



JANUARY 26, 2021

# 2020 Annual Planning Outlook Engagement

Power System Planning, IESO

## Webinar Participation (including audio)

- To interact, click the “Show Conversation” icon (message bubble symbol) to submit a written question or click on the “Raise hand” icon (hand symbol) at the top of the application window to indicate to the host you would like to speak
- Audio should be muted at all times. To unmute audio, click on the microphone icon at the top of the application window
- This webinar is conducted according to the [IESO Engagement Principles](#)

# Webinar Participation (Connection Issues)

- If you experience issues logging in:
  - Disconnect from remote server connections (VPN) and try logging in again
  - Download the mobile app and join through mobile
- Need help? Contact [Microsoft Office Support](#)

# Purpose of Engagement

- The IESO released the 2020 Annual Planning Outlook (APO) in December 2020
- Following the release of the report, today's engagement will provide a review of the key findings from the APO and provide an opportunity for stakeholders to ask questions

# Engagement Objectives

- To provide an overview of the long term outlook and provide an opportunity for stakeholders to seek clarification
- To provide key information for investment decision-making
- To support stakeholder understanding of linkages between IESO initiatives
- To solicit feedback on areas for continuous improvement

# Agenda

- Demand Forecast
- Supply Outlook and Resource Adequacy
- Transmission Outlook and Locational Requirements
- Marginal Costs and Greenhouse Gas Emissions
- Related IESO Engagements
- Looking Ahead

## 2020 Annual Planning Outlook – Key Findings

- Summer capacity needs continue to emerge through 2022 and long term needs are driven by increased demand, contract expiry, and retirement of Pickering Nuclear Generating Station
- Ontario is generally expected to have an adequate supply of energy in the near term. In the long term, energy needs will depend on the availability of existing resources post-contract expiry. If existing resources exit the market post-contract expiry and the capacity shortfall grows, the potential for unserved energy begins in 2026
- Depending on how future capacity requirements are met, current forecasts show the surplus baseload generation will decline and GHG emissions will rise over the outlook period

# Pandemic Uncertainty in the Planning Outlook

- To address uncertainty given the nature of the pandemic, the 2020 Annual Planning Outlook (APO) forecasts demand using two scenarios based on assumptions about the pace of economic recovery during the outlook period (2022-2040)
  - Scenario 1 features an earlier recovery from the pandemic with demand returning to pre-COVID levels by end of 2022
  - Scenario 2 anticipates a more significant economic downturn with demand recovering more slowly
- The impact of the pandemic on availability of generation is factored into the resource outlook



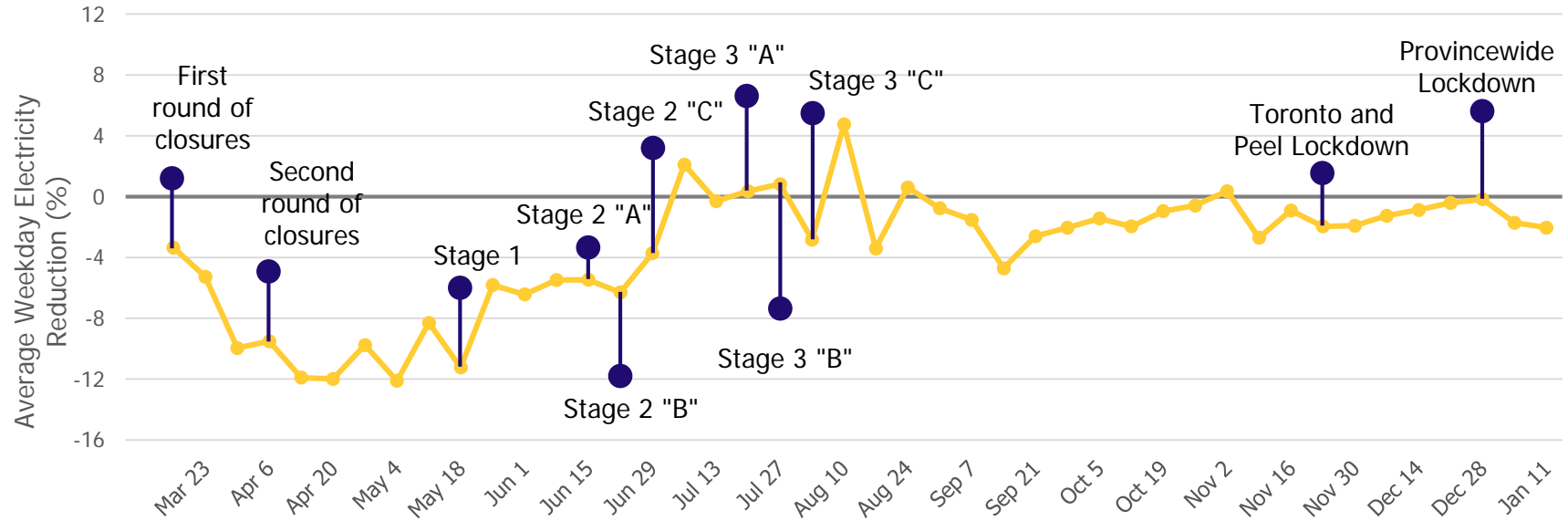


# Demand Forecast

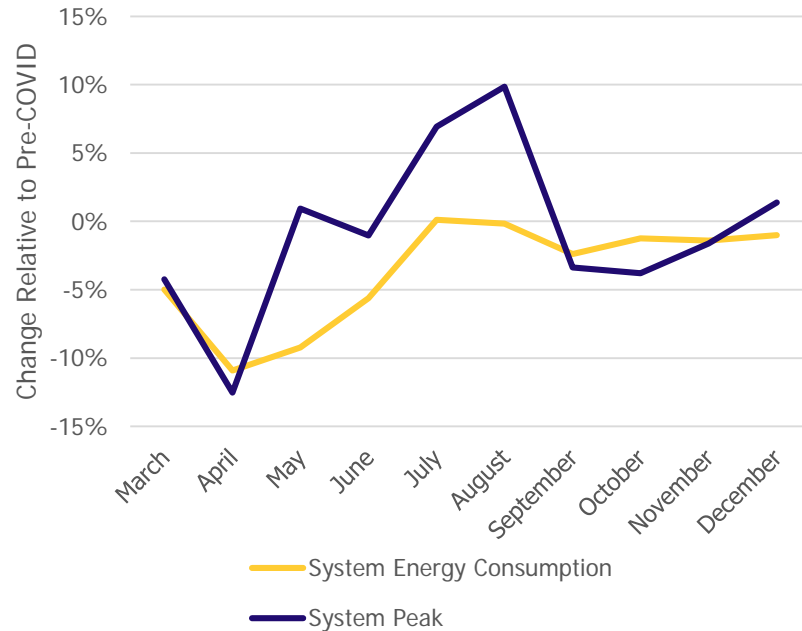


# Impacts of COVID on Ontario System Demand

# COVID measures and Weekly System Energy



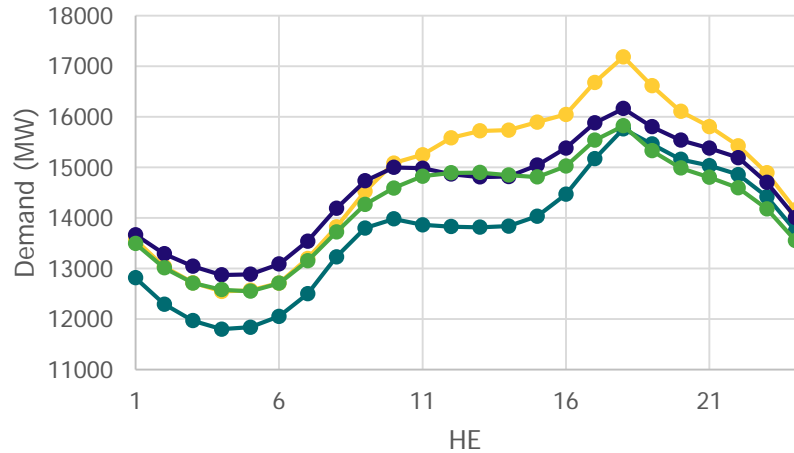
# Impact on Ontario Energy and Peak Demand



- Demand dropped by more than 10% during peak COVID-19 closures
- Largest increases in peak (7-10%) occurred in Summer months, due to suspension of ICI and increased residential Air Conditioning load
- Peaks and energy in Fall are close to pre-COVID levels.

