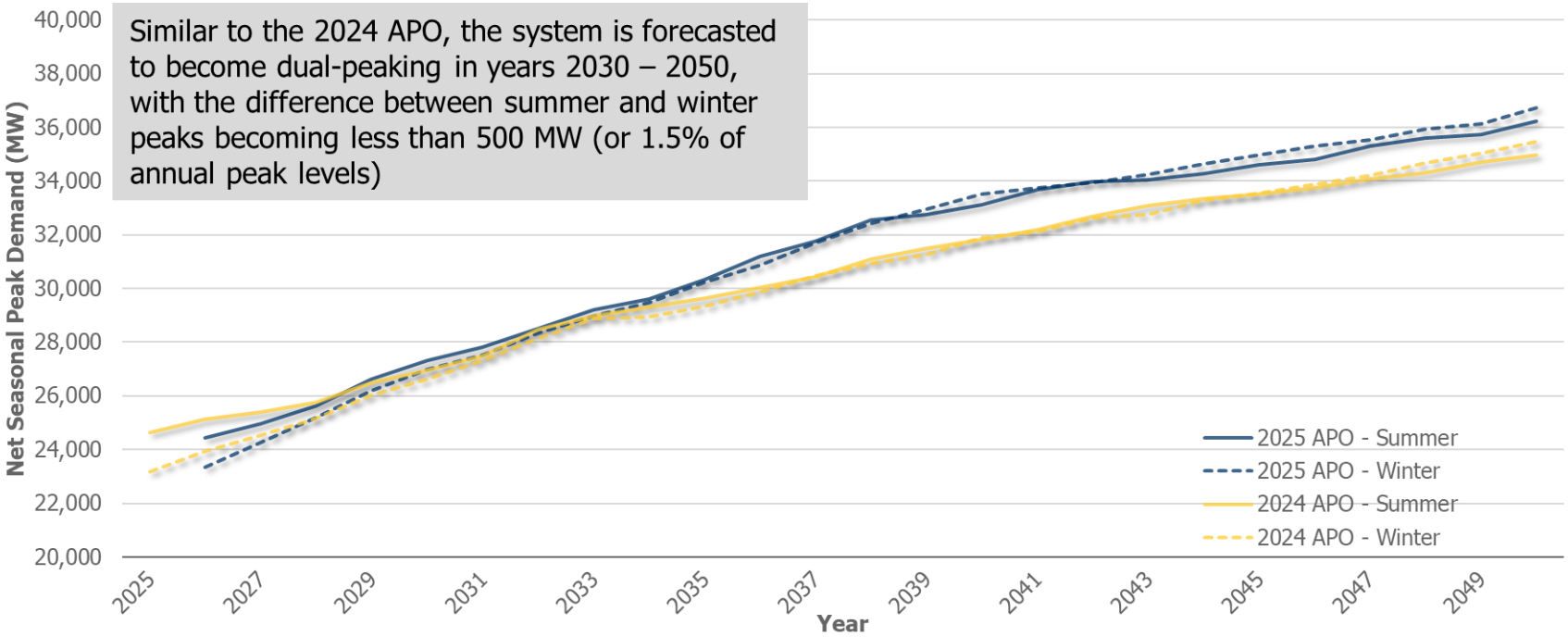
Forecast Evolution – Dual Peaking System



Note that for the most part, summer continues to drive system capacity needs due to resource performance.

Demand: Uncertainties and Risks

Multiple uncertainties can impact the electricity demand forecast over the long-term

- Current and near-term state of economy
- Long-term demographic, affordability and productivity trends
- Materialization of:
  - Commercial data centres, and cryptocurrency mining projects;
  - Industrial automobile production & supply chain sub-sector transition to electric vehicles
  - Hydrogen production
- Industrial mineral extraction sub-sector project development and electrification
- Electrification technology development & acceptance: buildings, vehicles, industry
- General decarbonization strategies: thermal storage & networks, distributed energy resources
- Climate change on weather sensitive load
- Policy changes

Supply Outlook, Transmission Outlook and Needs

Supply Outlook

The supply case for the 2025 APO builds on the High Nuclear Case from the 2024 APO, and includes:

