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2023 Annual Planning Outlook: Demand Forecast, Supply Outlook, and Acquisition Needs

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Welcome and Introduction

- This engagement is conducted according to the IESO Engagement Principles
- Today's session will be recorded and available for viewing online
- All documents associated with this engagement can be found on the Annual Planning Outlook webpage

Participation

- For questions and comments click on the "raise hand" icon (hand symbol) at the top of the application window. This will indicate to the host you would like to speak
- To unmute audio, click on the microphone icon at the top of the application window
- Audio should be muted when not asking a question
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Agenda

- Overview of 2023 Annual Planning Outlook
  - Demand Forecast
  - Supply Outlook
  - Resource Adequacy Outlook
  - Preliminary acquisition targets and actions required to meet needs
  - Transmission Outlook
- Next Steps for Engagement Opportunities

Today's Discussion

- Information session to provide a high-level preliminary overview of the 2023 Annual Planning Outlook (APO) and the resource adequacy needs informing the IESO's subsequent procurements, as well as key considerations in planning for Ontario's Energy Transition

APO Overview

26-Year Outlook (2025-2050)

- Forecasts electricity demand; assesses reliability of electricity system; identifies capacity and energy needs; specifies acquisition targets and mechanisms to meet needs
- Provides sector with most current insights to guide investment decisions
- The APO will be merged with the Annual Acquisition Report – target release February 2024

2023 APO Summary

- Demand continues to grow driven by decarbonization efforts, economic and population growth
- IESO and provincial government actions have reduced system needs as compared to the 2022 APO, improving the supply outlook up to the mid-2030s
  - Other actions underway can further reduce system needs including; Long-Term 1 (LT1) RFP; expanded Capacity Auctions; and a Memorandum of Understanding (MOU) with Hydro Quebec for summer capacity
- Considering ongoing actions and uncertainties, the need for 5 TWh of energy remains between 2029-2031, growing through the 2030s

2023 APO Summary (2)

Meeting growing energy and capacity needs will require cadenced long-term procurements

- The Long-Term 2 (LT2) RFP will need to acquire 2,000 MW of new energy-producing resources to be in-service by 2030
  - In addition, 1,500 MW is required to be in service for both 2032 and 2034
  - Totaling 5,000 MW between 2029-2034
  - These are preliminary targets; finalized numbers will be set in Feb. 2024
- Even with acquisition of these resources, capacity needs are expected to grow through the 2030s and other procurements may be required

2023 APO Summary (3)

- Post-2035 procurement targets are uncertain at this time as system needs will largely be dependent on the evolution and timing of government policy decisions
- Looking out to 2050, increasing system requirements are driven by resources reaching contract expiry or market exit, and increased growth in demand
- The transmission outlook in the APO will discuss updated transmission needs and Schedule of Planning Activities, including information on upcoming work to address transmission policy direction from the Powering Ontario's Growth report

