Forecasting and Planning Update

July 6, 2020
Webinar

ieso
Connecting Today. Powering Tomorrow.

Agenda

9:00	**Forecasting and Planning Update** • Update: Market operations and pandemic response • Value of Interties During COVID-19 • Demand impacts of COVID-19 • Revised 5-year demand outlook
10:30	*Break*
11:00	**The Brattle Group:** COVID-19 Impacts on North American Electricity Markets

Today's Webinar Presenters

Terry Young, Vice President of Policy, Engagement and Innovation

Chuck Farmer, Senior Director, Power System Planning

Tam Wagner, Senior Manager, Operational Effectiveness

Nicola Presutti, Senior Manager, Market Forecasts & Integration

Tom Chapman, Senior Manager, Market Development & Strategy

Kausar Ashraf, Senior Manager, Demand & Conservation Planning

Jordan Penic, Senior Manager, Engagement and Indigenous Relations

MARKET OPERATIONS UPDATE

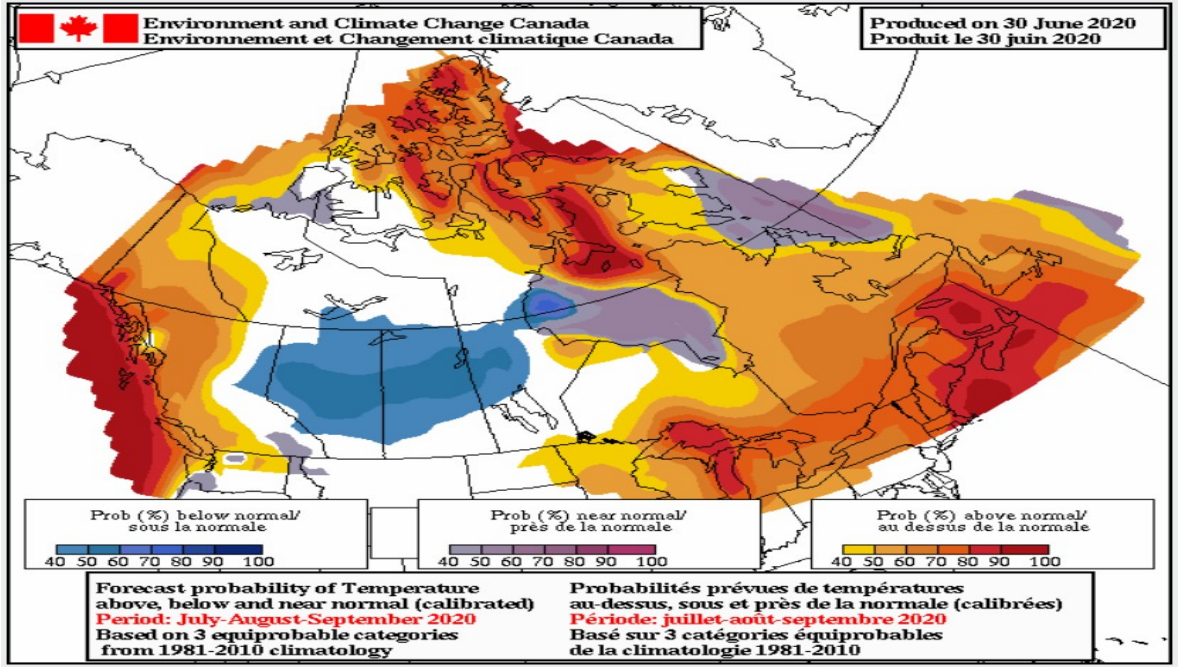
Pandemic Response and Recovery

- As the province evolves to Phase 2 of reopening Ontario, the electricity sector is also evolving to ensure that we continue to provide the essential service required to allow businesses to successfully reopen
- While essential electricity sector staff have continued to work throughout this pandemic, plans to return other staff to the workplace have been put in place
  - The health and safety of employees remain the top priority
- Return-to-office plans include:

Pandemic Response and Recovery (Continued)

- A phased approach that staggers the return of staff to the office to ensure physical distancing can be maintained while others continue to work from home
- Enhanced protocols including cleaning, personal protective equipment, limited business travel, etc.
- Regular communications and training to increase awareness and to set and manage expectations for the 'new normal'
- A strategy that is flexible to allow incorporating lessons learned and changing circumstances

Summer Outlook - Weather



Environment Canada predicts that summer 2020 will have above normal temperatures.

Summer Preparations

- Implement readiness procedures with Market Participants by:
  - Testing generators for Unit Readiness
  - Coordinating outage plans with the transmitters and neighbouring areas
  - Collaborating with gas pipeline operators on gas availability.
- Continue to monitor for extreme conditions and issue alerts as appropriate

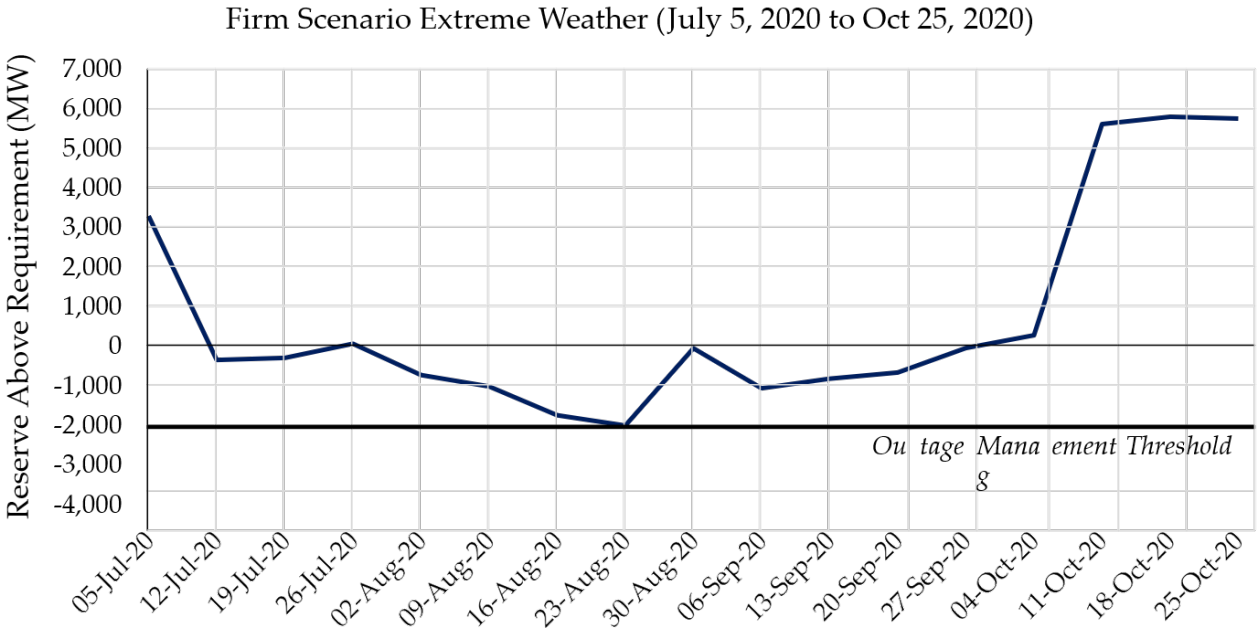
Summer Preparations (Continued)

- Forest fires have already been present in Northeastern Ontario
  - Pose a threat to transmission elements
  - Is an early indicator of potential dry conditions for the northern hydroelectric fleet
- Continue to monitor risks to grid operations as a result of COVID-19, including potential increased absenteeism across the sector.

Summer Preparations (Continued)

- Potential risks in summer 2020 and summer 2021 are expected to be mitigated by outage rescheduling. The IESO continues to monitor the situation and will provide updated assessments when more information becomes available.
- Ontario's electricity system is well-positioned for the next 18 months and expected to be adequate under both the normal weather and extreme weather scenarios.