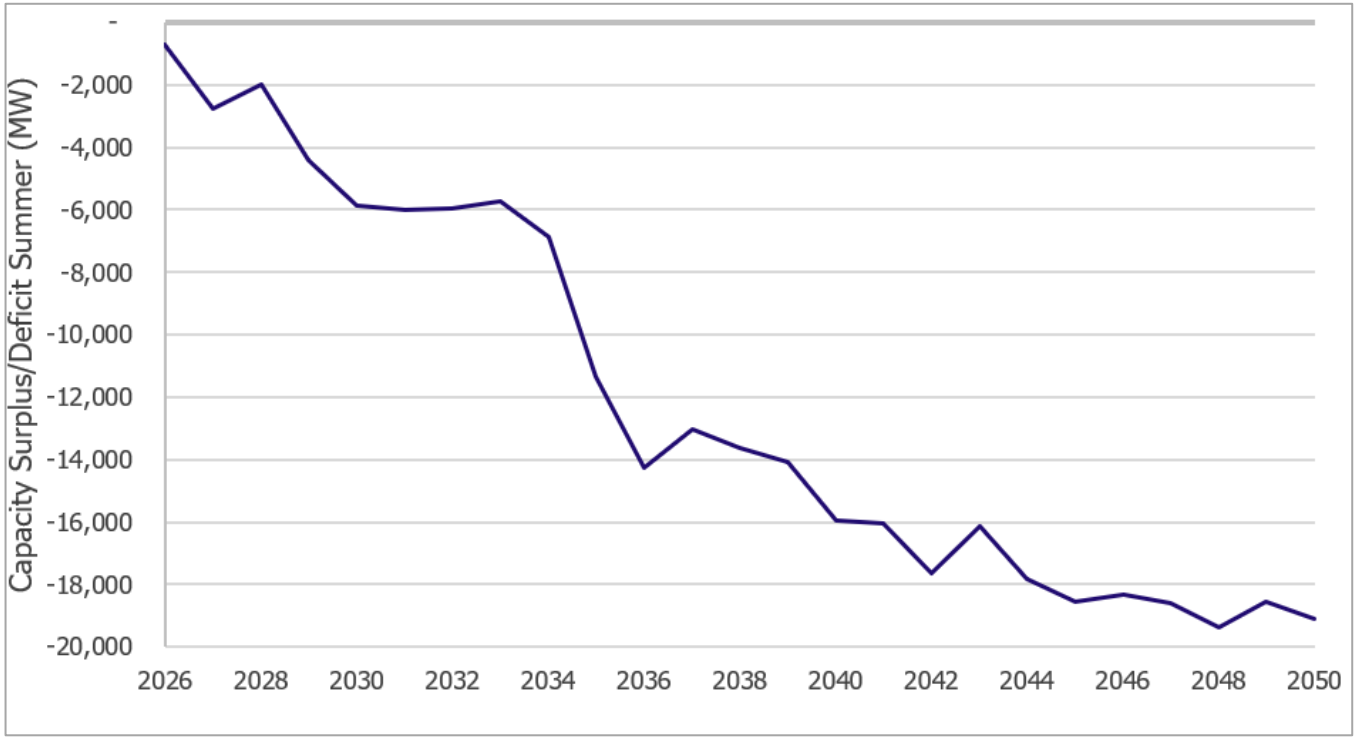
- Existing resources until end of contract or commitment period
- Resources committed through an IESO-planned action or policy announcement known by July 2024
- New storage, bioenergy, and gas resources acquired through the Long-Term 1 RFP procurement