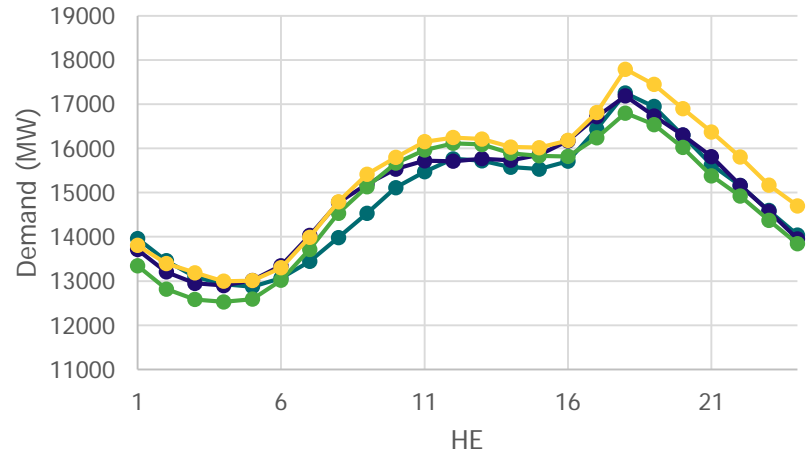
# Christmas and New Year's Eve vs. Similar Days Pre-COVID

## Christmas Demand



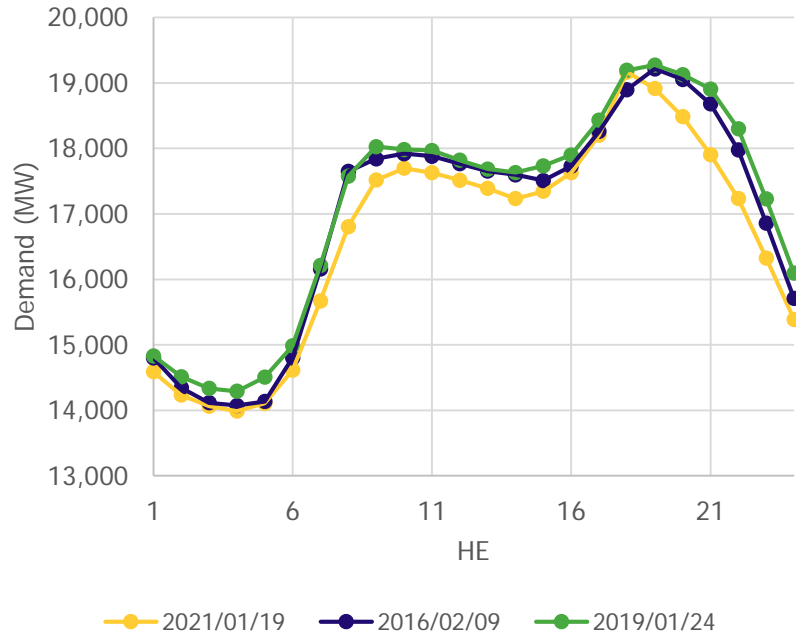
- Fri 2020/12/25
- Tue 2018/12/25
- Sun 2016/12/25
- Wed 2019/12/25

## New Year's Eve Demand



- Sat 2016/12/31
- Mon 2018/12/31
- Tue 2019/12/31
- Thu 2020/12/31
- Sun 2016/12/31

# January 19, 2021 vs. Similar Days Pre-COVID



- Morning Ramp-Up:
  - Reductions in demand causing a slower ramp.
- Evening Ramp-Down:
  - Ramp-Down begins sooner, right after peak hour
  - Reduction in demand in all late evening hours, causing steeper ramp-down
- Peak and over-night low unaffected

# Demand Forecast Highlights

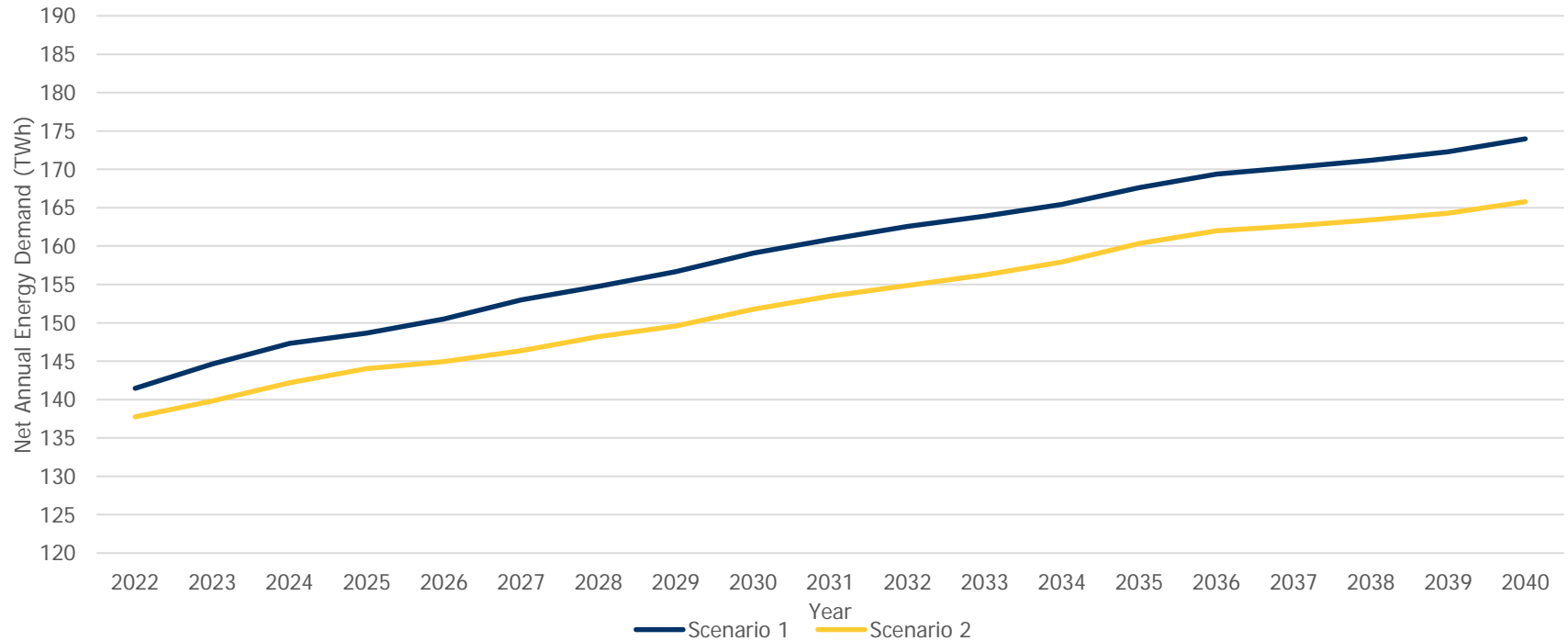
- Demand is lower in the near term and higher in the longer term than forecasted in the 2019 Annual Planning Outlook
- Includes two scenarios to understand and consider the uncertainty risks regarding pandemic and economic impacts as well as subsequent recovery and growth
- Includes an assumption of continued conservation program delivery over the entire outlook period

# Demand Forecast Key Findings

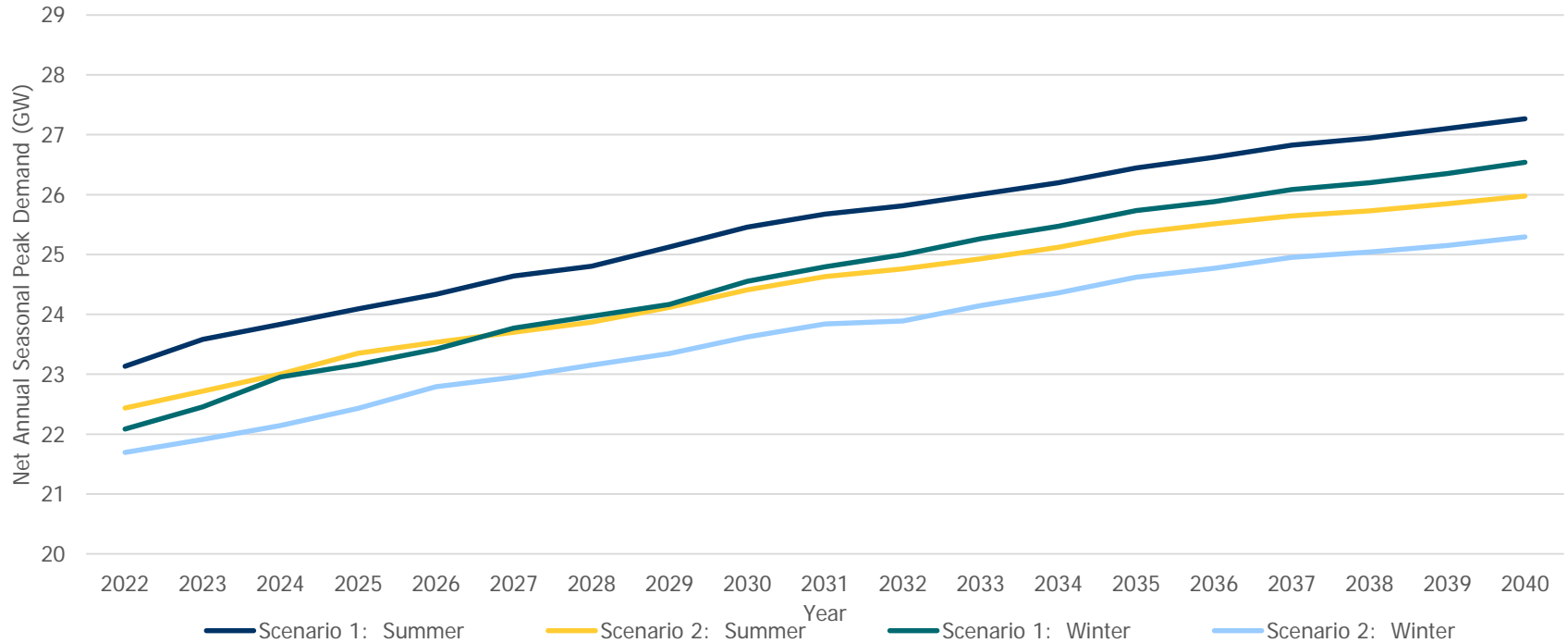
#	Demand Driver	Key Finding
1	Commercial sector	Decreased demand in near term followed by a slow recovery
2	Residential sector	Demand projected to grow faster than previously projected due to increased household count in the long term supported by higher immigration levels
3	Industrial sector	Demand has shown and is expected to continue to show resiliency with overall slow and steady growth over the outlook period
4	Agricultural sector	Additional demand growth emerging in the west of London area