2020Q2 Reliability Outlook – Summer 2020 Reserve Above Requirement (RAR) Outlook



http://www.ieso.ca/en/Sector-Participants/Planning-and-Forecasting/Reliability-Outlook

Questions

VALUE OF INTERTIES DURING COVID-19

Operational Value during COVID

- From an operational perspective, the interties are some of Ontario's largest and most flexible assists, and are able to effectively compliment the operation of other resources
- Trading over the ties helped ensure supply and demand remained in balance providing operational benefits
- In recent months exports have provided valuable markets for Ontario's baseload hydroelectric and nuclear fleet
  - Avoided the need to spill water at hydroelectric plants

Operational Value during COVID (Continued)

- Avoided the need to maneuver or shut down nuclear plants
- Avoided curtailments of renewable resources

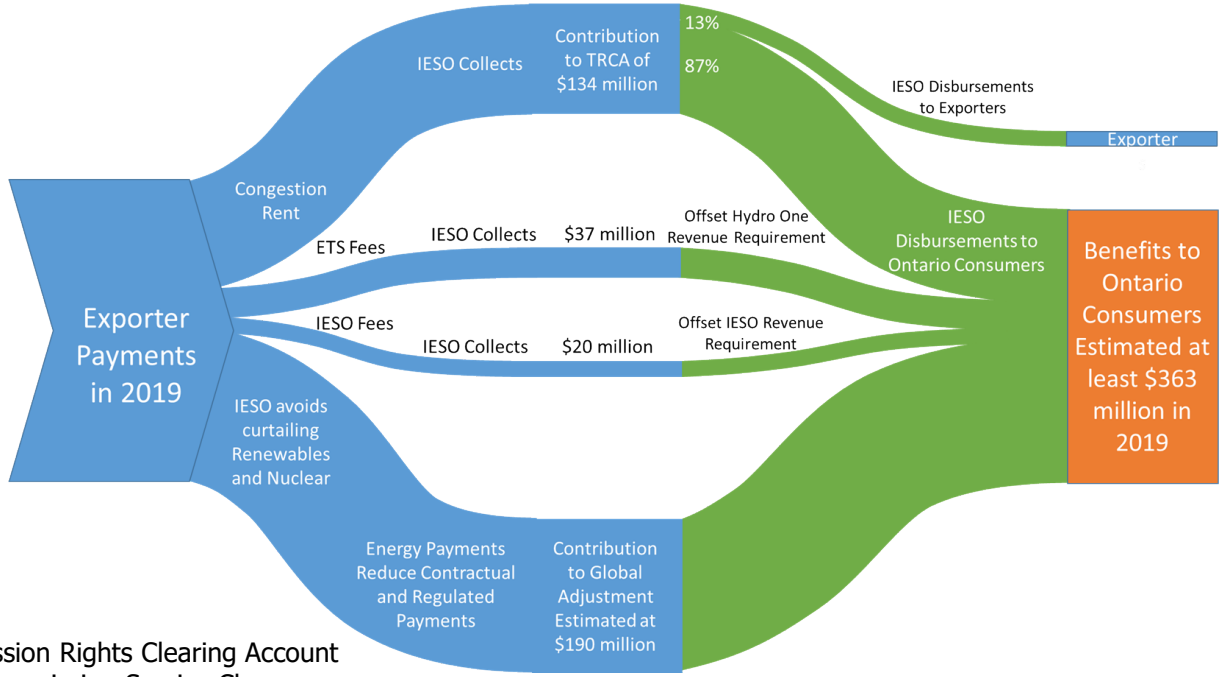
Economic Value during COVID

- Throughout 2019, benefits to Ontario consumers from intertie trade exceeded $360 million
  - These benefits to Ontario consumers have continued since the start of the COVID 19 pandemic, with March 01 to May 31, 2020 incremental benefits estimated at $75-107 million

Economic Value during COVID (Continued)

Incremental Revenue Generation		Contributions to Fixed System Costs		Avoided System Costs
• Traders often pay a premium (called intertie congestion rents) to export power and the majority of that premium is returned to Ontario consumers	+	• Exports help pay for system costs that would otherwise have to be paid for by Ontario consumers e.g. the cost of maintaining intertie assets as well as wholesale system costs	+	• Trade can avoid the need to maneuver and curtail of nuclear, hydro and renewable generators reducing Global Adjustment costs for Ontario consumers

Economic Benefits of Competitive Exports – 2019



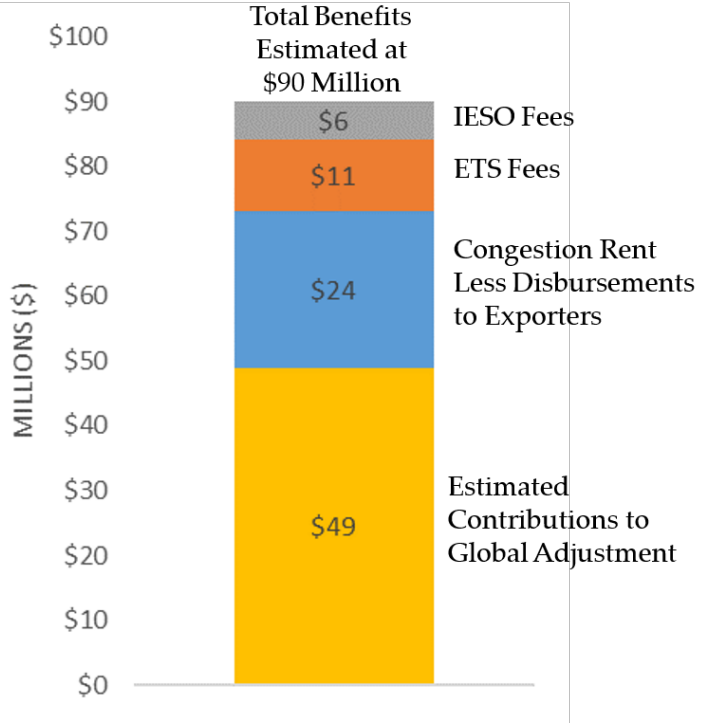
Notes:

- All values to scale
- TRCA is the Transmission Rights Clearing Account
- ETS is the Export Transmission Service Charge
- Estimates do not include exporter contributions to all uplift costs which would further increase benefits to consumers, likely similar in size to the ETS fee

Snapshot of Economic Benefits: March to May 2020

During these difficult times, exports have significantly helped reduced costs for Ontario consumers

From March to May 2020, the total benefits from exports is estimated at $90 million



Questions

UPDATE: DEMAND OBSERVATIONS AND INSIGHTS

Timeline of Closures & Reopening in Ontario

The Government of Ontario had announced that their province would take a staged approach to reopening the economy. The timeline for reopening by location has been the following:

Please see table on next slide

Timeline of Closures & Reopening in Ontario (Continued)

Event	Date	Notes
1st Round of Closures	March 17	State of emergency declared in Ontario
2nd Round of Closures	April 4	Additional closures, resulting in further reductions in electricity demand
Stage 1 Reopening	May 19	All construction, as well as certain health and medical services, seasonal and recreational activities, and household and animal services can now resume operations. *Minimal impact to electricity demand*
Stage 2 Reopening – A	June 12	Stage 2 reopening for all regions in Ontario except for the GTA, Hamilton, Niagara, and Windsor-Essex, June 12-18
Stage 2 Reopening – B	June 19	Stage 2 reopening for all regions in Ontario except for Toronto, Peel, and Windsor-Essex June 19-23
Stage 2 Reopening – C*	June 24	Stage 2 reopening for all regions in Ontario except for Windsor-Essex, June 24 – July 1st

- * Note: Stage 2 reopening C has just recently begun. More observations are required before the results and impacts can be determined.

COVID-19 Impacts on Demand - Closures

The stay in place policies in conjunction with the closure of non-essential businesses have had the following system wide impacts on grid demand:

- Overall, energy, minimum and peak demands were significantly reduced
- Closures due to COVID resulted in on average 10% reduction in energy consumption and 9% reduction in peak demand, before Stage 2 reopening commenced on June 12.