Transmission Outlook

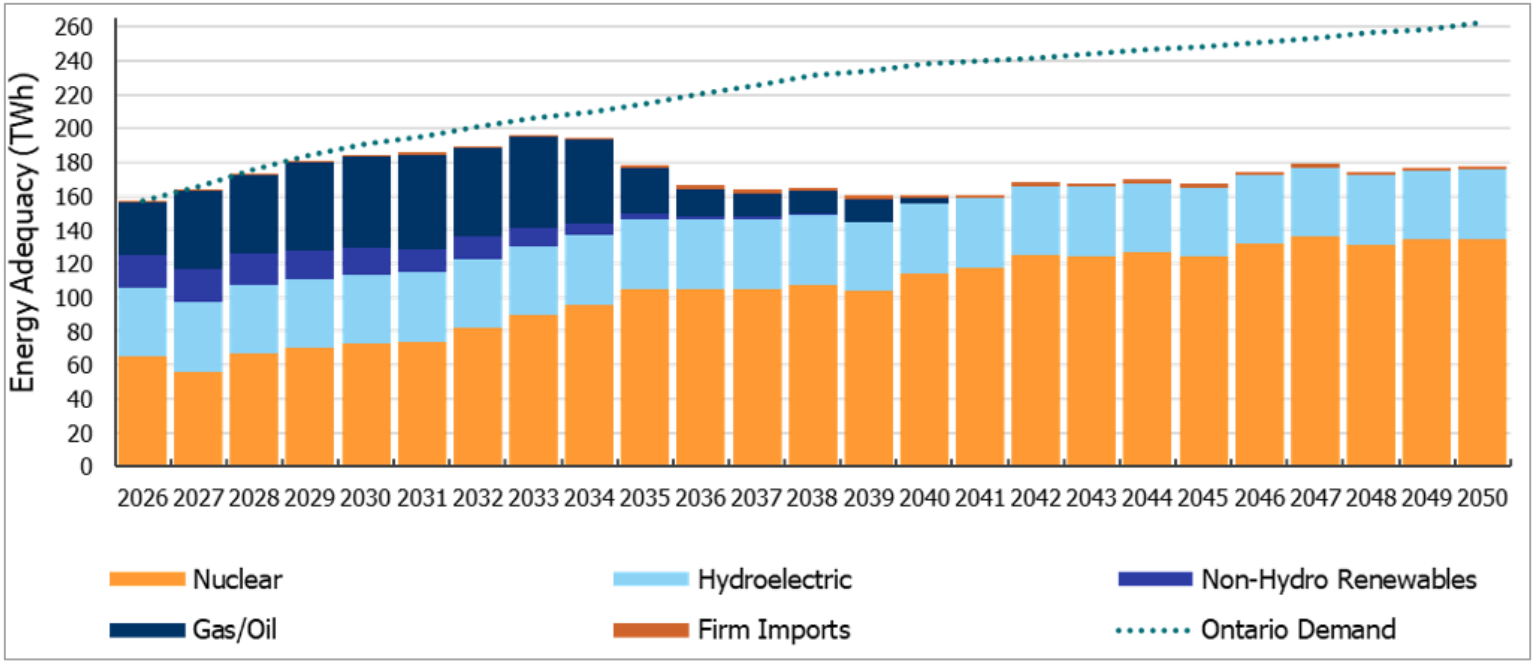
Planned Transmission Projects

- Since the 2024 APO, several transmission reinforcements have been completed and now are in-service, including:
  - Watay Power Transmission Project
  - Chatham to Lakeshore Project
  - Sudbury Area Reinforcements – X25S Unbundling
- Multiple other transmission projects are expected to come into service by 2030, as per bulk and regional plans
- These projects support load growth and economic development across the province and enable deliverability of new resources connecting to the system

Capacity Adequacy Outlook – Summer



Energy Adequacy Outlook



In-Flight Actions to Improve Supply

- Multiple in-flight (ongoing) actions expected to reduce needs include:
  - Anticipated contribution from resources acquired through MT2 RFP
  - Resources secured through future capacity auctions (minimum target threshold of 1,000 MW)
  - Capacity from agreements with Hydro Quebec
  - Uprates to Bruce generating units and OPG hydro generating units, following refurbishments
- Post-2035, system needs are driven by resources reaching contract end or end-of-life; the Clean Electricity Regulations (or an equivalency agreement) will impact how these needs can be met

Supply: Uncertainties and Risks

Uncertainties related to existing and new resources and the transmission system could impact Ontario's supply; some of these risks have been factored into the 2025 APO assessment of needs