# Energy Demand



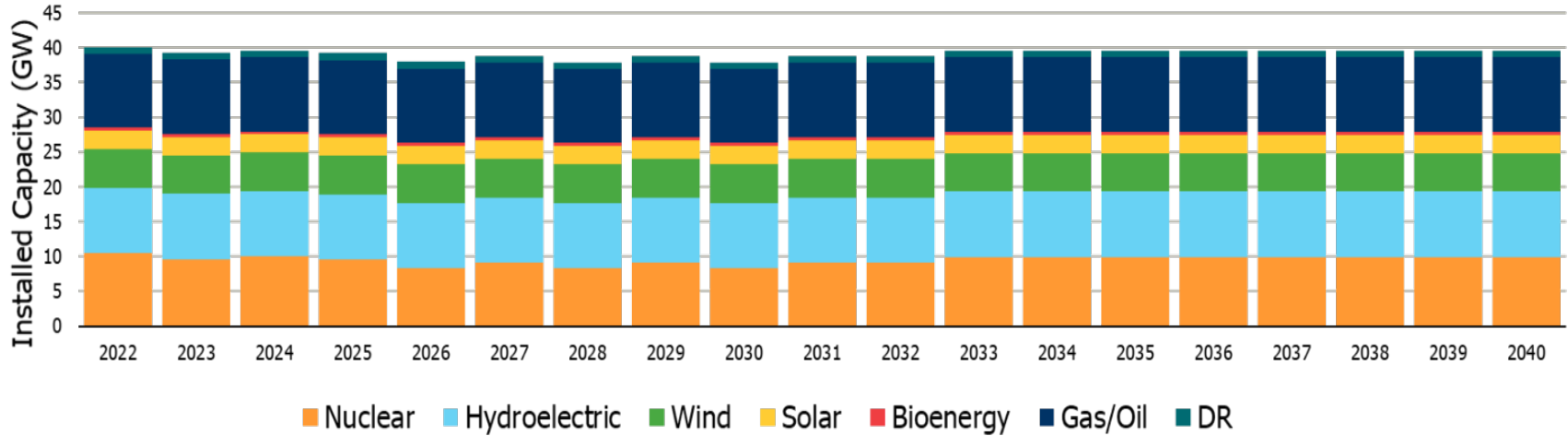
# Seasonal Peak Demand



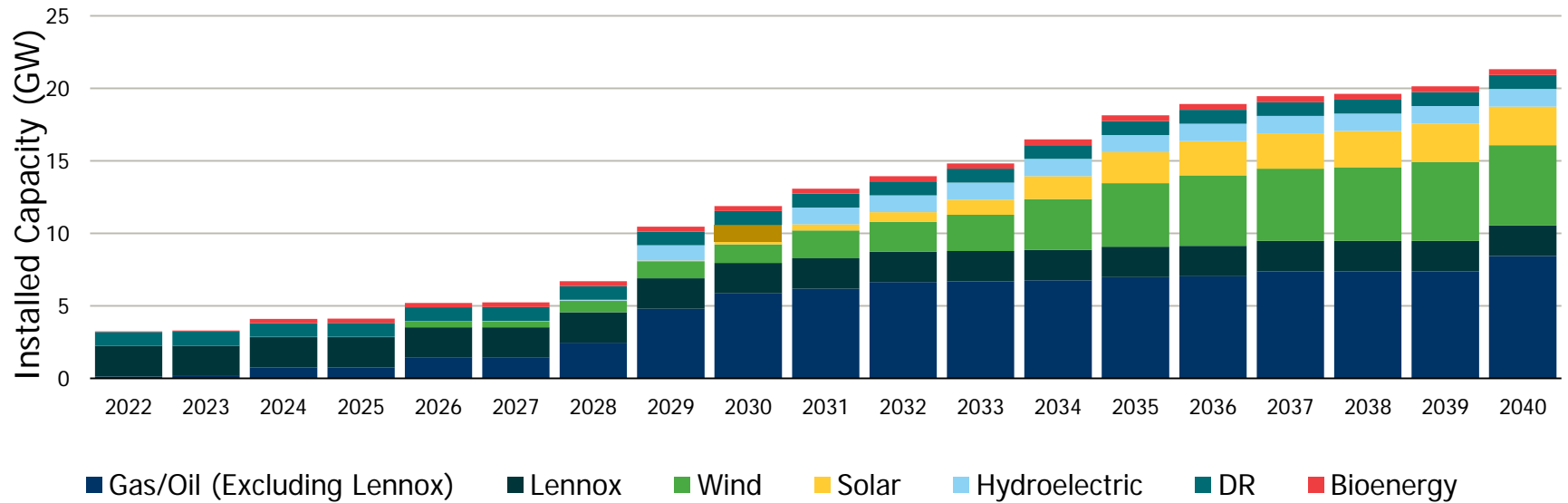


# Supply Outlook and Resource Adequacy

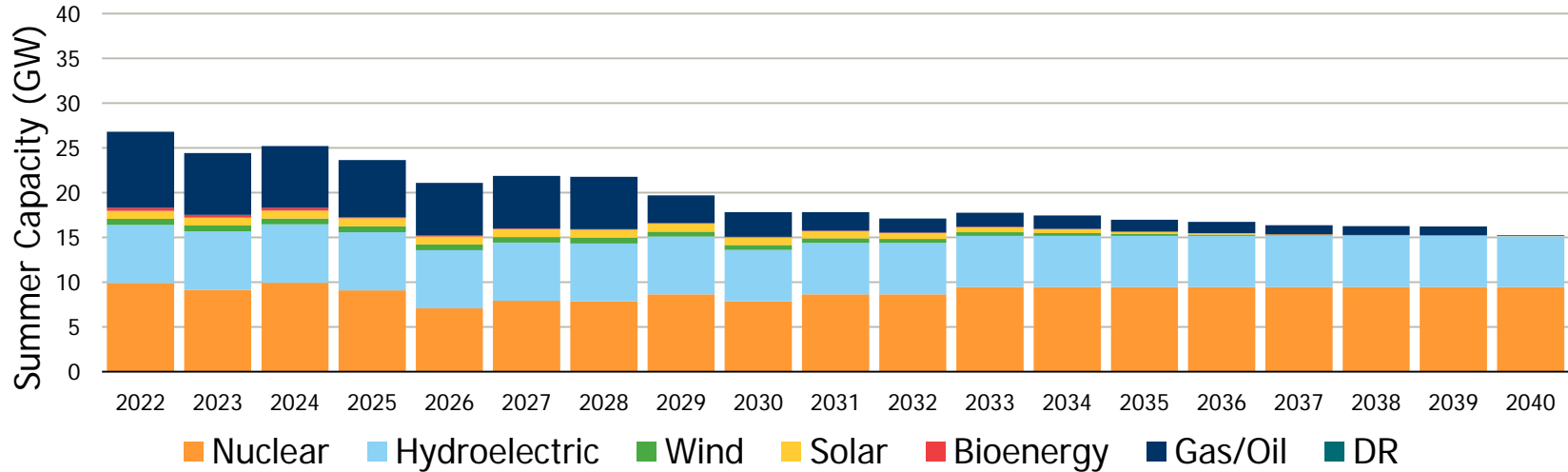
# Installed Capacity Outlook



# Contracts and Commitments Ending

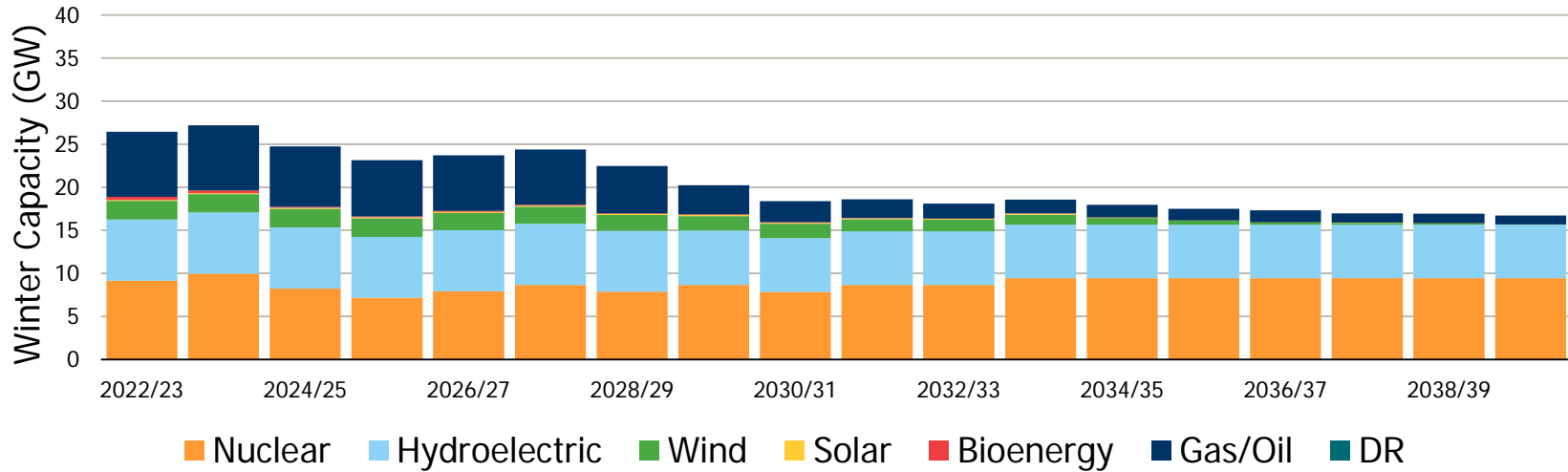


# Committed Summer Effective Capacity



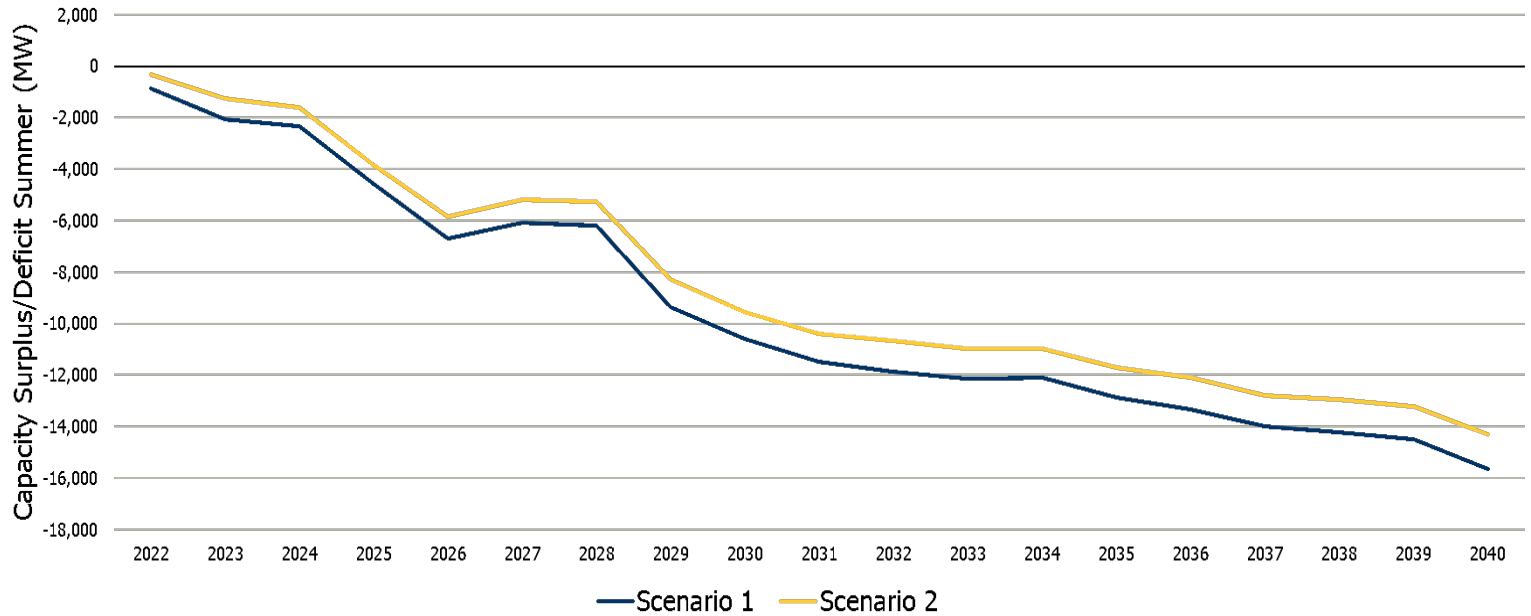
Supply forecast does not assume continued availability of existing resources

# Committed Winter Effective Capacity



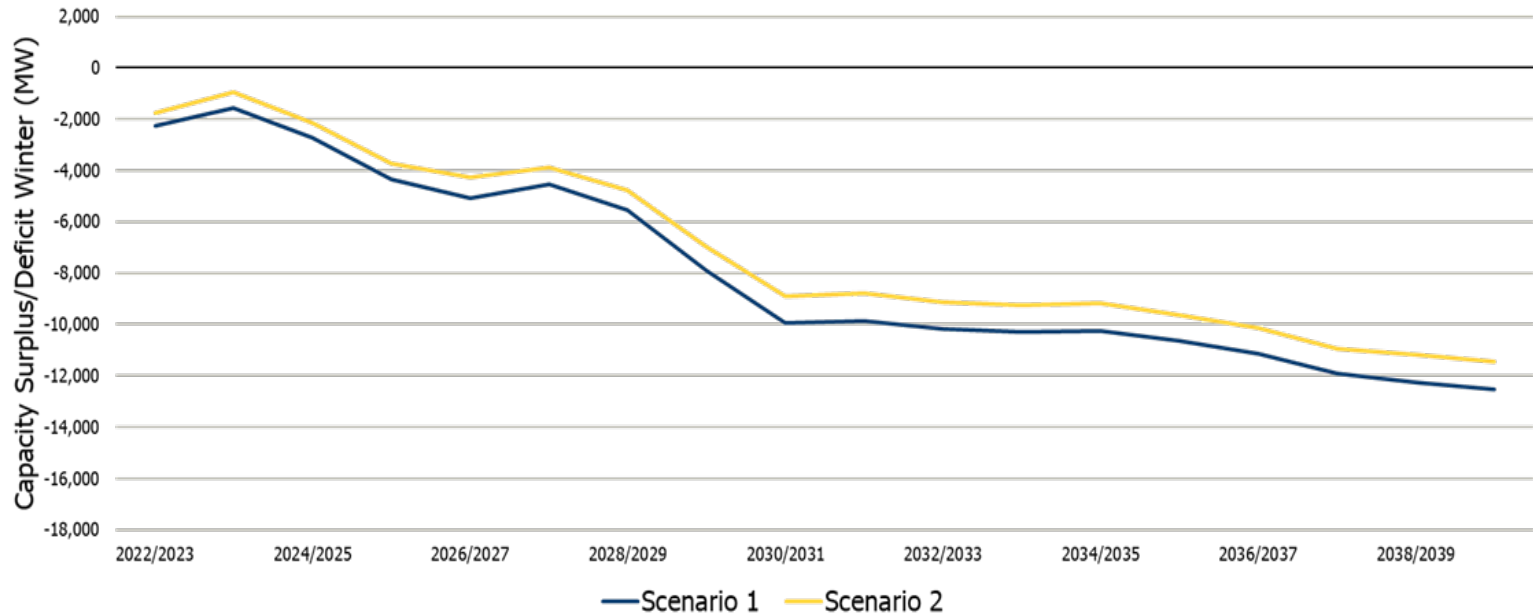
Supply forecast does not assume continued availability of existing resources