COVID-19 Impacts on Demand – Closures (Continued)

	Avg. Daily Energy Reductions compared to pre-COVID	Avg. Daily Energy Reductions compared to pre-COVID	Avg. Daily Peak Reductions compared to pre-COVID	Avg. Daily Peak Reductions compared to pre-COVID
	Weekday	**Weekend**	**Weekday**	**Weekend**
Overall System Impacts	7-14%	6-10%	8-14%	5-10%
1st Round of Closures	3 -11%	2-8%	3-13%	4-7%
2nd Round of Closures	7-14%	6-10%	8-14%	5-10%

COVID-19 Impacts on Demand - Reopening

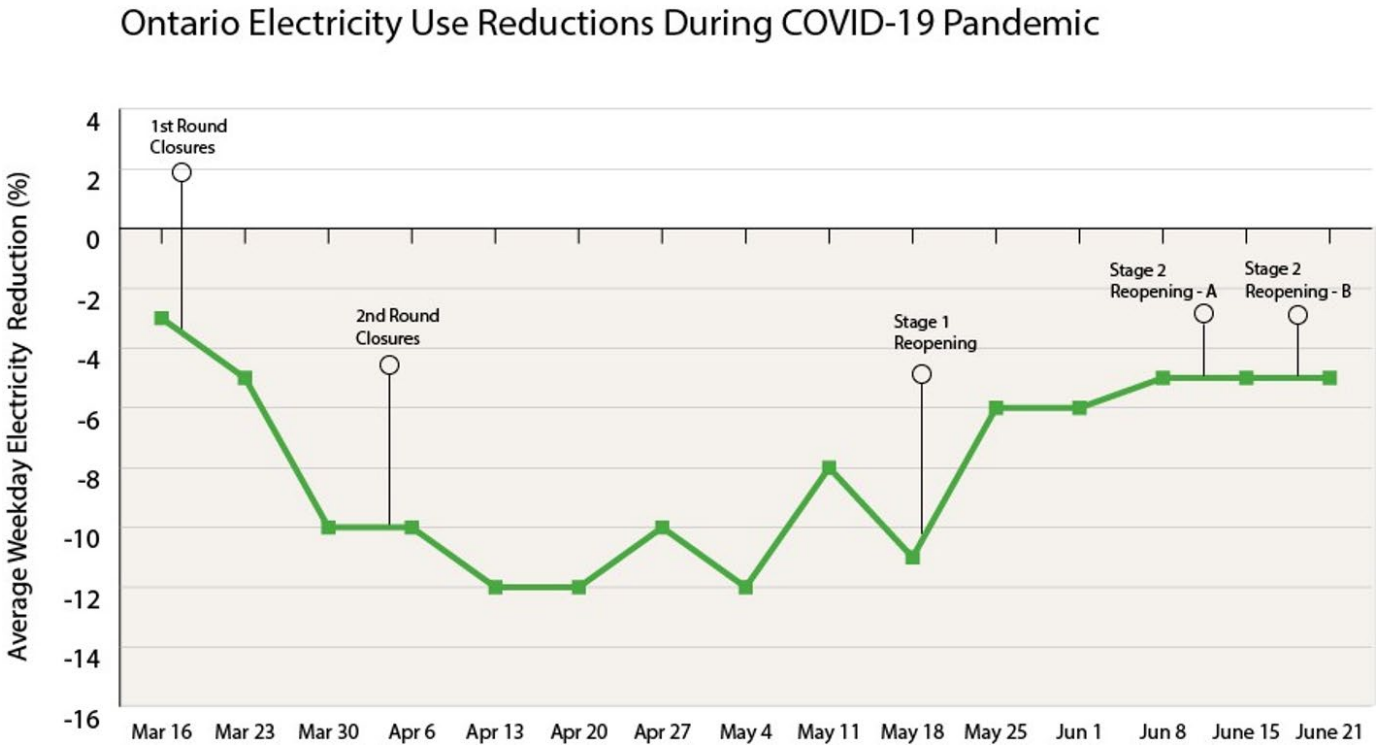
Stage One reopening had minimal impacts on the electricity system. However, the system started to evolve once Stage 2 began. The following impacts, reflect system impacts as of June 22nd The change in demand reductions are as follows:

- Overall, we expect energy, minimum demands and peak demands to gradually increase over the coming weeks

COVID-19 Impacts on Demand – Reopening (Continued)

	Avg. Daily Energy Reductions compared to pre-COVID	Avg. Daily Energy Reductions compared to pre-COVID	Avg. Daily Peak Reductions compared to pre-COVID	Avg. Daily Peak Reductions compared to pre-COVID
	Weekday	**Weekend**	**Weekday**	**Weekend**
2nd Stage of Reopening A	4-7%	5-6%	1-6%	2-5%
2nd Stage of Reopening B	4-5%	2-6%	4-5%	1-7%

COVID-19 Impacts on Ontario Electricity Demand



Demand Impacts Summary

- Closures due to COVID resulted in on average 10% reduction in energy consumption and 9% reduction in peak demand
- ICI curtailment activity had been reduced due to COVID-19 before the hiatus was announced
- Since June 12, the following impacts have been observed compared to demand before Stage 2 reopening:

Residential segment:

- Energy consumption is lower by 4% on average

Demand Impacts Summary (Continued)

- Even with slight decreases, because residential demand is very sensitive to hot and humid weather, it is believed to be the cause of seeing system peaks similar to pre-COVID during heat waves

- **Commercial segment:** Demand has recovered by 4-5%
- **Distribution connected commercial and industrial:** Demand has recovered by 8-12 %
- **Transmission connected wholesale customers:** Demand has recovered by 5-6% (excluding ICI activity)

Heat Wave Impacts by Customer Segment Demand

- During heat-waves, the overall energy used in the residential sector increased by 9% compared to pre-COVID levels
  - This led to similar system energy and peak compared to pre-COVID levels.
- Example of heatwave days were: May 25-27, June 9-10, June 17-22
- The changes are shown in the table on the next slide, where red indicates demand decreases, and green indicates demand increases

Heat Wave Impacts by Customer Segment Demand (Continued)

Customer Segment	Avg. Daily Energy Change compared to similar days pre-COVID	Avg. Daily Peak Change compared to similar days pre-COVID
System	1-7% (-)	0-6% (-)
Residential	3-17% (+)	3-19% (+)
Small Commercial	8-13% (-)	9-16% (-)
Dx Connected Industrial/Commercial	8-14% (-)	3-12% (-)
Tx Connected Industrial/Commercial	8-17% (-)	6-17% (-)

REOPENING DEMAND IMPACTS BY SEGMENT

Residential Demand Impacts - Reopening

- On average, energy consumption reduced by 2% since reopening, though there is high variability in numbers due to hot weather
- Impacts vary depending on weather trends and during heatwaves since Stage 2 reopening, energy consumption is increased by 7% compared to pre-COVID levels
- Looking forward: returning to pre-COVID residential demand will be gradual, as many people continue to work from home throughout the summer

Residential Demand Impacts – Reopening (Continued)

Stage	Avg. Daily Energy Increases compared to pre-COVID	Avg. Daily Energy Increases compared to pre-COVID	Avg. Daily Peak Increases compared to pre-COVID	Avg. Daily Peak Increases compared to pre-COVID
	Weekday	Weekend	Weekday	Weekend
2nd Stage of Reopening A	1-14%	1-6%	1-15%	9-11%
2nd Stage of Reopening B	1-5%	1-10%	1-5%	2-11%

Small Commercial (<50kW) Demand Impacts - Reopening

- Slight recovery in consumption since Stage 2 reopening
- Contribution to morning peak has recovered by 5% since Stage 2 reopening
- Energy recovered by 2% and peak consumption by 5% on average since reopening
- This segment is weather sensitive, therefore impacts will range depending on weather conditions

Small Commercial (<50kW) Demand Impacts - Reopening (Continued)

Stage	Avg. Daily Energy Reductions compared to pre-COVID	Avg. Daily Energy Reductions compared to pre-COVID	Avg. Daily Peak Reductions compared pre-COVID	Avg. Daily Peak Reductions compared pre-COVID
	Weekday	Weekend	Weekday	Weekend
2nd Stage of Reopening A	6-10%	7-8%	7-12%	9-11%
2nd Stage of Reopening B	6-10%	7-16%	6-11%	7-16%

Distribution Connected Industrial/Commercial Customers Demand Impacts - Reopening

- Energy consumption has recovered by 10% and Peak consumption by 12% on average since Stage 2 reopening
- Recovering more quickly than small commercial
- Majority of commercial load is weather sensitive, therefore impacts will range depending on weather

Distribution Connected Industrial/Commercial Customers Demand Impacts – Reopening (Continued)