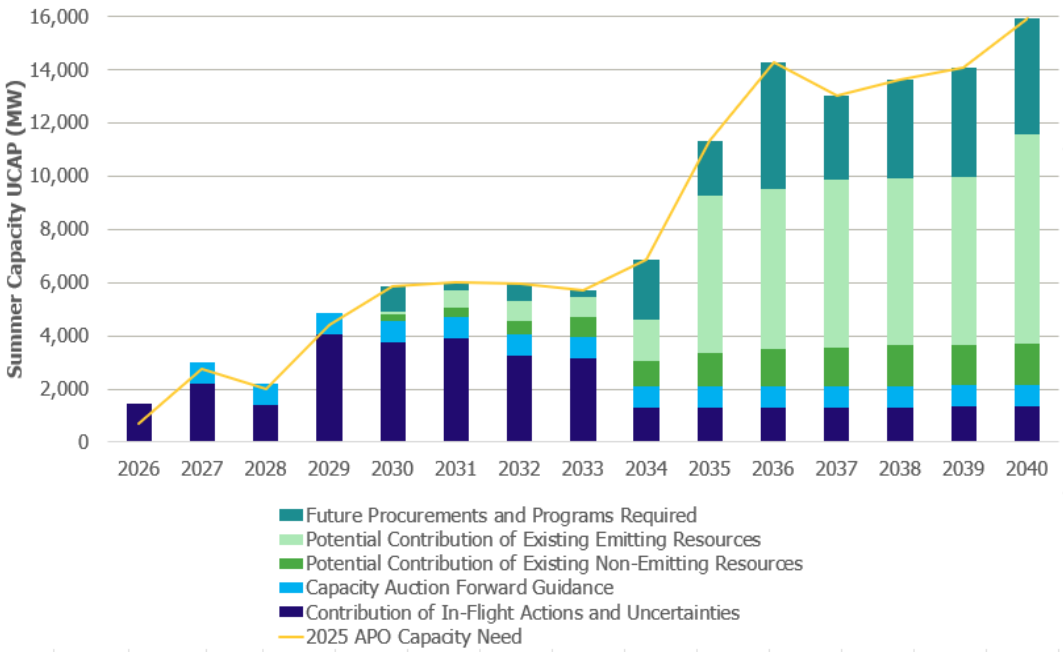
Existing Resources and Transmission

- Aging generation & transmission assets, leading to decreased performance and more frequent outages
- Delays to nuclear refurbishments or new builds
- Market exit of existing resources after contract expiry
- Uncertainty with the future participation of the gas fleet & fuel security

New Resources and Transmission

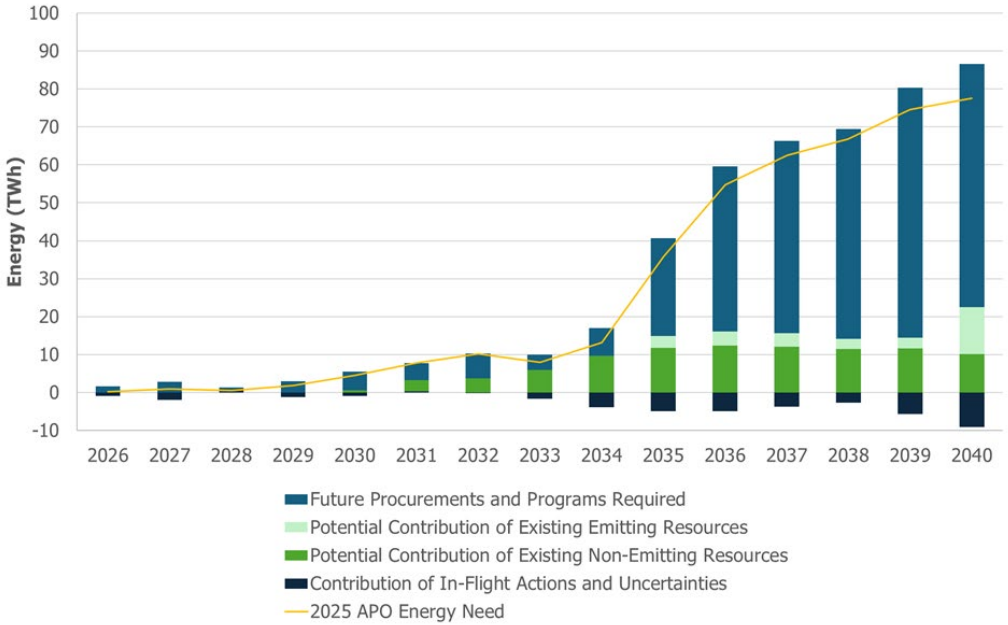
- Procurement targets not met (e.g., lack of municipal support, deliverability challenges, lead time required to build new transmission)
- Resources contracted through a procurement do not reach commercial operation
- In-service delays for new resources
- Unreliable operation of new resources and technologies during first years of operation

Remaining Capacity Needs



- Capacity needs in the 2030s can be helped with the reacquisition of existing resources
- With their potential contribution, needs in 2030 are ~800 MW, growing to ~2,100 MW by 2034; this could be met through LT2, continued capacity auction growth, and incremental demand side management (eDSM)
- Needs increase significantly in 2035 as resources reach contract expiry, and at which point the CER (or an equivalency agreement) impacts how needs can be met

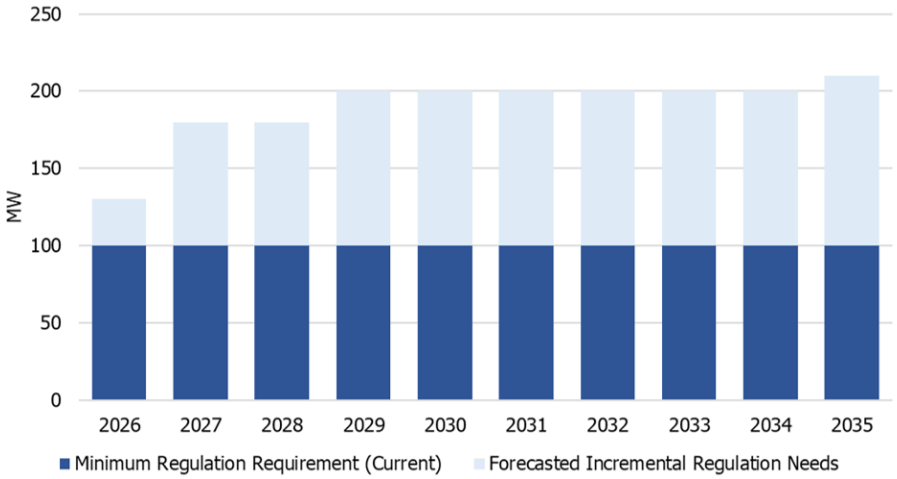
Remaining Energy Needs



- Energy needs are helped with the reacquisition of existing resources
- With their potential contribution, needs start in 2029 at 3 TWh, and grow to approximately 7 TWh by 2034; this can be met through LT2 and eDSM
- Needs increase significantly in 2035 as resources reach their assumed end of life, and at which point the CER (or an equivalency agreement) impacts how needs can be met