# Summer Capacity Surplus/Deficit, without Continued Availability of Existing Resources





# Winter Capacity Surplus/Deficit, without Continued Availability of Existing Resources



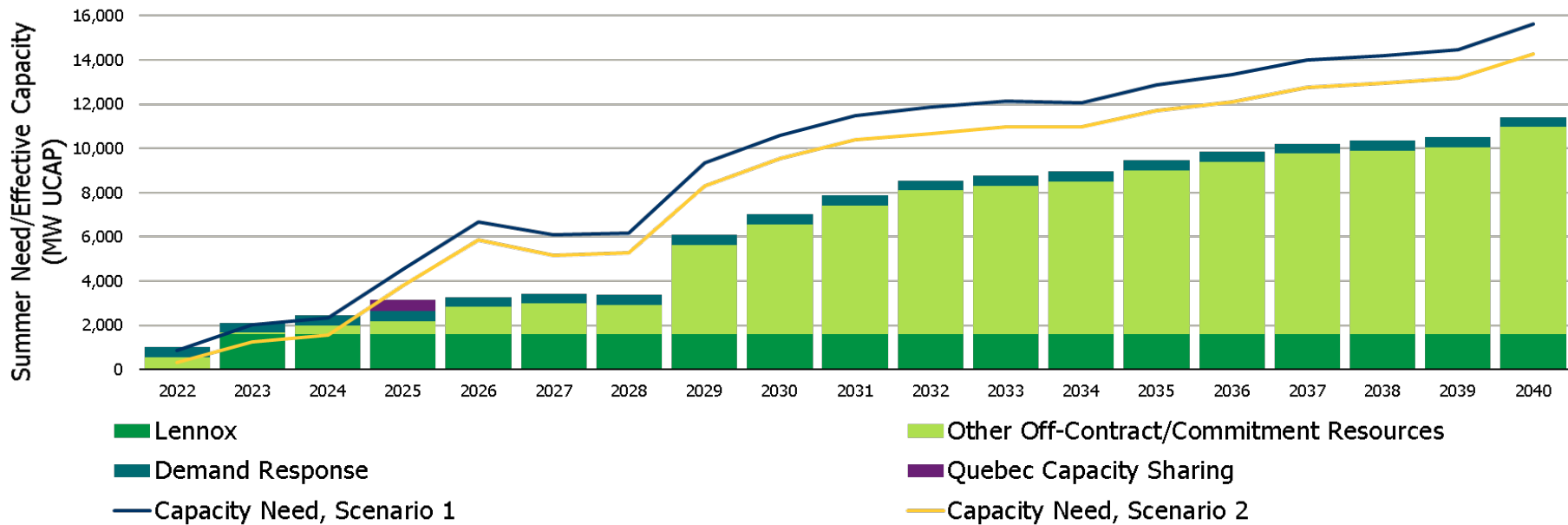
## Zonal Adequacy Needs - Minimums

- Zonal minimum emerges during the summer and winter seasons in the mid-2020s in the GTA and Eastern Ontario (i.e., Toronto, Essa, East, and Ottawa) zones. With the retirement of Pickering NGS and the Darlington refurbishment, this area will have less generation capacity available than it has today
- Zonal minimum emerges during the summer and winter seasons towards the end of the decade in the West zone, driven by demand growth
- Future system reinforcements reduce some of the transmission constraints that are resulting in these zonal minimums