Stage	Avg. Daily Energy Reductions compared to pre-COVID	Avg. Daily Energy Reductions compared to pre-COVID	Avg. Daily Peak Reductions compared to pre-COVID	Avg. Daily Peak Reductions compared to pre-COVID
	Weekday	Weekend	Weekday	Weekend
2nd Stage of Reopening A	9-15%	4-7%	7-15%	1-5%
2nd Stage of Reopening B	10-15%	6-15%	7-8%	3-4%

Transmission Connected Wholesale Customer Demand Impacts - Reopening

- Energy consumption is up by 5% since reopening on average on non-ICI days
- This load is typically not very weather sensitive
- The automotive industry was the first sector which saw increases, and began trending upwards around May 11
- Steel began to return on May 25, following Stage 1 reopening
- Looking forward, a gradual increase is expected in all sectors, up to pre-COVID levels

Transmission Connected Wholesale Customer Demand Impacts – Reopening (Continued)

Stage	Avg. Daily Energy Reductions compared to pre-COVID	Avg. Daily Energy Reductions compared to pre-COVID	Avg. Daily Peak Reductions compared to pre-COVID	Avg. Daily Peak Reductions compared to pre-COVID
	Weekday	Weekend	Weekday	Weekend
2nd Stage of Reopening A	3-15%	11-12%	2-12%	6-7%
2nd Stage of Reopening B	9-13%	9-12%	17-18%	10-11%

Questions

UPDATED DEMAND FORECAST AND SCENARIOS

Summary: Updated Demand Forecast

- The IESO released its first Annual Planning Outlook in January (2020 APO)
- Given level of uncertainty, the updated demand forecast will not include a reference forecast, but will present scenarios for the 2021 – 2026 period
- Two scenarios will be assessed representing the range of likely COVID-19 impacts and resulting economic conditions. Under both scenarios, electricity demand is expected to be lower than forecasted in the 2020 APO

Summary: Updated Demand Forecast (Continued)

1. **Rabbit:** shallow recession, fast recovery, electricity demand lower by about 5% in 2021 recovering to about 4% in 2026*
2. **Tortoise:** deep recession, slow recovery, electricity demand lower by about 7% in 2021 recovering to about 5% in 2026*

- For the purposes of the updated demand forecast scenarios, ICI impacts have not been included in the demand forecasts and will be treated instead as a supply side resource (similar to Demand Response)

* variances relative to 2020 APO Reference Case demand forecast

Demand Forecast Scenario Definitions

- In both scenarios, the 2020 APO Reference Case demand forecast was used as baseline

1. **Rabbit** scenario:
   - Economic recovery initiated in 2020 Q3 continues through 2021 as COVID-19 measures are phased out
   - Electricity demand recovers to 2019 levels by 2022 Q1, (electricity demand in 2022 is approximately 4% lower vs. 2020 APO)
2. **Tortoise** scenario:

Demand Forecast Scenario Definitions (Continued)

- Prolonged COVID-19 impacts persist through 2020 and through 2021 Q1, leading to economic damage and significant prolonged unused capacity in the economy, particularly in the commercial sector
- A global recession takes hold on the scale of the 2007/8 Financial Crisis
- Economy restructures over time as global conditions and new domestic conditions take hold
- Electricity demand recovers slowly at 1%, reaching 2019 levels by 2025 Q4, (electricity demand in 2025 is approximately 6% lower vs. 2020 APO)

Demand Forecast Scenario Assumptions

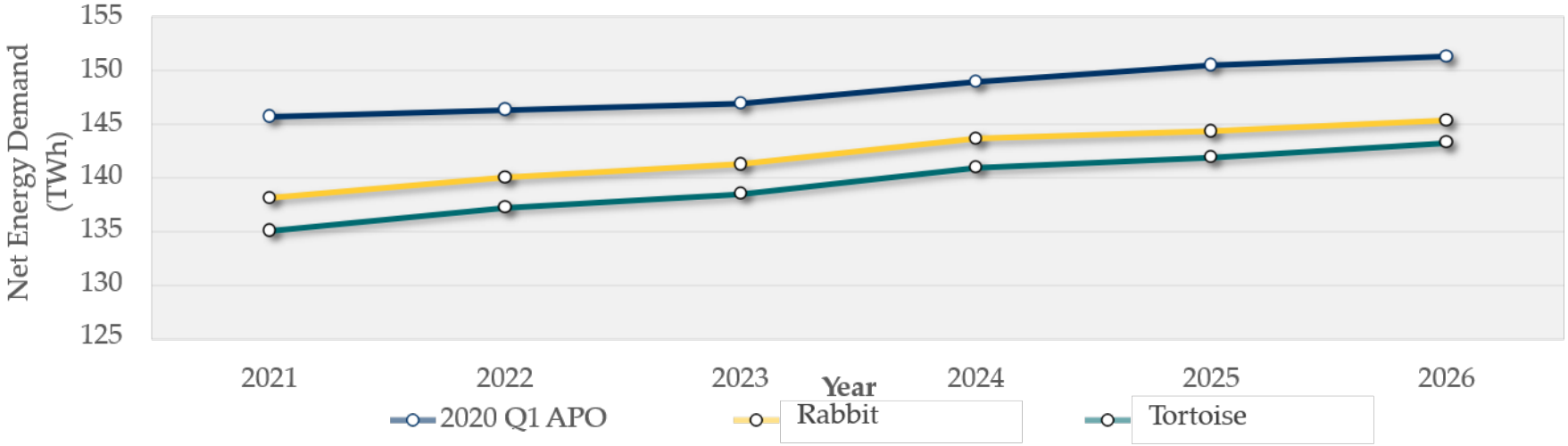
Rabbit – shallow recession, fast recovery

2021 Q1	COVID-19 measures phased-out
2021 Q2 - Q4	Acceleration of economic recovery
2022 Q1	Economic recovery realized Electricity demand remains lower than 2020 APO (~4%)
2022 - 2026	Rates of electricity demand growth consistent with 2020 APO

Tortoise – deep recession, slow recovery

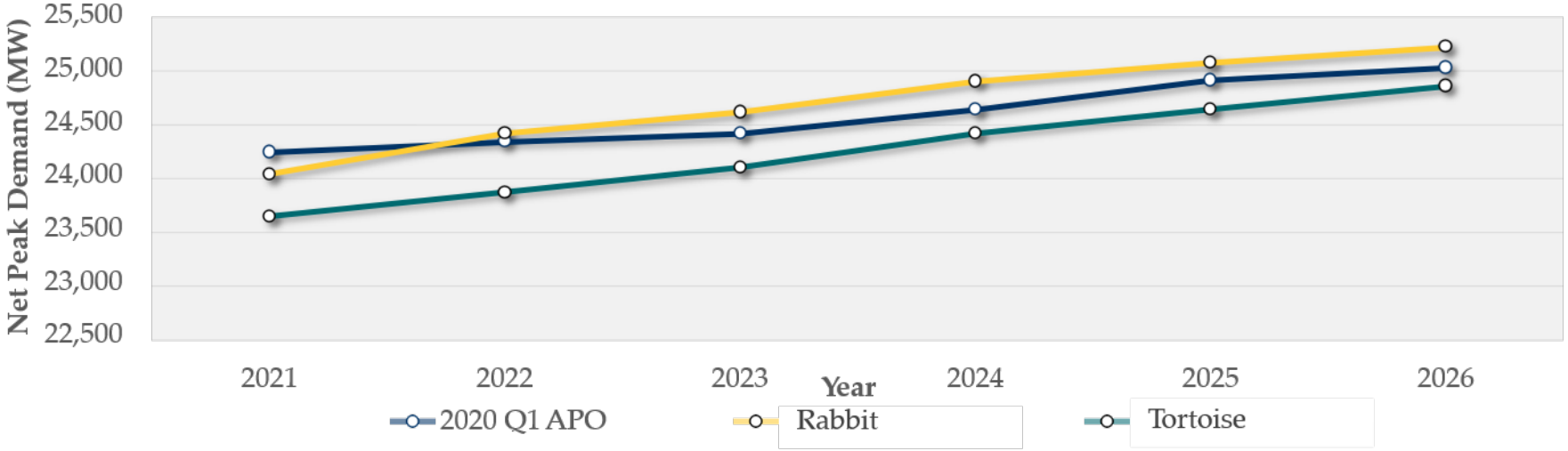
2021 Q1	COVID-19 State-of-Emergency persists, including full social-distancing measures in place
2021 Q2 - Q4	COVID-19 measures slowly phased-out
2022 - 2024	Slow economic recovery
2025 Q4	Economic recovery realized Electricity demand remains lower than 2020 APO (~6%)
2026	Rate of electricity demand growth consistent with 2020 APO

Updated Demand Forecast Summary



Note: The 2020 APO aassumed 1.600 MW peak reduction due to ICI. The updated demand forecast does not assume peak demand reduction due to ICI.