Demand Forecast Summary

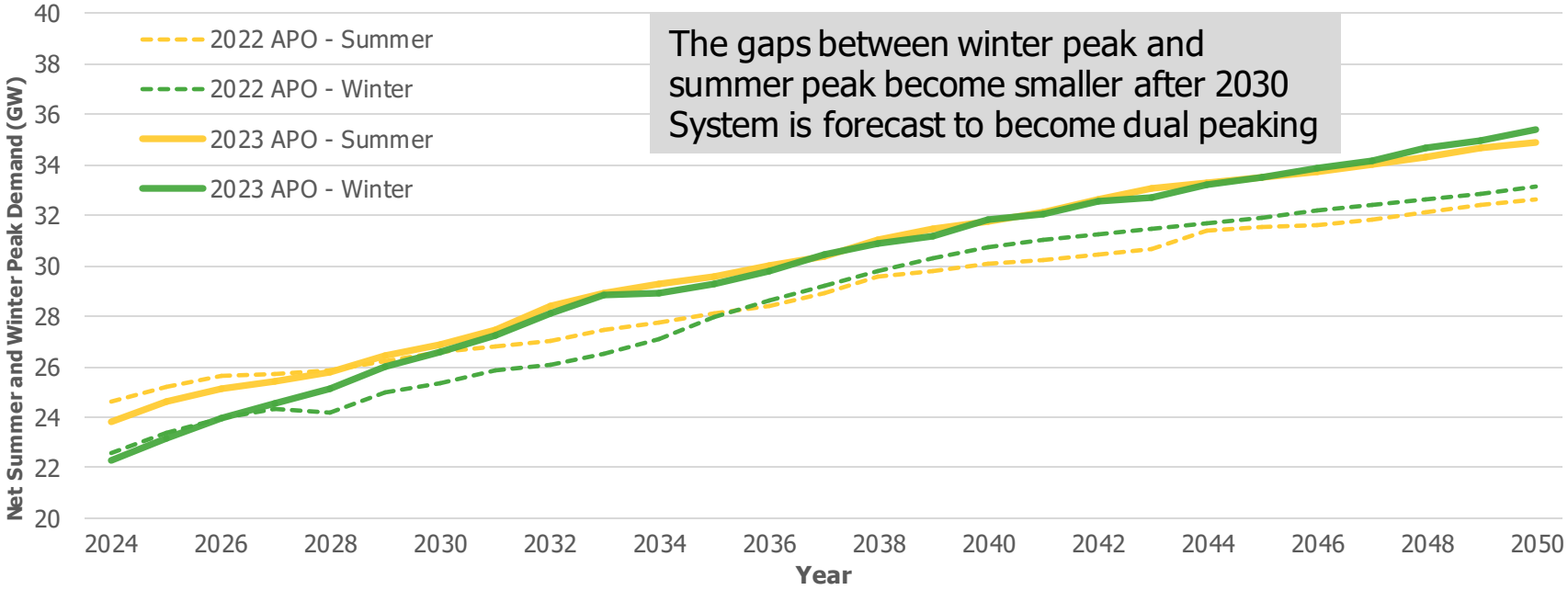
Increases in energy demand are attributed to:

1. Industrial sector projects
2. Updated transportation sector assumptions

Decreases in demand are attributed to:

1. Updated electricity Demand Side Management program energy savings
2. Shifted peaks due to managed charging profiles for electric vehicles (EVs)