Operability Needs – Regulation Service

- In addition to energy and capacity needs, Ontario's resource mix must contain the reliability services needed for reliable grid operations
- **Regulation service** helps to balance normal minute-to-minute fluctuations in supply and demand and to restore frequency immediately after a system event
- Incremental regulation service needs of ~30 MW begin as early as 2026, and are anticipated to grow to 110 MW in 2035

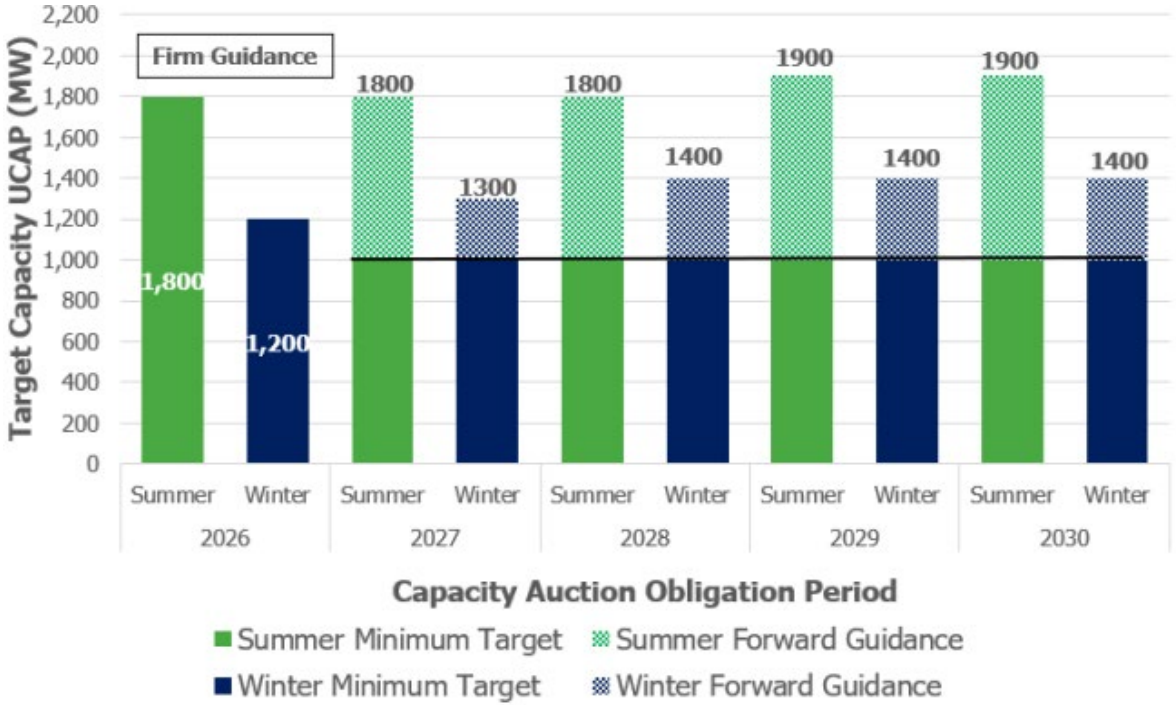


Operability Opportunity – Voltage Control

- Adequate **reactive support and voltage control service** is required to maintain acceptable voltage levels across the grid
- With the Pickering B NGS refurbishment scheduled to start in late 2026, over 1,000 MVAr of robust voltage control capability will be lost near the GTA
- The IESO has planned the system to ensure sufficient facilities will be available to control voltages within safe and reliable ranges following the removal from service of Pickering units
- To address the increased complexity and cost of managing voltages post-Pickering, the IESO continues to explore opportunities to enhance voltage control capability, including the provision of additional voltage support from facilities in the GTA (where cost-effective)