Updated Demand Forecast Summary (Continued)

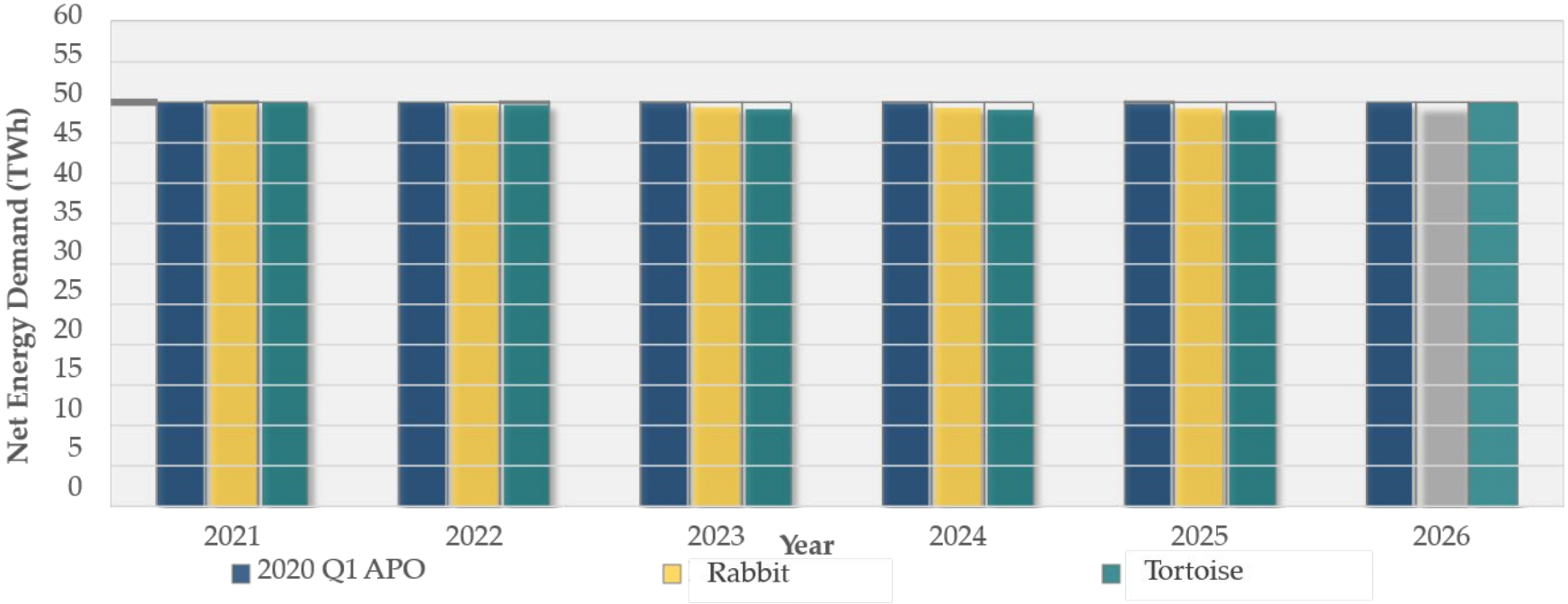


Note: The 2020 APO aassumed 1.600 MW peak reduction due to ICI. The updated demand forecast does not assume peak demand reduction due to ICI.

Residential Sector Summary

- It is assessed that maximum social distancing measures, and thus maximum residential sector occupancy, are currently in place, indicating the observed increase in residential demand attributable to COVID-19 of 5% is the maximum level
- Net residential sector energy demand effectively flat compared to 2020 Q1 APO

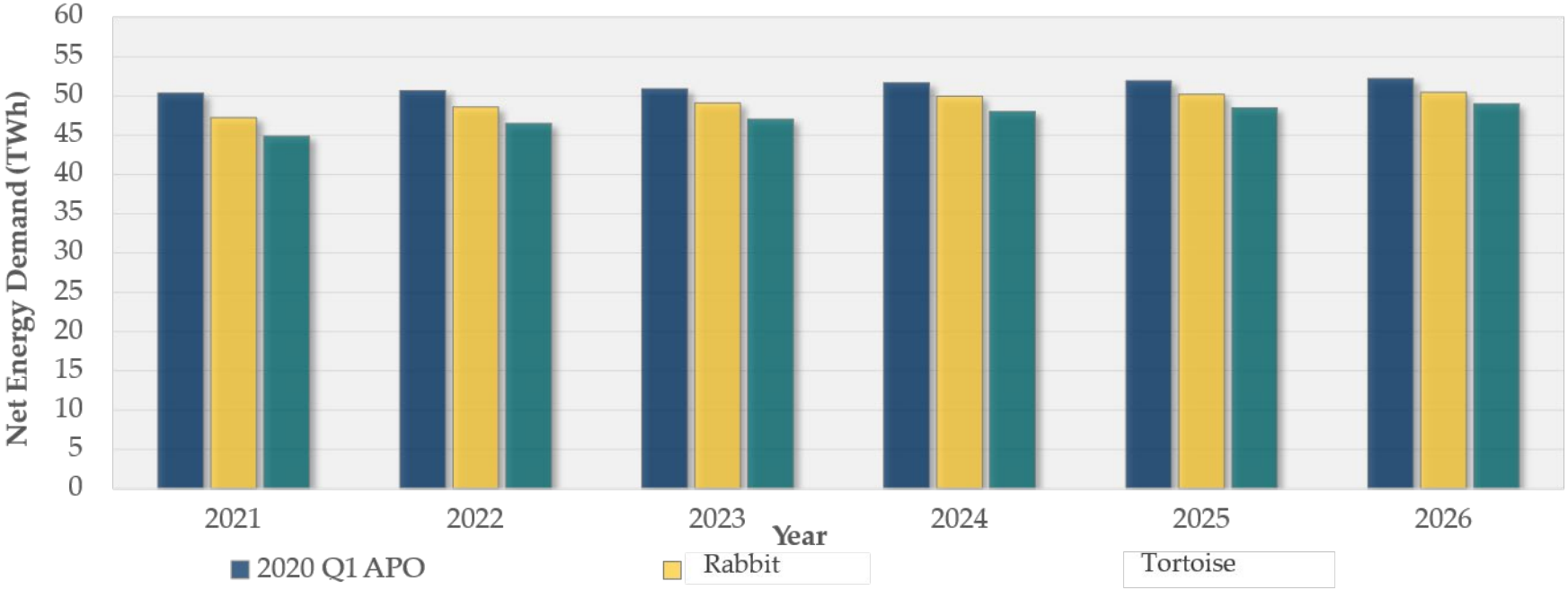
Residential Sector Summary (Continued)



Commercial Sector Summary

- Electricity demand in overall commercial sector is seeing dramatically decrease due to COVID-19
  1. It is estimated that only a few sub-sectors' demand shows slight increases ranging from 1-5%: food retail and hospitals
  2. Nursing homes and warehouse show steady trend
  3. Most other commercial buildings include offices, non-food retails, recreation centers, educational facilities, and restaurants shows a decrease 25-50% in full lock down period, rather than 100%. Despite closures, the residual electricity demand for "care and maintenance" mode remains considerable accounting for minimum building ventilation and auxiliary system operations