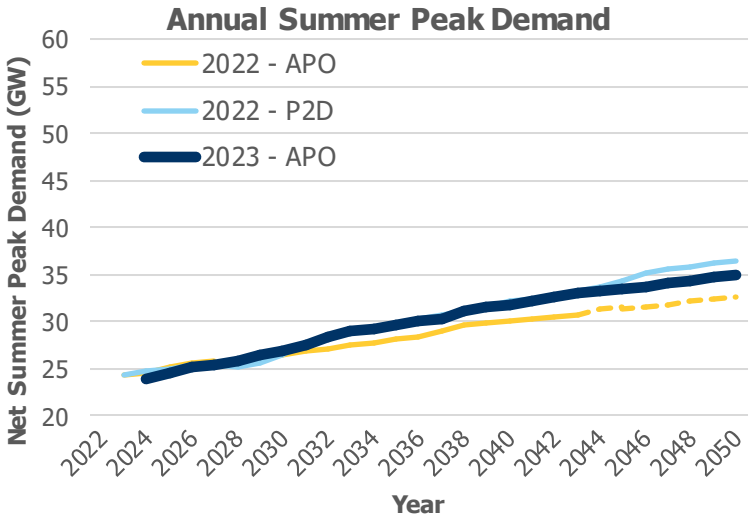
Forecast Evolution – Dual Peaking



**APO 2022 results for 2044-2050 were not part of the published outlook*

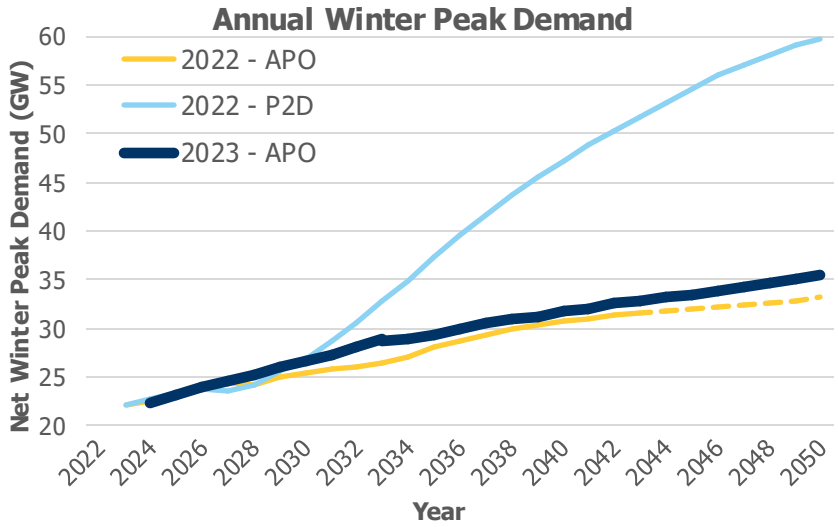
Seasonal Peak Demand

The system is forecast to become dual-peaking by 2030, with summer and winter peaks both around 27 GW



Average Annual Growth Rate over Forecast Period

	APO 2023	APO 2022 Ref	2022 Pathways to Decarbonization (P2D) Study
Summer Peak	1.5%	1.2%	1.5%
Winter Peak	1.8%	1.8%	3.8%



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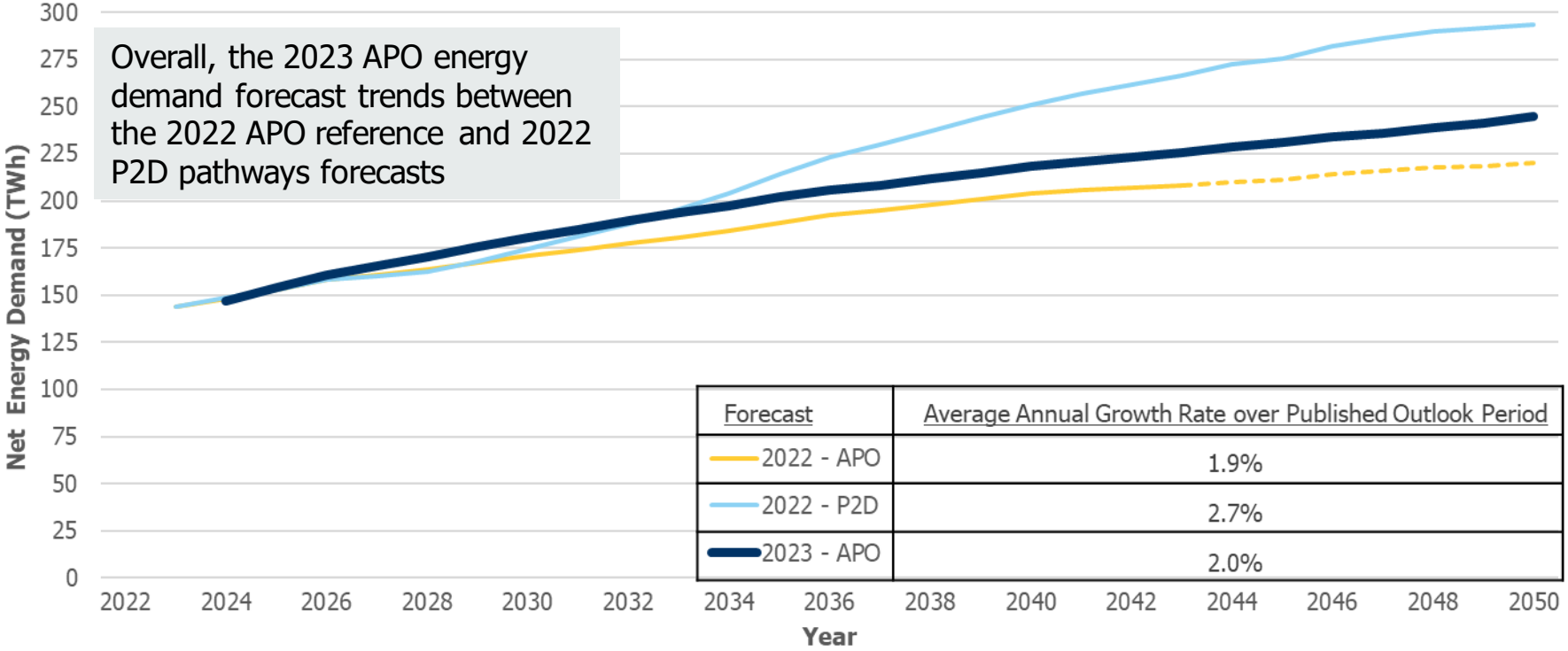
Annual Energy Demand Forecast