Actions to Meet Needs

Planned Actions: Capacity Auction



Planned Actions: Long Term 2 RFP

- The windowed approach of the Long Term 2 (LT2) RFP ensures that eligible resources gradually enter the electricity system to meet needs
- With total targets of up to **14 TWh** and **1,600 MW** to be in service before 2034, remaining energy and capacity needs identified in the 2025 APO could be met each year
- Moreover, these higher aggregate targets support resource adequacy requirements if additional risks (such as project delays or previous targets not being met) materialize
- They can also help prepare for significant needs starting in 2035 and better position the province to accommodate load growth above what is currently forecast

Transmission Actions To Meet System Needs

Northern Connections Study (2024-2025)

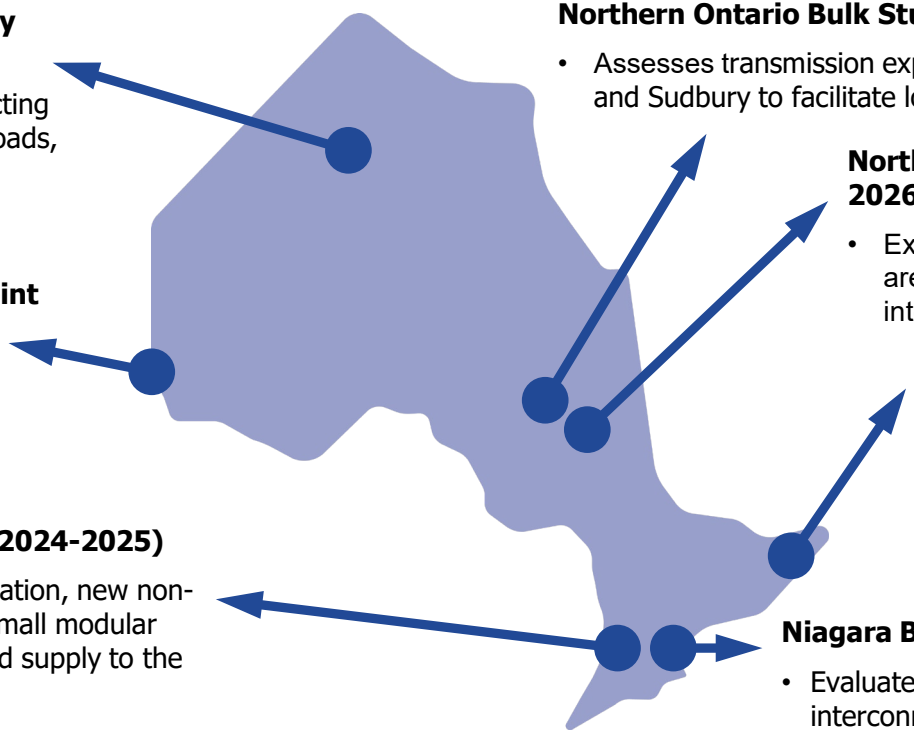
- Considers options for connecting First Nations Communities, loads, and generation in remote Northwestern Ontario

ON-Manitoba Intertie Joint Study (ongoing)

- Plans for aging intertie equipment with Manitoba

South and Central Ontario Bulk Study (2024-2025)

- Considers decarbonization, new non-emitting resources, small modular reactors, Bruce C, and supply to the GTA



Northern Ontario Bulk Study (2024-2025)

- Assesses transmission expansion options between Toronto and Sudbury to facilitate load growth and new resources

North of Sudbury Bulk Study (2025-2026)

- Examines supply to the north of Sudbury area, non-emitting resources, and interconnection with Quebec

Eastern Ontario Bulk Study (2024-2026)

- Evaluates supply to eastern Ontario (including Ottawa and Belleville areas), interconnections with Quebec/New York, and new resources

Niagara Bulk Study (2025-2026)

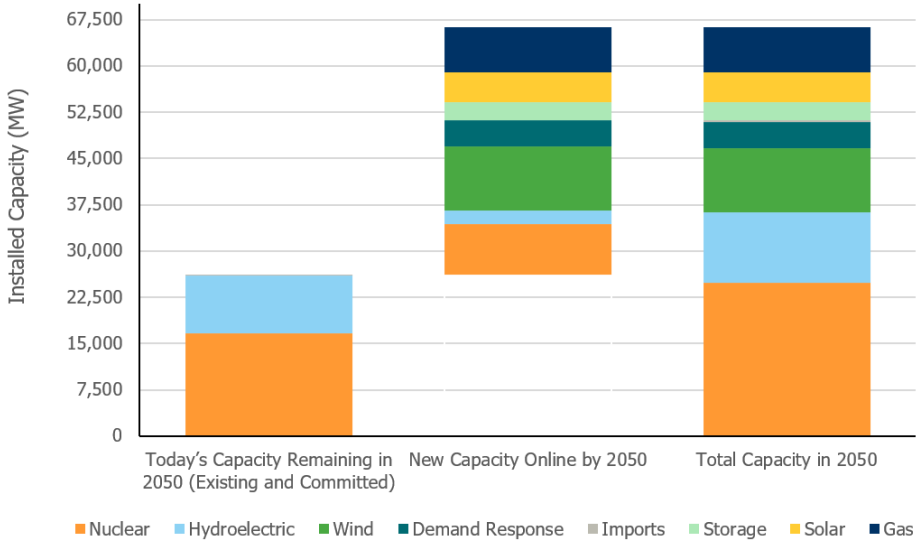
- Evaluates supply to the Niagara region and interconnection with New York