## Zonal Adequacy Needs - Maximums

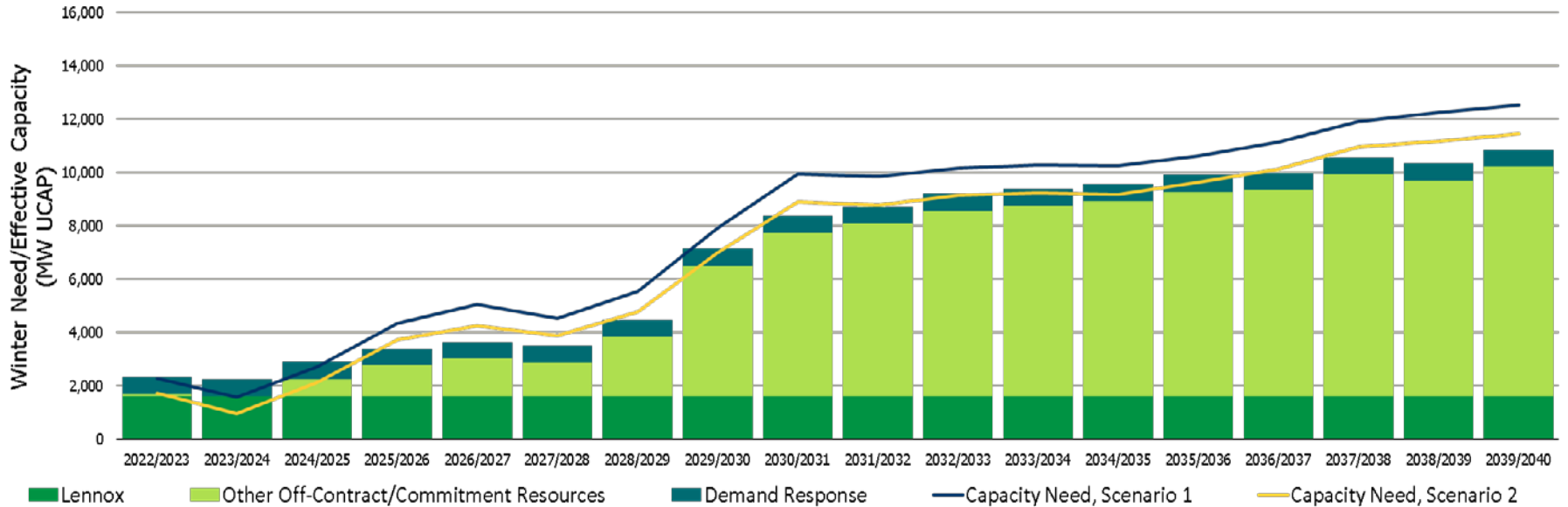
- Zonal maximum will limit the amount of capacity that can be added in Northern Ontario (Northwest and Northeast zones) during the summer and winter seasons due to transfer capability limitations on the Flow South interface
- The Flow East Towards Toronto interface limits the amount of capacity that can be added in Southwest Ontario (i.e., Southwest, West, Niagara and Bruce zones) during the summer and winter seasons
- Future system reinforcements reduce some of the transmission constraints that are resulting in these zonal minimums

# Options Available to Meet Summer Needs



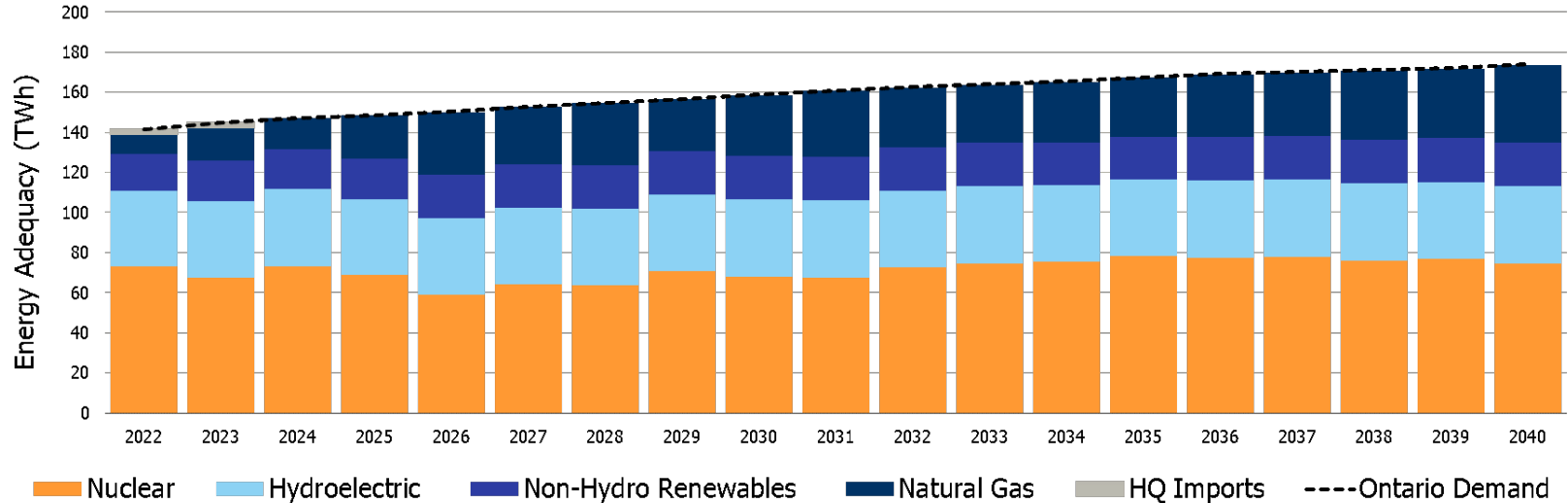
Excludes new resources that may be in development. Continued availability of existing resources will be addressed through the [Resource Adequacy engagement](#).

# Options Available to Meet Winter Needs



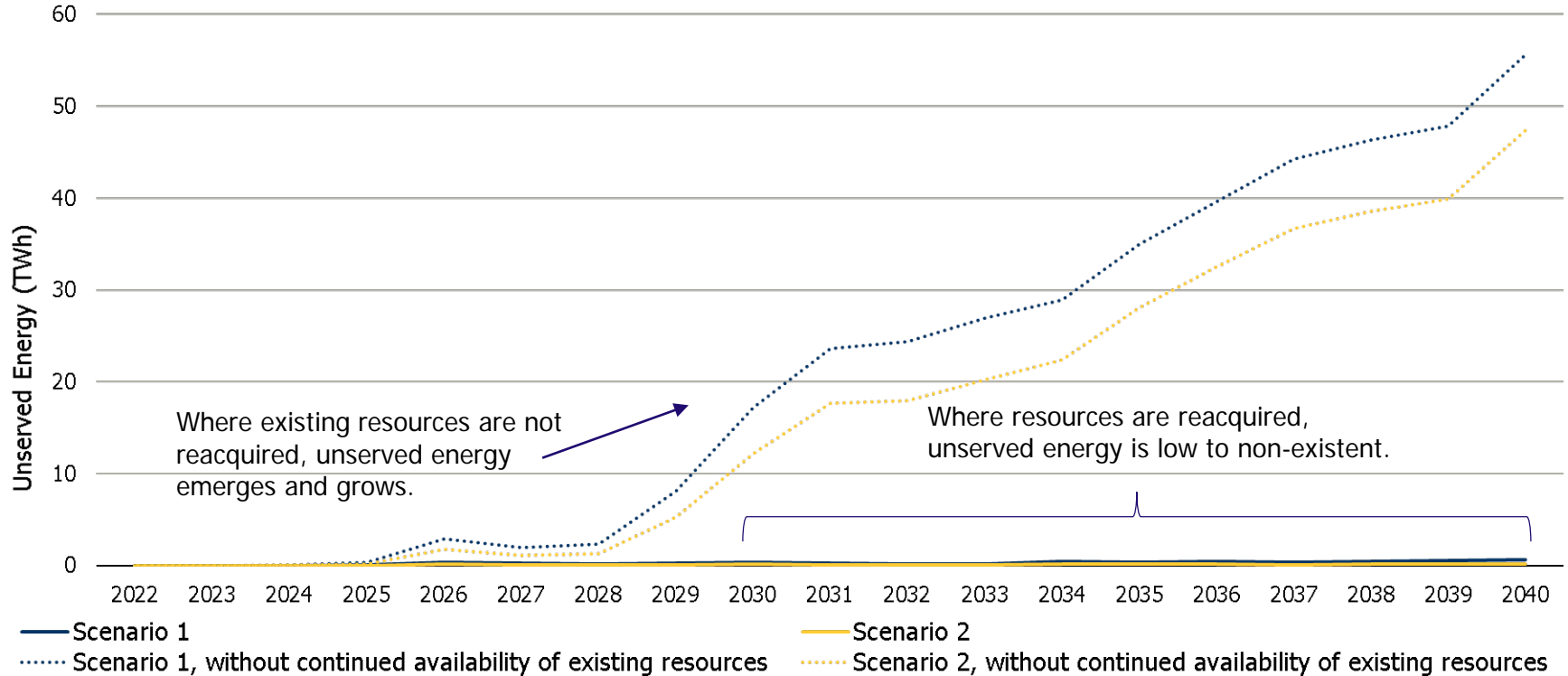
Excludes new resources that may be in development. Continued availability of existing resources will be addressed through the [Resource Adequacy engagement](#).