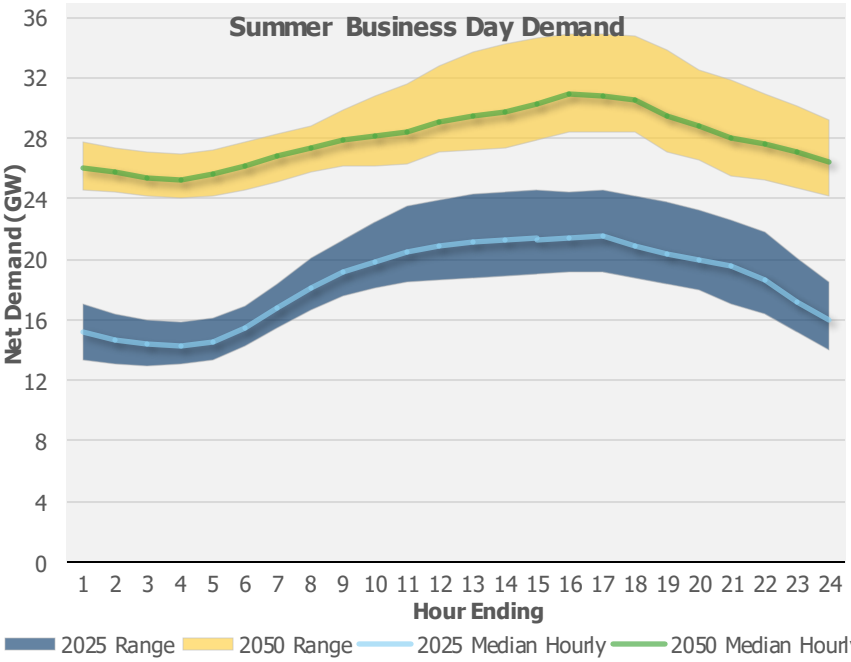
Overall, the 2023 APO energy demand forecast trends between the 2022 APO reference and 2022 P2D pathways forecasts

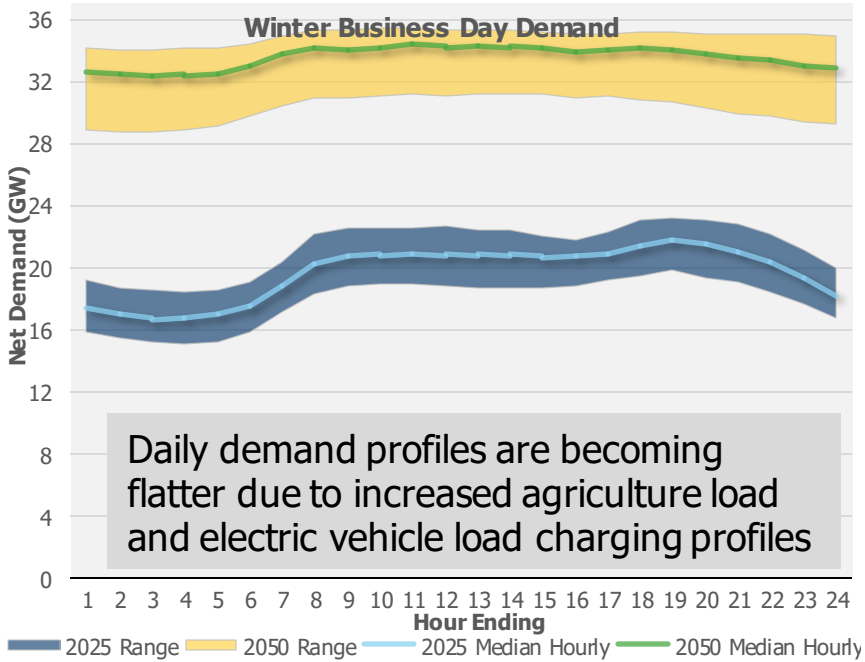


Forecast	Average Annual Growth Rate over Published Outlook Period
2022 - APO	1.9%
2022 - P2D	2.7%
2023 - APO	2.0%