Capacity Expansion Scenario, Costs and Emissions

Capacity Expansion Scenario

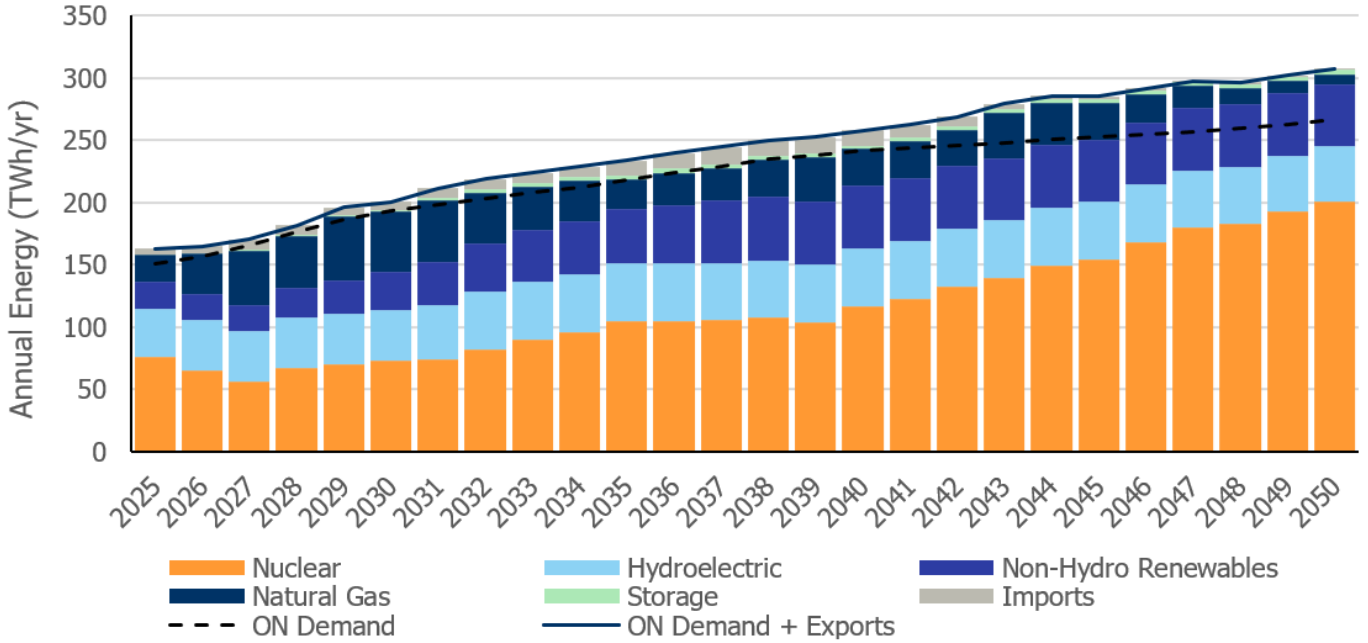
- To complement the 2025 APO, the IESO assessed a theoretical supply mix that could meet future system needs out to 2050, along with the associated greenhouse gas emissions and costs
- The resulting combination of resources reaffirms the importance of a diverse supply mix capable of meeting demand
- While the analysis estimates outcomes based on the lowest-cost supply mix that could meet future reliability needs, actual outcomes will be determined by results of future competitive procurements and government policies
- More information on the approach and assumptions used in the analysis are provided in the Capacity Expansion Scenario, Costs, and Emissions module