# Energy Adequacy – Scenario 1

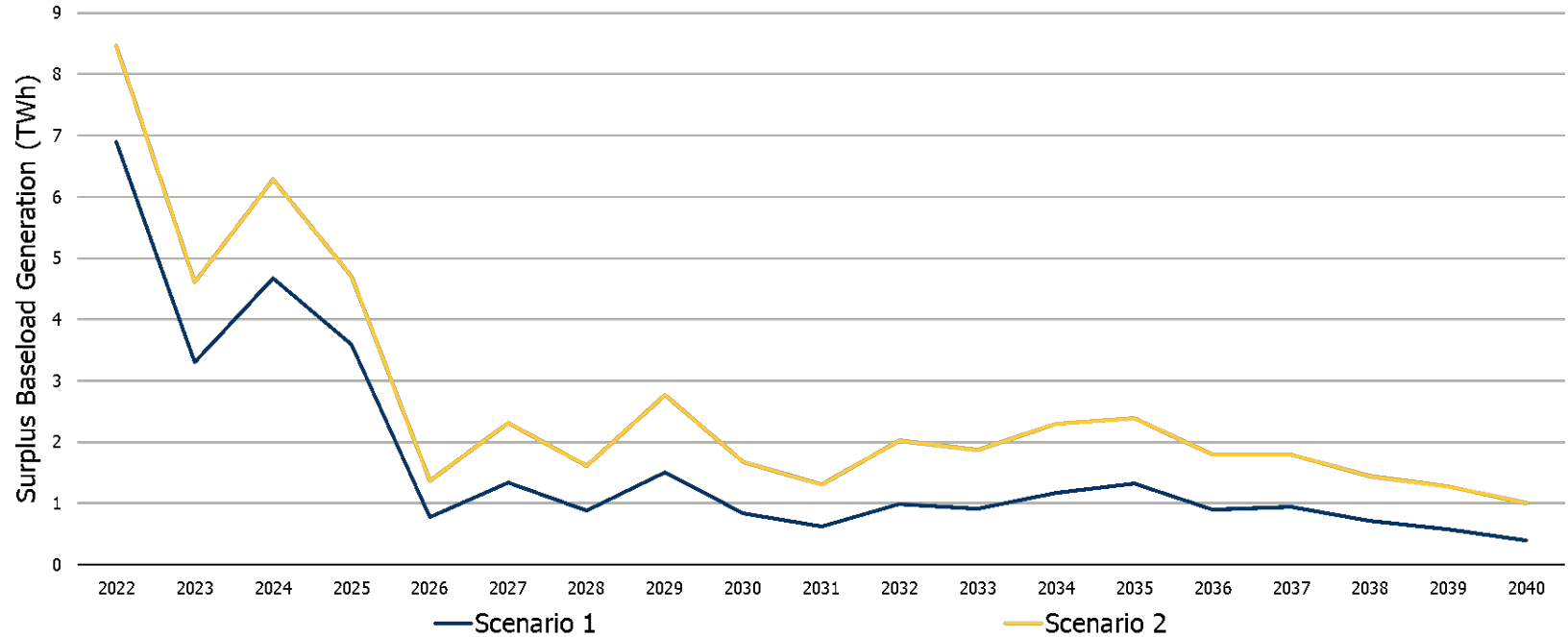


Energy adequacy forecast shown assumes continued availability of existing resources

# Unserved Energy



# Surplus Baseload Generation







# Transmission Outlook and Locational Requirements

# Transmission Outlook

- The bulk transmission system is critical to ensuring power can be delivered from the supply resource to the customer. The ability of the transmission system to transfer power across the province is defined by the capability of key interfaces
- Transmission reinforcements in the West of Chatham, Ottawa, eastern Ontario (near Napanee), and areas of northern Ontario are anticipated to come into service within the next five years, and will assist in maintaining a reliable transmission system

# Anticipated Transmission Projects



# Transmission Outlook and Locational Requirements

- Under certain supply and demand conditions transfer capability may become constrained between 2025 and 2030 along three major interfaces: Flow East Towards Toronto (FETT), Flow Into Ottawa (FIO) and Buchanan Longwood Input (BLIP)
- Planning is underway in these areas to identify preferred solutions to address needs
- Solutions may include transmission upgrades, and/or locational requirements for new resources

# Constraints on the FETT Interface

- The FETT interface allows resources located west of FETT to help supply demand east of the interface. Improving the FETT transfer capability would reduce the amount of capacity that must be sited east of FETT
- Last year, the IESO recommended upgrading the conductors on the existing transmission lines to improve the FETT capacity for a planned 2025 in-service date. Along with continued operation of Lennox GS, this upgrade meets the significant increase in the capacity need east of FETT in 2026 after Pickering NGS retires
- Other transmission options can complement the line upgrade to provide further increase in the FETT capacity. The need for further increase in the FETT capacity will be considered along with the resource acquisition framework which is under development

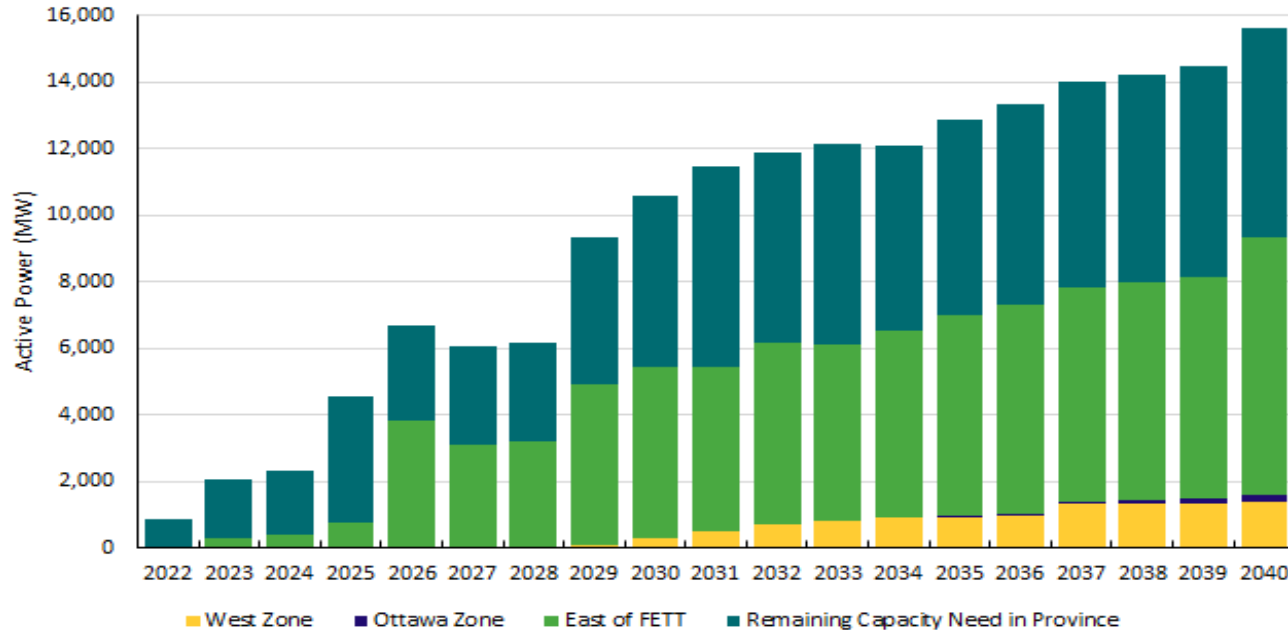
# Constraints on the FIO Interface

- The IESO's ongoing Gatineau Corridor End of Life Study is assessing refurbishment and decommissioning options for significant transmission facilities in eastern Ontario. Completion of this study is planned for Q2 2021
- Without these circuits, the reliability of bulk and regional supply, generation deliverability, and imports from Quebec would be greatly impacted
- Even with the refurbishment of these circuits, the eastern Ontario system requires reinforcement to meet new needs, including the security of the bulk supply to the Ottawa region in the medium term, a near-term requirement to improve supply to the Peterborough area and the ability to meet growing load demand in west Ottawa

## Constraints on the BLIP Interface

- A capacity need has been identified for the West Zone in the medium term due to constraints on the BLIP interface. Further, there is a local need to site capacity west of Chatham (a sub-region of the West Zone) to address limitations of interfaces within the West Zone
- Options to meet these needs are being evaluated in the West of London Bulk Plan, due to be completed at the end of Q1 2021.

# Summer Capacity Needs including Locational Requirements\*



\* Note: Figure does not consider transmission reinforcements and does not assume continued availability of existing resources. As the Ottawa Zone is located east of FETT, any additional capacity in that zone would contribute towards the amount required east of FETT.