**APO 2022 results for 2044-2050 were not part of the published outlook*

Daily Demand Profiles





Daily demand profiles are becoming flatter due to increased agriculture load and electric vehicle load charging profiles

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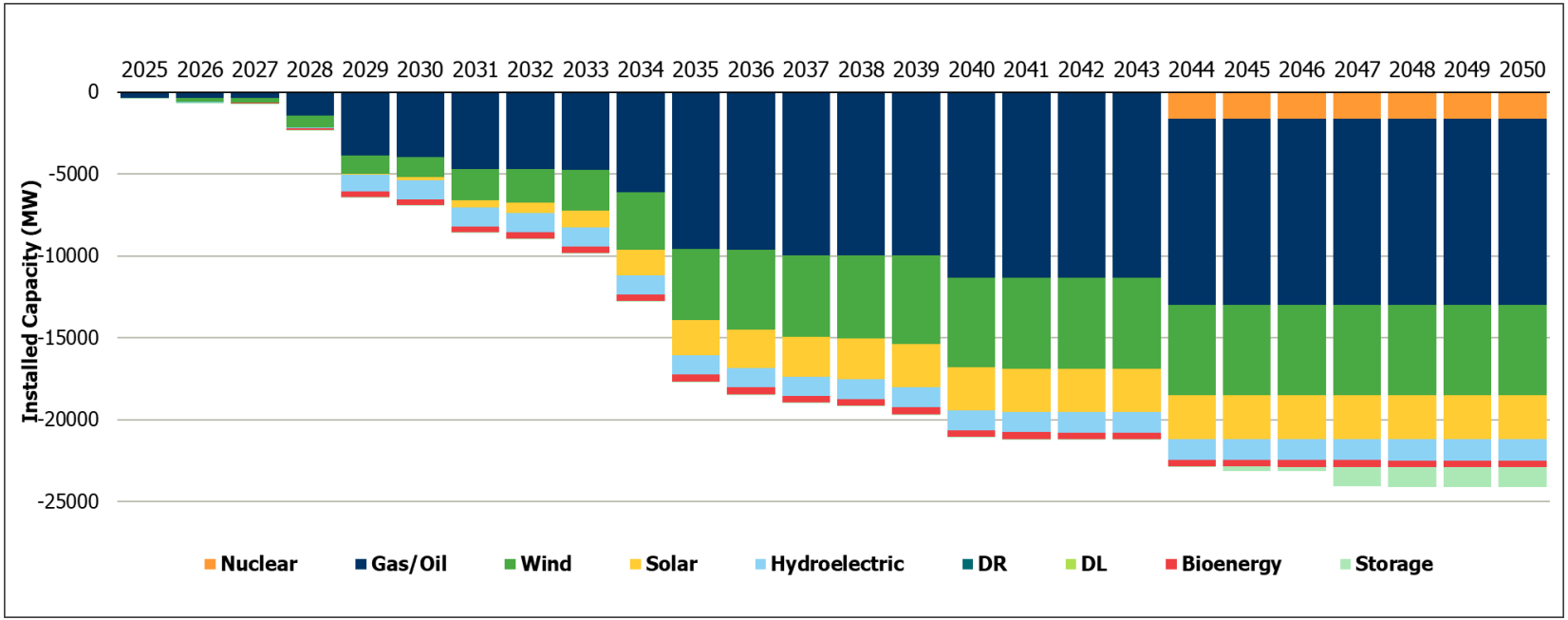
Risks and Uncertainties – Demand

- The demand forecast incorporates all **firm/known** policies, industrial projects, the Industrial Conservation Initiative, and the federal EV targets for 2035 at time of development
- Uncertainties may lead to an increase or a decrease in demand (see directional pressures indicated for each)

- Global Economic Trends
- Electricity Demand Side Management beyond current Framework

- Electrification
- Large Loads
- Government Policy supporting Electrification and Mining