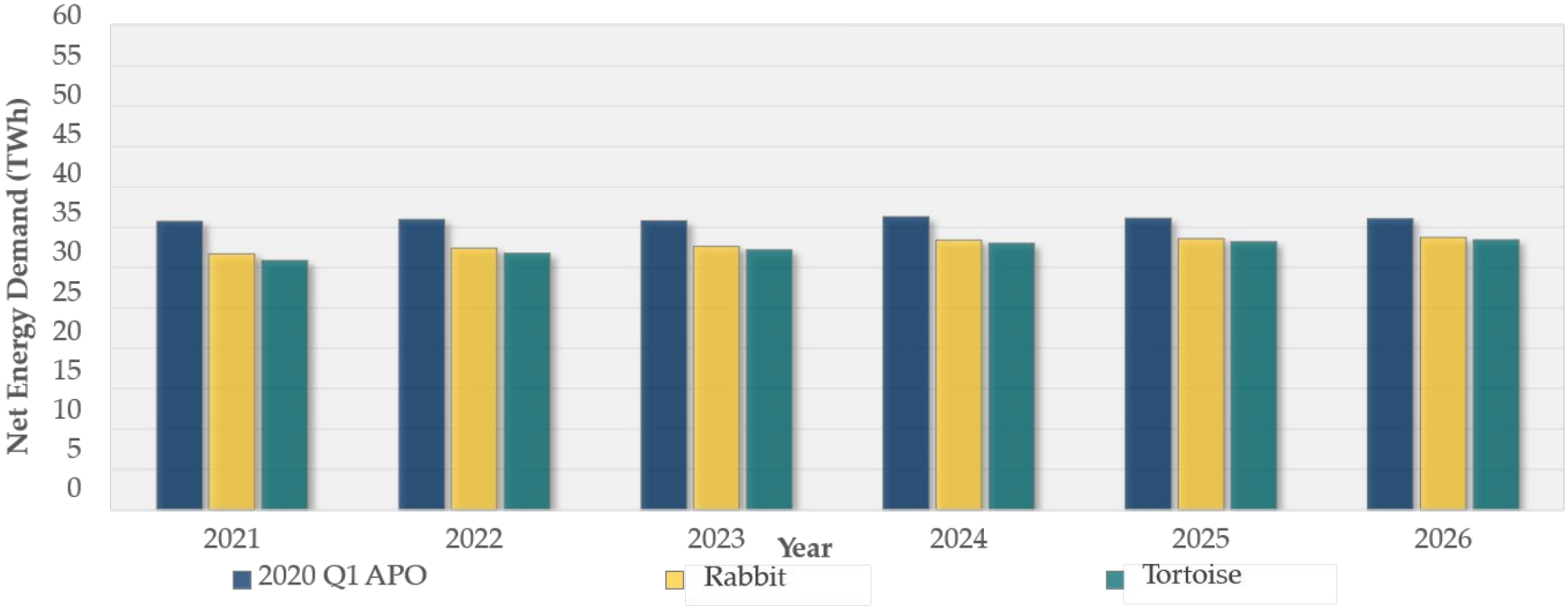
Commercial Sector Summary (Continued)



Industrial Sector Summary

- Industrial sector and sub-sector electricity demand Pandemic impacts were inferred from observed IESO's wholesale customer load data by NAICS Codes, and internal industry news update
- Demand for fabricated metals, auto, non-metallic minerals and primary metals dropped more than 20% during full locked-down period. Other subsector demand dropped less than 20% due to short-term operational impact because of social distancing

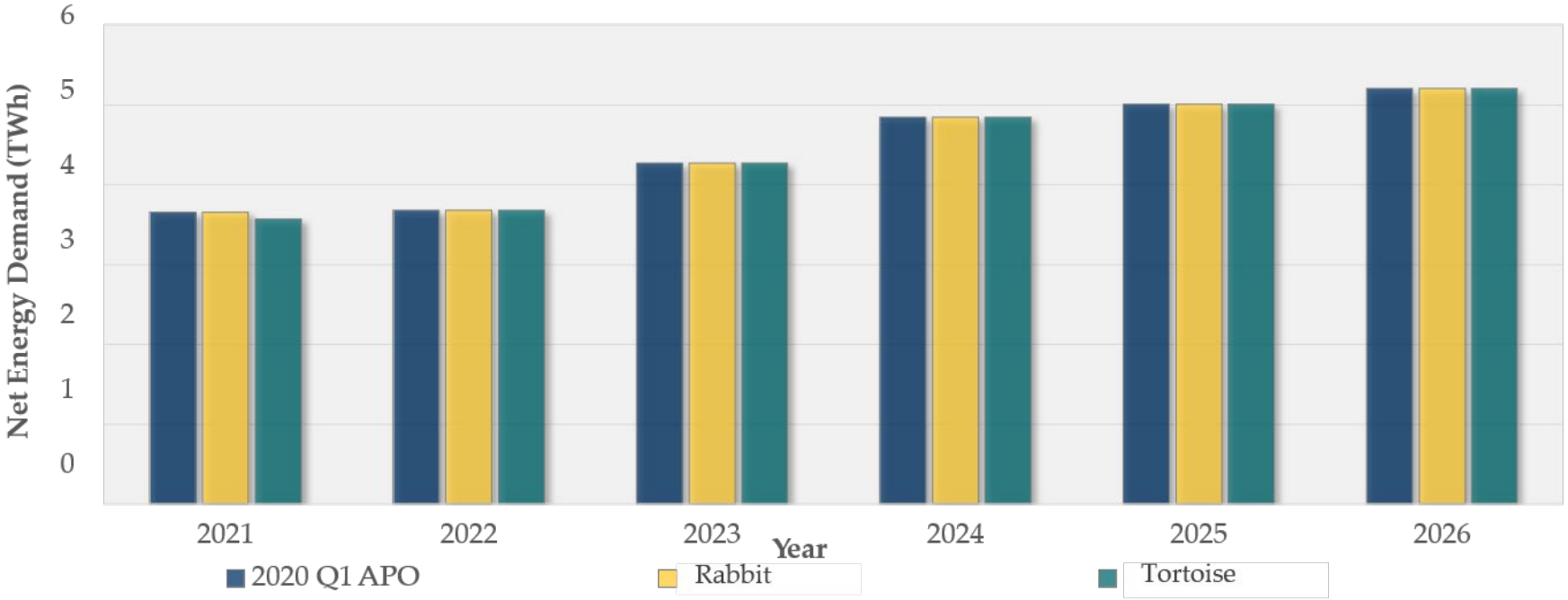
Industrial Sector Summary (Continued)



Agricultural Sector Summary

- There have been concerns of decrease in available labour force to plant, maintain and harvest crops due to reliance on foreign labour workers. The federal and provincial government has been quick to act and support this sub-sector through policy direction and financial support
- In the Rabbit scenario, we assume no changes to the agricultural sector demand growth. The Tortoise scenario assumes slight delays in the pace of the increased load which leads to a minor difference in demand in 2021. But this delay is expected to recover by 2022

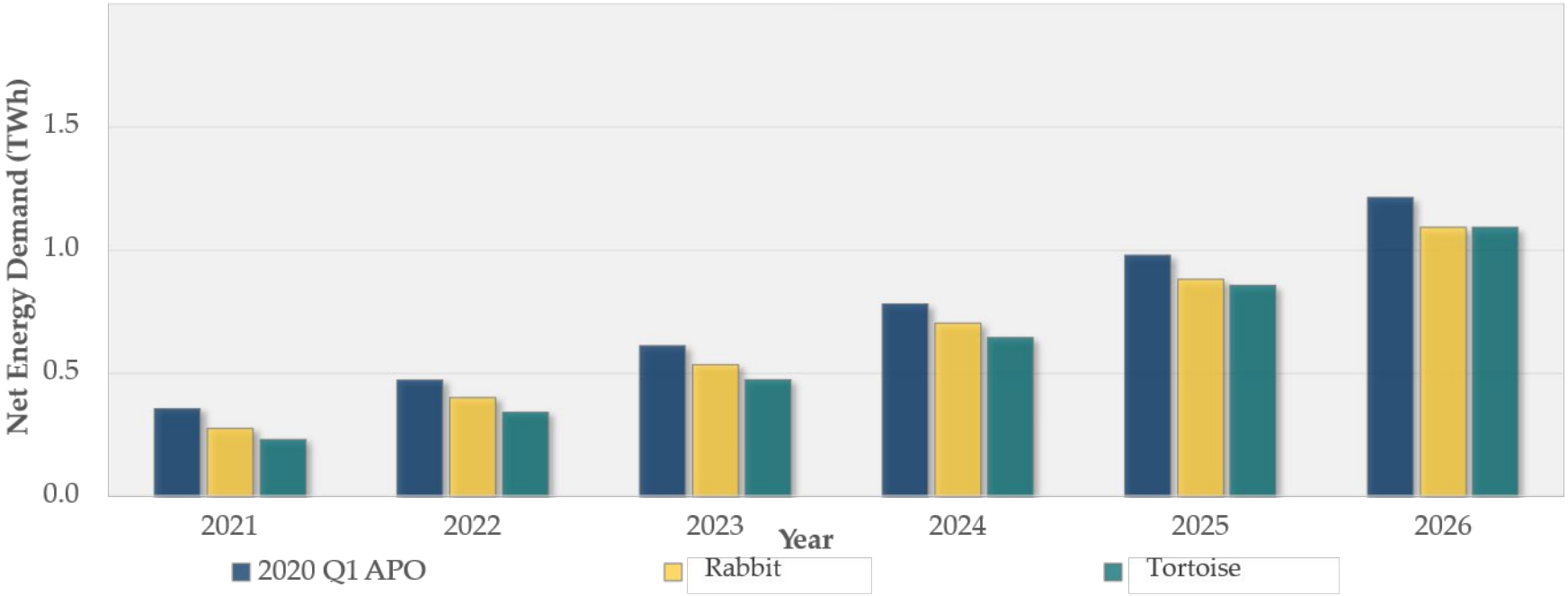
Agricultural Sector Summary (Continued)