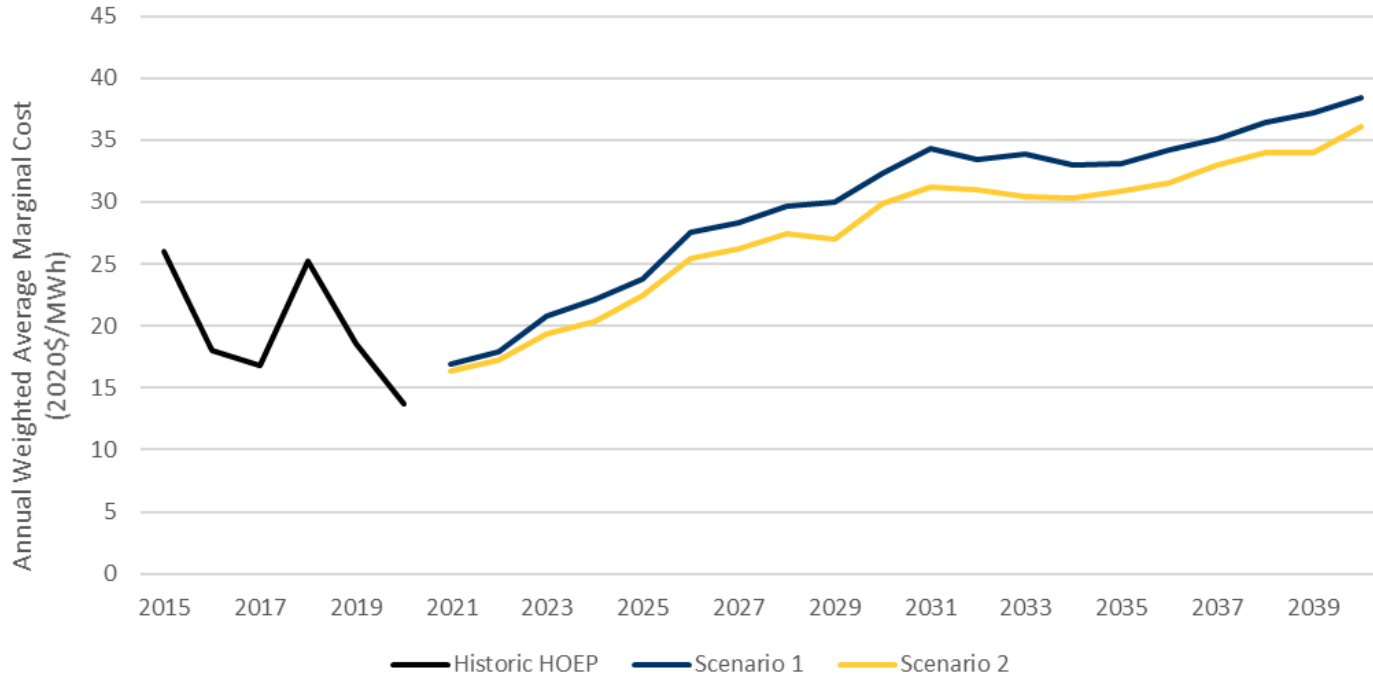


# Marginal Costs and Greenhouse Gas Emissions

## Outcomes and Other Considerations

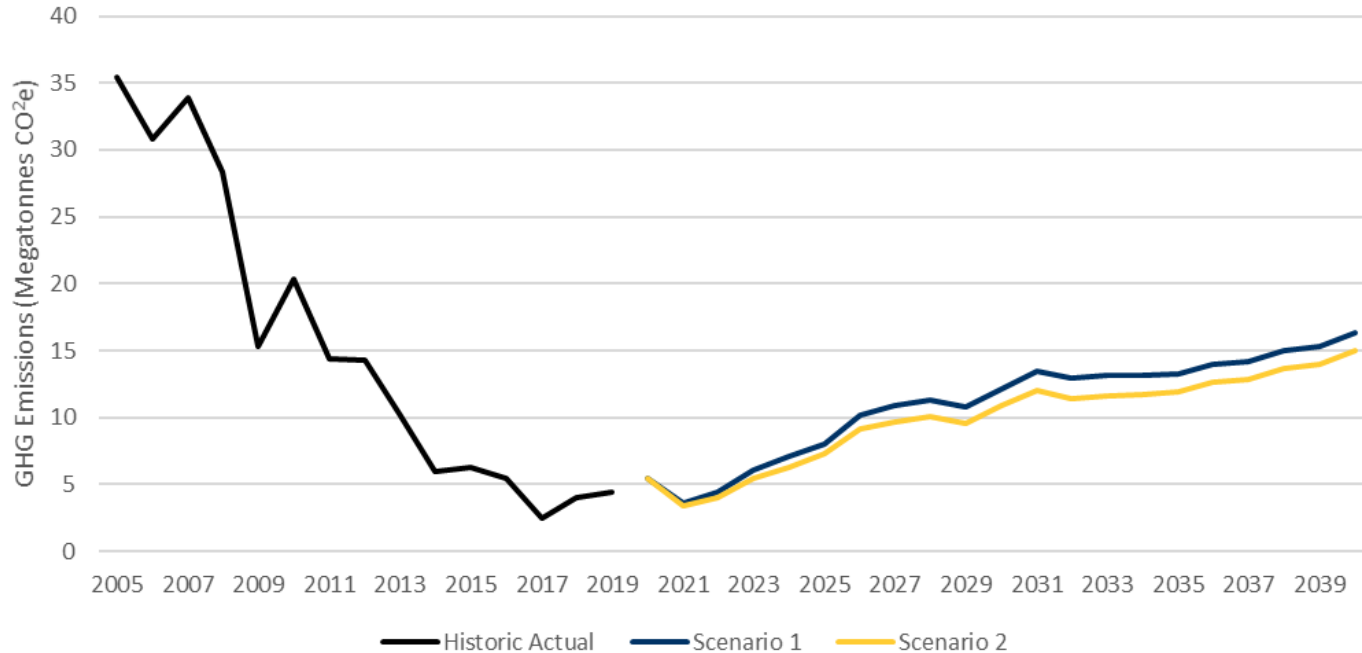
- Increased demand over the outlook period, and the impacts of nuclear refurbishments and retirements, mean that gas-fired generation will more often be the marginal unit of production, and will account for an increasing share of Ontario's energy production
- As a result, both the marginal cost of electricity production and electricity sector emissions are forecast to increase over the outlook period
- However, electricity remains a source of low-carbon energy in Ontario; increased electrification of emissions-intensive sectors provides an opportunity to reduce province-wide emissions

# Weighted Average Marginal Costs and Historical HOEP Price\*



\*Note: 2020 Actual HOEP is year-to-date as of November 26, 2020

# Electricity Sector Greenhouse Gas Emissions\*



\*Note: 2020 emissions data not available; values for 2020 are from the 2019 APO, Energy Efficiency case forecast



# Related IESO Engagements

# Reliability Standards Review

- In the December 14, 2020 IESO's [Reliability Standards Review](#) Update stakeholder engagement session, the IESO presented the methodology for determining the amount of non-firm imports for the assessment
- This assumption will be incorporated in the 2021 APO. The inclusion of non-firm imports is expected to reduce overall resource requirements
- This methodology currently yields a non-firm import assumption of 250 MW in summer and 240 MW in winter. The amount will be re-evaluated in future APOs

# Formalizing the Bulk System Planning Process

- To increase transparency and predictability in the development of power system plans, the IESO is formalizing the bulk system planning process to move to a more consistent approach to ensure solutions are identified transparently as needs materialize, opportunities for integrated solutions are pursued, and analyses are carried out as efficiently as possible
- This renewed process will enable more consistent forecasting and reporting on system conditions to identify bulk power system needs, provide transparent signals to the market, and enable sector participants to plan ahead, prepare for, and participate in solutions
- The APO is expected to be one of the key outputs of the IESO's bulk system planning process

# Resource Adequacy Engagement

- As a result of stakeholder feedback on the limitations of having a one-size-fits-all procurement mechanism, the IESO is working with stakeholders through its [Resource Adequacy engagement](#) to enable a framework of competitive mechanisms to meet Ontario's resource adequacy needs in the short, medium and long term
- While capacity auctions will meet short-term needs, the IESO is exploring other acquisition tools that will offer longer commitments as part of this engagement – target capacities for these will be informed by this APO and future editions



# Acquisitions Report

- In addition to the Annual Planning Outlook, the IESO is planning to develop a report to translate planning outlook needs (i.e. needs from the APO) into acquisition targets
- Targets will meet system planning criteria, but will also need to capture additional considerations such as operational needs (e.g. real time issues not captured by APO) and identify the mechanism for acquisition
- Additional information on this report will be presented in the Resource Adequacy engagement session following this webinar

# Status Update of Related Engagement Initiatives

- Reliability Standards Review: in December 2020, the IESO proposed a methodology for determining non-firm imports to be included in resource adequacy assessments; feedback to the methodology has been received
- Resource Adequacy Engagement: following this engagement, a stakeholder engagement webinar will cover the high-level framework, and engage with stakeholders on a new report that will translate needs identified in planning documents into acquisition targets for each of the mechanisms identified in the framework
- Formalizing the Bulk System Planning Process: stakeholder engagement webinar is being planned for Q1 2021 to present an overview of the formalization of the IESO's bulk system planning process



# Looking Ahead

# Annual Planning Outlook: Product Evolution

The Annual Planning Outlook is a report that continues to evolve. Potential elements in future APOs can include:

## Today

- Resource adequacy needs
- Reserve margin requirements
- Transmission security needs
- Zonal requirements
- Marginal costs
- Avoided costs and emissions

## Upcoming

- Produce net and grid demand forecast
- Inclusion of non-firm imports
- Translating needs into acquisition targets

## Future

- Ancillary services needs
- Integration of bulk/regional/local needs
- Formal incorporation into the bulk planning process

Stakeholder engagement

# Questions for Stakeholders

## 2020 APO Report

1. What chapter/section is most helpful?  
What did you like about it?
2. What do you want to read more about?
3. What key factors, uncertainties, and additional considerations should the IESO include in future outlooks?