Existing Resources Reaching Contract End



**Graph excludes mothballed resources*

2023 APO Supply Cases

Case 1

- Existing and committed resources **until end of contract or commitment period**
- Explores the outlook under a 'do nothing' scenario

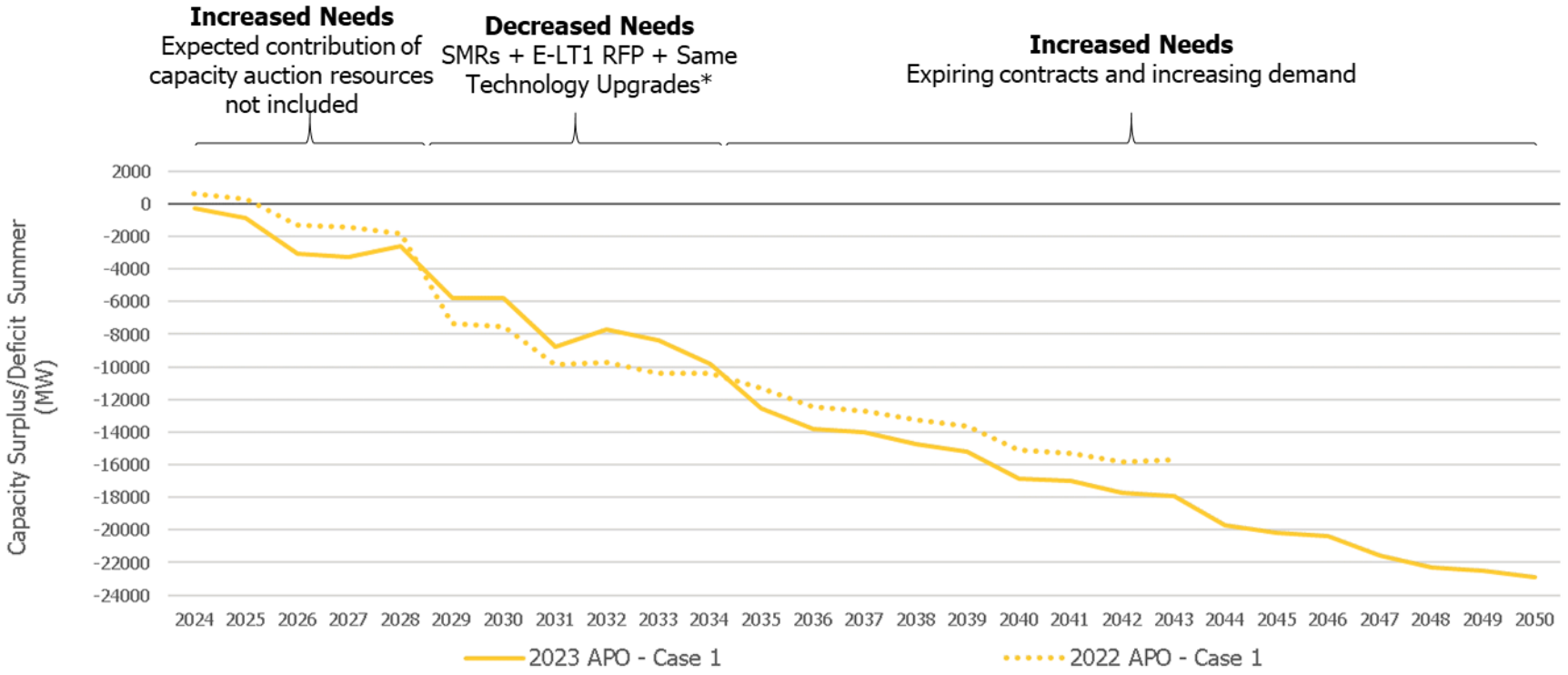
Case 2

- Case 1, with **Pickering Continued Operation, Pickering B Refurbishment, and Bruce C Expansion**
- Explores the potential impact of government policy decisions around nuclear