Electric Vehicle Electricity Demand

- Electric vehicle electricity demand is a result of:
  1. Electric vehicle sales, influenced by economic outlooks and represents additions to the provincial electric vehicle population, as well as
  2. Electric vehicle distance traveled, which is influenced by policies such as social distancing measures, work-from-home policies, both which are expected to be withdrawn on a phased approach, as well as and temporary or permanent closures of businesses

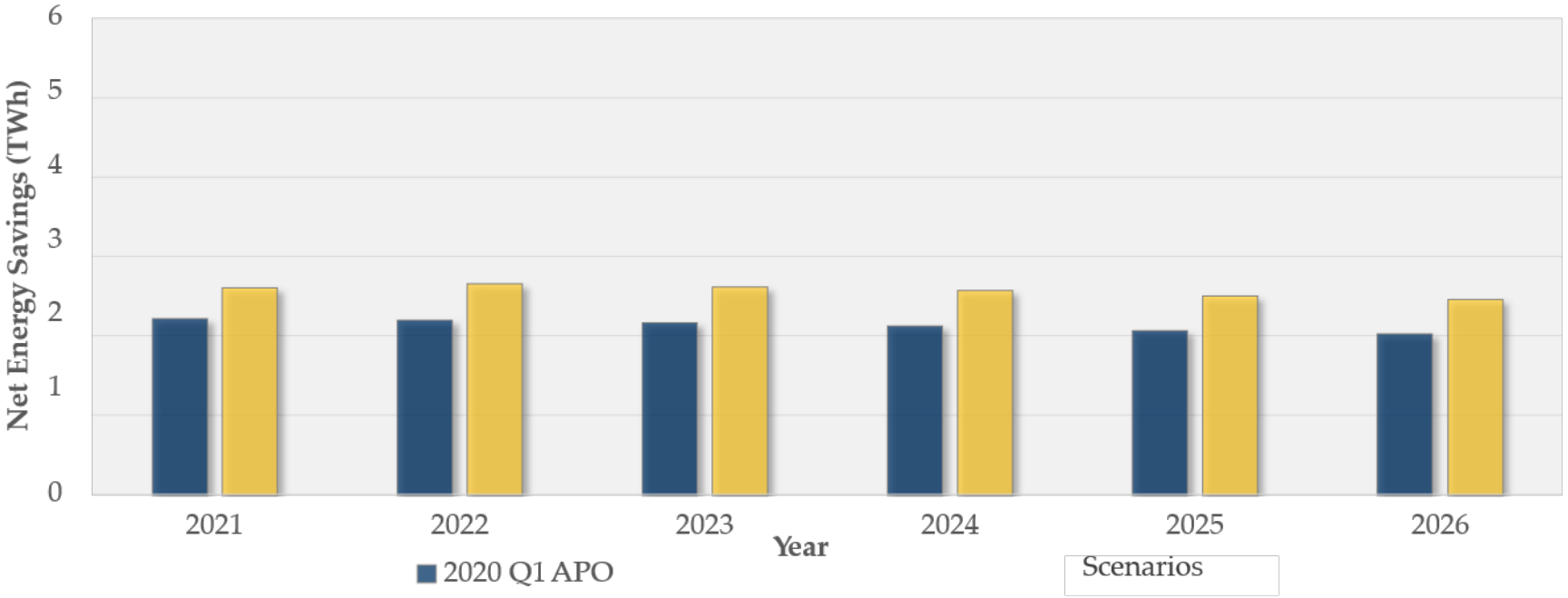
Electric Vehicle Electricity Demand (Continued)



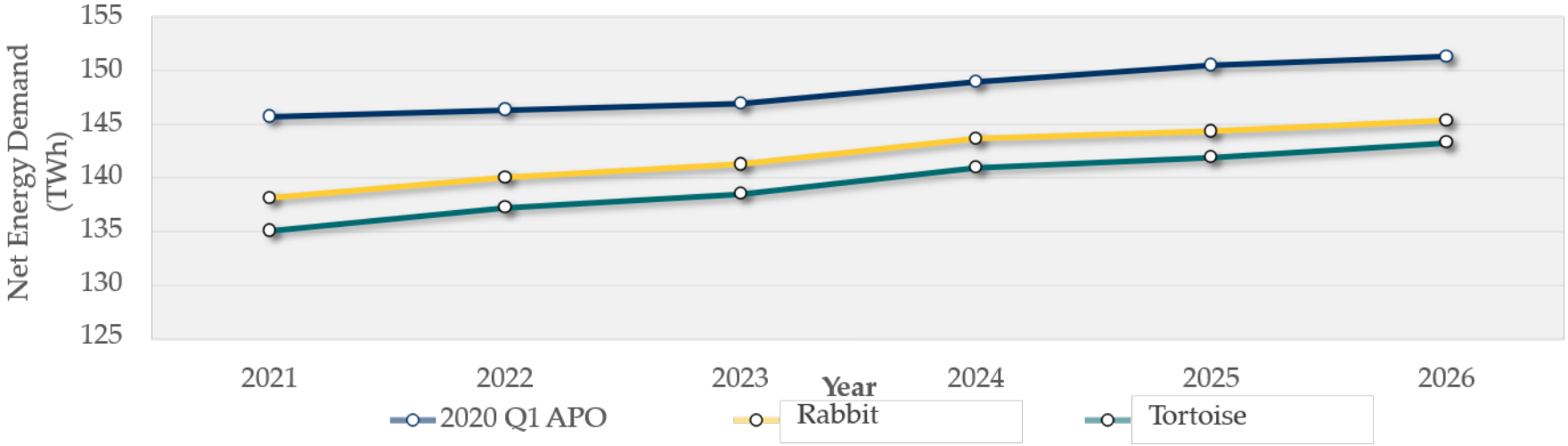
Electricity Conservation Programs

- The latest Conservation Program savings forecast includes updates to:
  1. 2015-2020 CFF Programs projects completed in year 2018 (true-up)
  2. CFF WD project savings, which included CFF projects initiated prior to the discontinuation of CFF on March 21, 2019, but not yet completed, and
  3. Interim Framework on Energy Efficiency Programs for 2019-2020
- The main impact is of these updates is that Interim Framework savings are expected to materialize over a longer multi-year period rather originally forecasted