Capacity Expansion Scenario: 2050 Installed Capacity

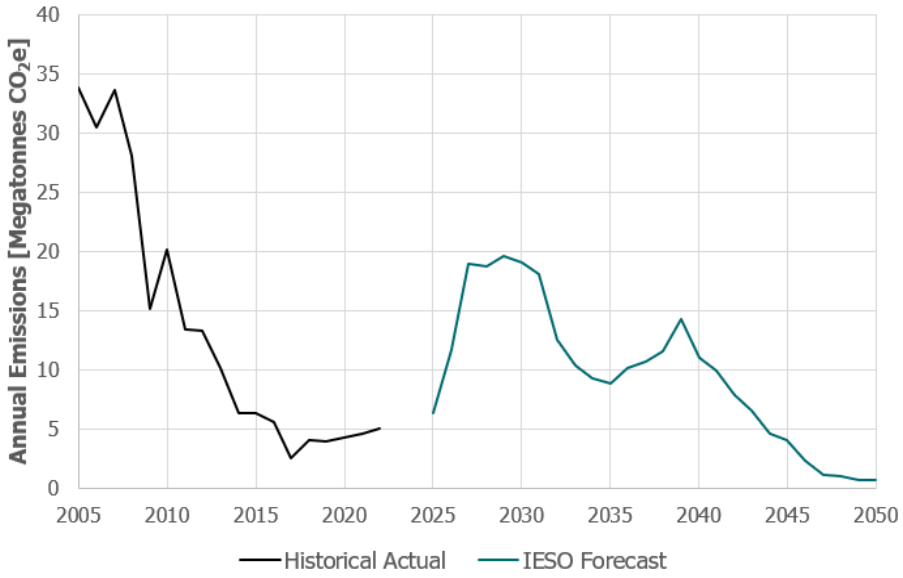


- The **illustrative** resource mix considers new resource additions and assumed retirements of existing resources
- New non-emitting resources are balanced with the strategic phase-out of aging infrastructure, creating a low-emissions system capable of meeting future needs

Capacity Expansion Scenario: Annual Energy Production

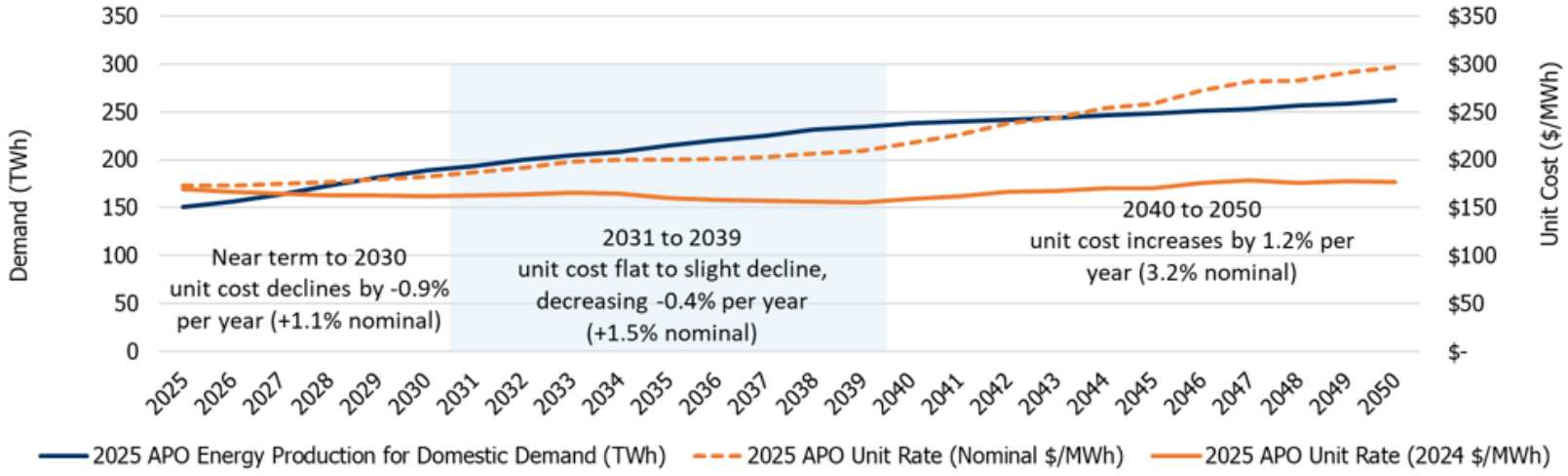


Capacity Expansion Scenario: Emissions Outlook



- Emissions are forecast to increase in the 2020s due to growing demand and reduced nuclear production during refurbishment outages
- Emissions are then forecast to level out in the 2030s as new resources are built to meet increasing demand
- In the 2040s, emissions decrease as new nuclear and renewable resources come online, and approach zero by 2050 as these resources displace natural gas generation
- Increased electricity system emissions do not necessarily mean increased economy wide-emissions, as the emissions intensity of electricity remains far below other fuels

Capacity Expansion Scenario: Unit Cost of Electricity



Next Steps

- The next Annual Planning Outlook (APO), expected in 2026, will incorporate updated electricity system needs, reflecting evolving trade policy and potential economic impacts
- Stakeholders are encouraged to submit written feedback using the Feedback Form available on the APO engagement webpage
- Feedback is requested by June 4, 2025