Supply Outlook

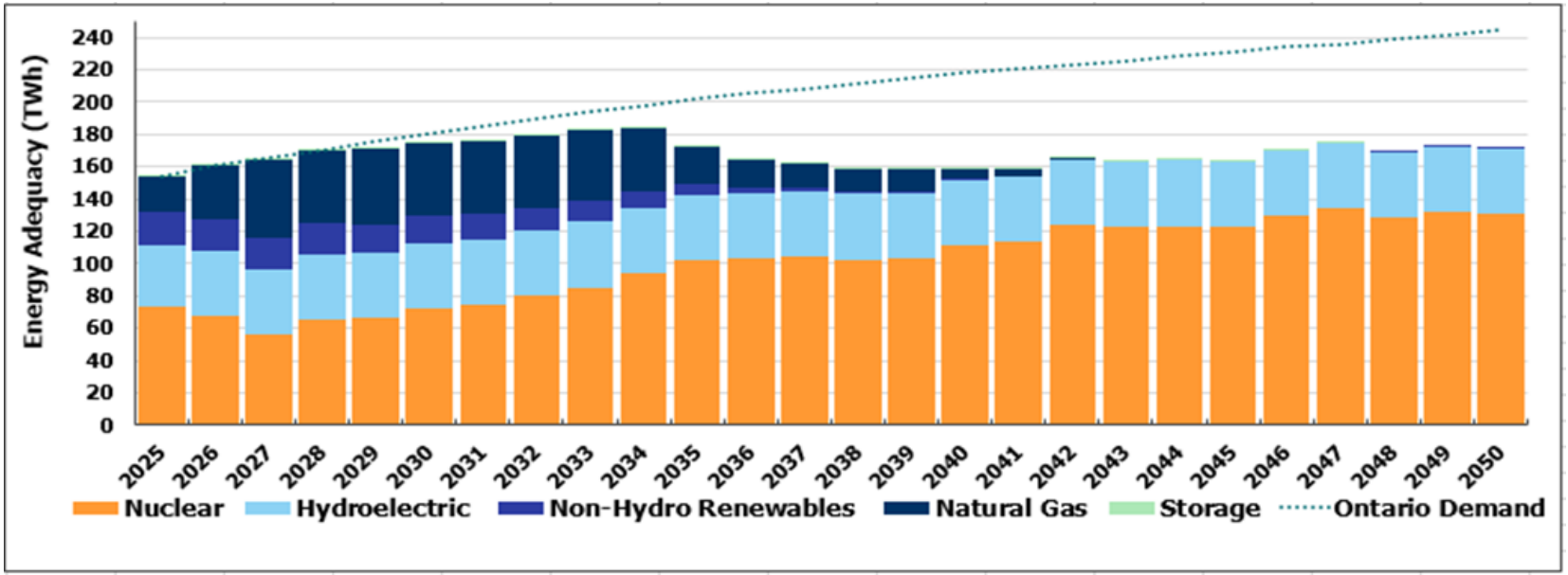
- Compared to the 2022 APO, capacity needs have:
  - Increased in the near-term: expected contribution of capacity auction resources was not included, to better identify system needs and inform planned actions; near-term needs can be met through future auction targets
  - Decreased in the medium-term: increased supply from three additional small modular reactors and resources acquired through the Same-Technology Upgrades and Expedited Long-Term RFP procurements
  - Increased in the long-term: increasing demand and expiring contracts
- Energy needs are consistent with the previous outlook, with an energy gap beginning to grow in 2029

Capacity Adequacy Outlook – Summer



**SMR: Small Modular Reactor; ELT 1 RFP: Expedited Long-Term RFP*

Energy Adequacy Outlook



Energy adequacy outlook is shown for 2023 APO Case 2

Supply Outlook - Risks and Uncertainties

A number of risks and uncertainties related to existing resources, new resources, and the transmission system could result in a decrease in Ontario's supply

Existing Resources and Transmission

- Aging generation & transmission assets, leading to decreased performance and more frequent outages
- Nuclear refurbishments and retirements
- Market exit of existing resources
- Uncertainty with the Clean Electricity Regulation and impacts on future participation of gas fleet & fuel security