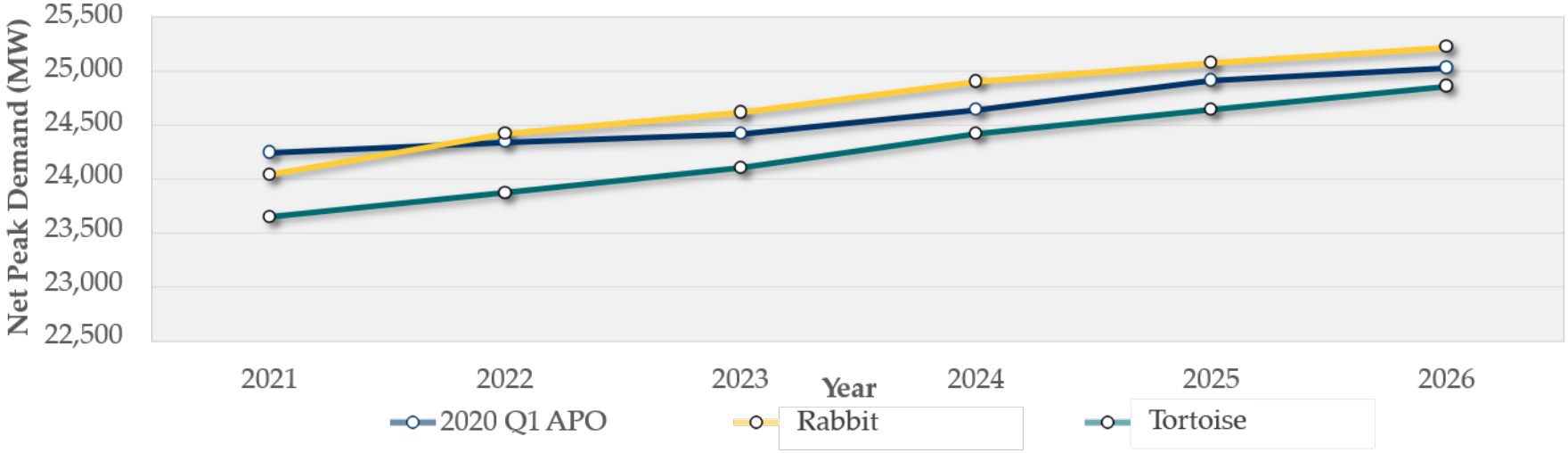
Electricity Conservation Programs (Continued)



Updated Demand Forecast Summary



Updated Demand Forecast Summary (Continued)



Questions

Summary

- Ontario's electricity system is well-positioned for the summer, with adequate supply to meet demand and to manage the expected increased peak demand due to ICI hiatus
- Electricity demand has been ramping up with warmer temperatures and staged economic reopening
- Peak demands compare to prior years due to the combination of increased residential air conditioning load as working from home continues and commercial buildings gradually increase occupancy
- July 22 webinar will include updated revised capacity and
- energy adequacy assessment results

Question?

What information from the IESO would you like to see in future Forecasting and Planning Updates?

Please submit your response using the 'Ask a Question' feature or contact IESO Customer Relations

APPENDIX

– CLOSURE IMPACTS BY SECTOR

Residential Demand Impacts – Closures

- Increased consumption during mid-day
- Delayed morning peak and using on average 13% more electricity during morning peak vs. pre-COVID-19 levels
- Daily minimums have increased 5% on average
- Impacts vary depending on weather trends
- Looking forward: returning to pre-COVID residential demand will be gradual

Residential Demand Impacts - Closures (Continued)

Stage	Avg. Daily Energy Increases compared to pre-COVID	Avg. Daily Energy Increases compared to pre-COVID	Avg. Daily Peak Increases compared to pre-COVID	Avg. Daily Peak Increases compared to pre-COVID
	Weekday	Weekend	Weekday	Weekend
1st Round of Closures	1-8%	1-8%	1-7%	1-6%
2nd Round of Closures	1-14%	1-7%	1-9%	1-9%

Small Commercial (<50kW) Demand Impacts - Closures

- Reduced consumption in all hours
- Contribution to morning peak has been reduced by 15%
- Greatest reductions occurred during the week following Easter
- Looking forward: the longer lockdown measures are in place, there is a likelihood that a portion of this load may not recover
- This segment is a weather sensitive load, therefore impacts will range depending on weather forecasts

Small Commercial (<50kW) Demand Impacts - Closures (Continued)

Stage	Avg. Daily Energy Reductions	Avg. Daily Energy Reductions	Avg. Daily Peak Reductions	Avg. Daily Peak Reductions
	Weekday	Weekend	Weekday	Weekend
1st Round of Closures	6-15%	5-12%	7-21%	9-18%
2nd Round of Closures	11-19%	5-14%	18-24%	10-20%

Distribution Connected Industrial/Commercial Customers Demand Impacts - Closures

- Contribution to morning peak has been reduced by 15%
- Greatest reductions occurred during the week following Easter
- Looking forward: Similar to small commercial, the duration of the lock down measures will have enduring impacts on their ability to return to pre-COVID-19 levels
- Majority of commercial load is weather sensitive, therefore impacts will range depending on weather forecasts

Distribution Connected Industrial/Commercial Customers Demand Impacts – Closures (Continued)

Stage	Avg. Daily Energy Reductions	Avg. Daily Energy Reductions	Avg. Daily Peak Reductions	Avg. Daily Peak Reductions
	Weekday	Weekend	Weekday	Weekend
1st Round of Closures	9-18%	9-13%	9-21%	10-16%
2nd Round of Closures	12-20%	9-15%	11-21%	4-15%

Transmission Connected Wholesale Customer Demand Impacts - Closures

- The automotive sector has been hit the hardest at the beginning of COVID in March
- Minimal impacts to the majority of the industrial load
- Looking forward: supply chain demand and transportation networks will have a high impact on the ability of these loads to return to pre-COVID-19 levels
- This load is typically not very weather sensitive

Transmission Connected Wholesale Customer Demand Impacts – Closures (Continued)

Stage	Avg. Daily Energy Reductions	Avg. Daily Energy Reductions	Avg. Daily Peak Reductions	Avg. Daily Peak Reductions
	Weekday	Weekend	Weekday	Weekend
1st Round of Closures	1-12%	1-6%	1-14%	1-9%
2nd Round of Closures	10-25%	8-25%	11-22%	10-23%

APPENDIX

– DEMAND FORECAST PROJECTIONS

Demand Forecast Projections

Sector	Rabbit (2021-2026)	Tortoise (2021-2026)	2020 APO – Reference Case (2020 - 2026)
Residential	Demand decreases slightly from 50 TWh in 2021 to 49.5 TWh in 2026	Social distancing measures persist in 2021 and reduced economic activity in later years lead to demand decreases from 50.5 TWh in 2021 to 49.3 TWh in 2026	Demand flat at approximately 50 TWh for 2020 – 2026
Commercial	Demand evolves from 47.2 TWh in 2021 to 50.4 TWh in 2026	Demand evolves from 44.8 TWh in 2021 to 48.9 TWh in 2026	Demand grows from 49.7 TWh in 2020 to 52.2 TWh in 2026, average of 0.8% / year
Industrial	Demand evolves from 31.7 TWh in 2021 to 33.8 TWh in 2026	Demand evolves from 30.9 TWh in 2021 to 33.5 TWh in 2026	Demand grows from 35.6 TWh in 2020 to 36.1 TWh in 2026, average of 0.2% / year

Demand Forecast Projections (Continued)

Sector	Rabbit (2021-2026)	Tortoise (2021-2026)	2020 APO – Reference Case (2020 - 2026)
Agriculture	No change versus 2020 APO	Delayed load connections in 2021 only due to infrastructure construction delays as a result of social distancing measures	Demand grows from 3.6 TWh in 2020 to 5.2 TWh in 2026, average of 6.2% / year
Electric Vehicles	Decreased EV production, sales and utilization according to economic activity. Demand lags 2020 APO by about 0.1 TWh per year	Decreased EV production, sales and utilization according to economic activity. Demand lags Rabbit by about 0.07 TWh per year until 2025	Demand grows from 0.3 TWh in 2020 to 1.2 TWh in 2026, average of 30% / year
Conservation Program Framework	Based on updates to 2018 CFF, 2019 – 2020 CFF WD and actual IESO CDM Plan approved in June 2019 which includes assumptions of 2.7 TWh annual savings implemented by 2022	Based on updates to 2018 CFF, 2019 – 2020 CFF WD and actual IESO CDM Plan approved in June 2019 which includes assumptions of 2.7 TWh annual savings implemented by 2022	Based on early March 2019 CFF WD & IF assumptions, 2.2 TWh annual savings implemented by 2021

Thank You

ieso.ca

1.888.448.7777

customer.relations@ieso.ca

engagement@ieso.ca

@IESO_Tweets

facebook.com/OntarioIESO

linkedin.com/company/IESO

ieso
Connecting Today. Powering Tomorrow.