## 2020 APO Modules, Methodology, and Supplemental Data

1. Are the assumptions, inputs, and methodology reasonable?
2. What information do you want to see more of?

# Submitting Stakeholder Feedback

- Your input is important to us. Please provide written feedback to [engagement.@ieso.ca](mailto:engagement.@ieso.ca) by **February 17, 2021** using the feedback form on the [Annual Planning Outlook webpage](#)
- The IESO will review the stakeholder feedback and provide a written response within Q1 2021
- The 2020 APO and other supporting materials can also be found on the APO webpage

## Next Steps

- Continuous improvement on the APO based on stakeholder feedback and periodic review with the goal to determine what works well and identifying opportunities for enhancement
- Begin early stages of 2021 Annual Planning Outlook development

---

# Thank You

[ieso.ca](http://ieso.ca)

1.888.448.7777

[customer.relations@ieso.ca](mailto:customer.relations@ieso.ca)

[engagement@ieso.ca](mailto:engagement@ieso.ca)



[@IESO\\_Tweets](https://twitter.com/IESO_Tweets)




[facebook.com/OntarioIESO](https://facebook.com/OntarioIESO)



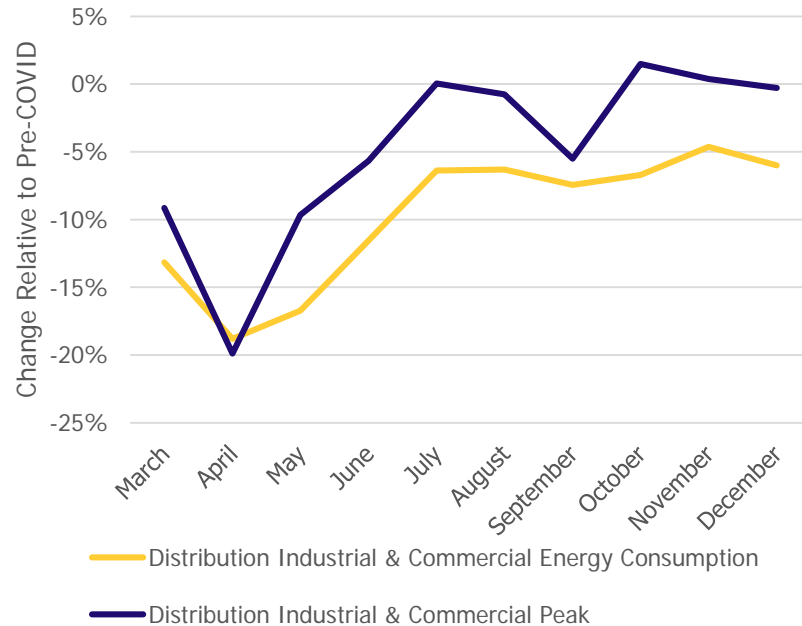
[linkedin.com/company/IESO](https://linkedin.com/company/IESO)





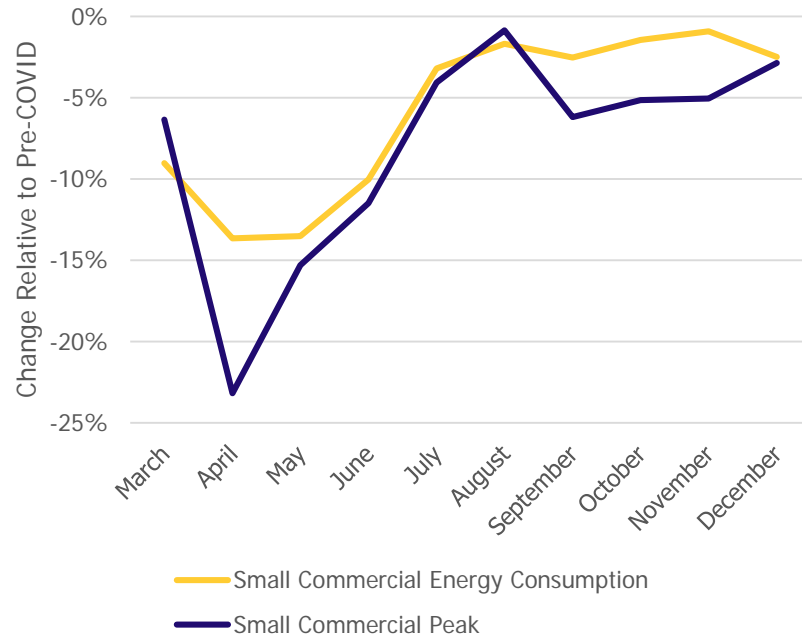
# Appendix: Impacts of COVID-19 on Sector Demands

# Impact on Distribution Industrial & Commercial Demand



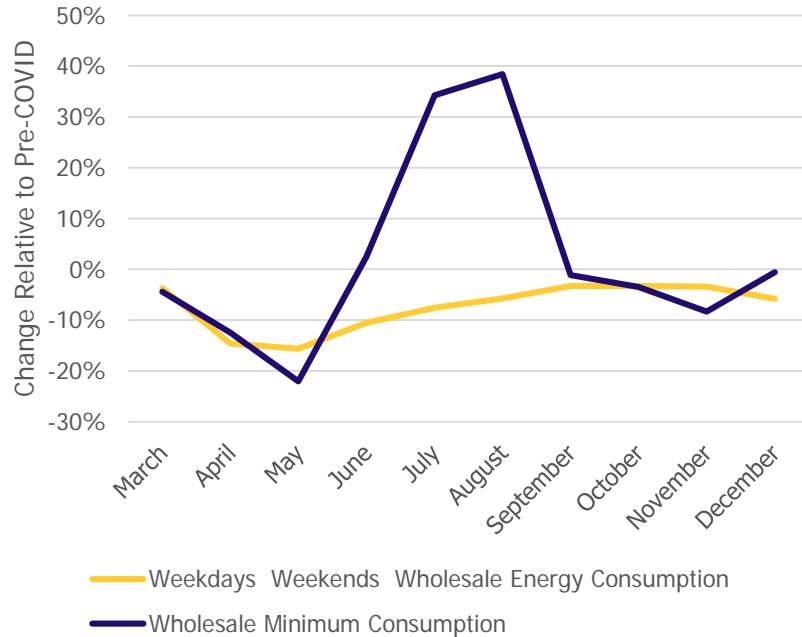
- Consumption in this sector decreased by 20% during closures in March and April
- Rapid increase of 14% in energy consumption as a result of Stage 2 and Stage 3 Re-opening
- Sector hit hardest in terms of reductions in energy consumption associated with ongoing effects of the COVID such as business closures and work-from-home
- Residual reductions in energy consumption of 5-6% persist.

# Impact on Small Commercial Energy and Peak Demand



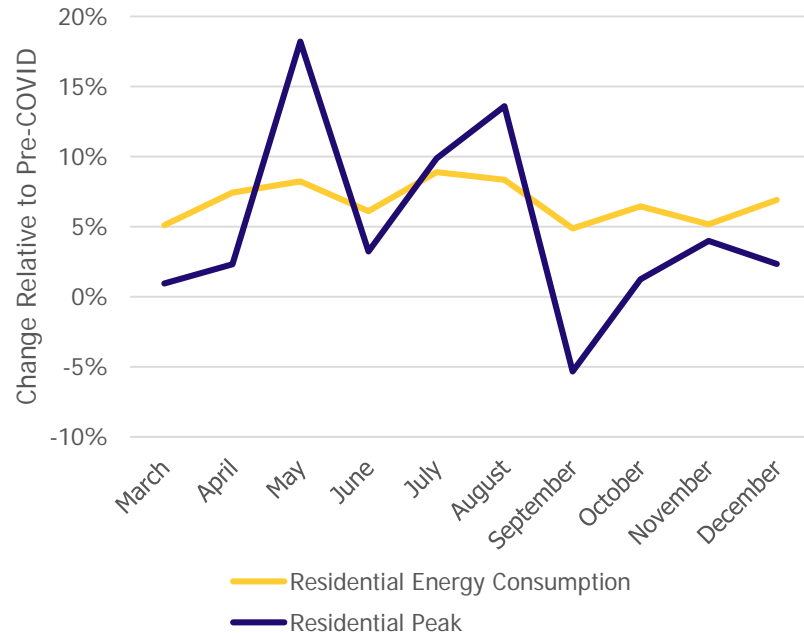
- Energy consumption in this sector decreased by 14% and peak by 23% during closures in March and April
- System recovery began in Stage 1 and continued through August.
  - Energy increased by 12% and peak by 20% during this period
- Persisting reductions of 2-3% in energy, due to COVID economic impacts
- Full recovery expected by end of 2022

# Impact on Wholesale Sector Energy & Peak Demand



- Major reductions of 15% in energy consumption during the two rounds of closures in March and April of 2020
- Recovered to 2019 consumption levels by September 2020 and has stayed constant since
- Suspension of the ICI program on June 26, 2020 led to increased consumption throughout the summer as seen by the drastic increase of 35-40% in the minimum consumption levels

# Impact on Residential Sector Energy & Peak Demand



- Largest increase in peak consumption was in May (18%), when COVID measures were strictest
- Significant increase in energy (5-9%) and peak consumption (by up to 18%) by the residential sector, associated with work-from-home
- Increases during months with hot weather were comparatively larger (8-9% for energy and 10 – 14% in peak), due to residential Air Conditioning load