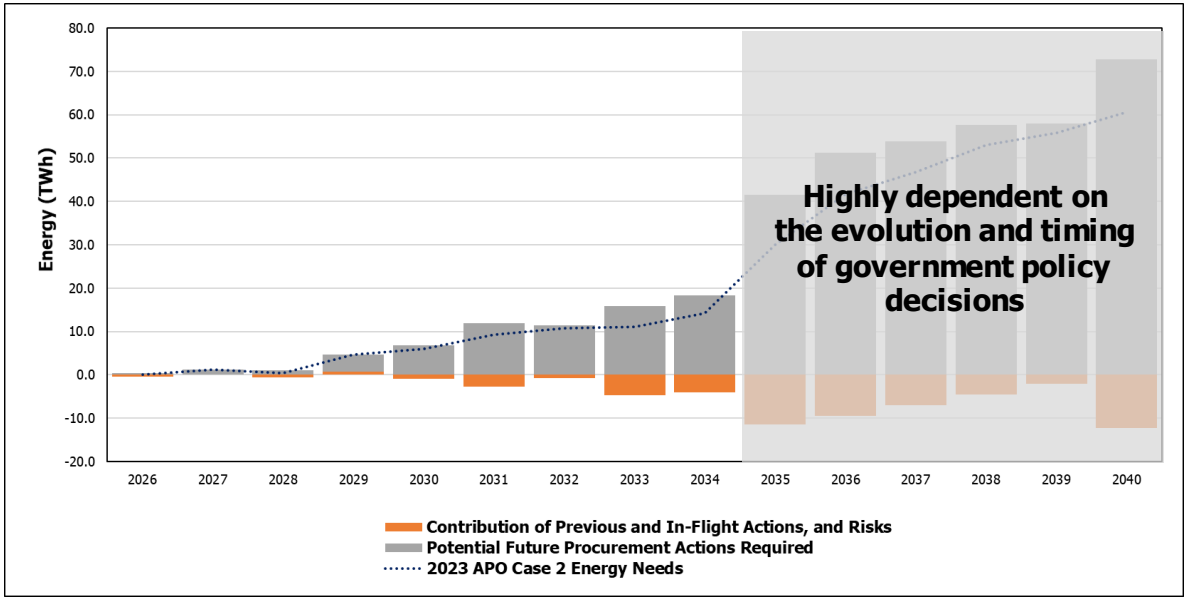
New Resources and Transmission

- Procurement targets not met (e.g., lack of municipal support, deliverability challenges, lead time required to build new transmission and generation)
- 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

Integrated Resource Adequacy Outlook

- The integrated Resource Adequacy Outlook considers previous and underway actions, and risks and uncertainties to determine the remaining capacity and energy needs. These include:
  - The remaining capacity finalized through the Same-Technology Upgrades Solicitation, following the IESO's June 27 Resource Adequacy Update
  - Anticipated capacity secured in future capacity auctions and through Long-Term 1 RFP
  - Capacity from the existing agreement (500 MW) and Memorandum of Understanding (600 MW) with Hydro Quebec
  - Uprates to Bruce generating units following refurbishments
- Recognizing not all resources provide energy, the integrated energy outlook accounts for contributions from resources acquired through the Same-Tech Upgrades Solicitation, anticipated gas resources secured through LT1 RFP, and Bruce generating unit uprates

Integrated Energy Outlook – Remaining Needs



- Approximate need of **5 TWh** from energy-producing resources starting in 2029
- Long-Term 2 RFP needs to acquire 2,000 MW (installed capacity) of new energy-producing resources by 2030
- In tandem, re-commitment of existing resources will be required to help address needs
- Further long-term procurements are anticipated to target 1,500 MW of new-build resources to be in-service in 2032 and 2034 (totaling 5,000 MW for 2029 to 2034)

Transmission System Outlook

- Transmission deliverability of resources will continue to be reported as part of LT2 and other procurement processes; the Transmission System Outlook in the APO remains focused on system needs over the long-term
- A comprehensive review of long-term transmission system needs was included in the 2022 APO. The 2023 APO will include:
  - An updated Transmission System Outlook, providing a summary of transmission system needs from the 2022 APO with updates
  - An updated Schedule of Planning Activities, including details on how the IESO plans to address the government's transmission policy direction from the government's "Powering Ontario's Growth" report and Minister's Letter

Next Steps

Timing	Activity
February 2024	• APO publication
March 2024	• Public webinar to provide an overview of the APO report
March 2024	• Engagement on the evolution of provincial planning products