Ontario's Renewable Energy Procurement Landscape

Lisa Asbreuk

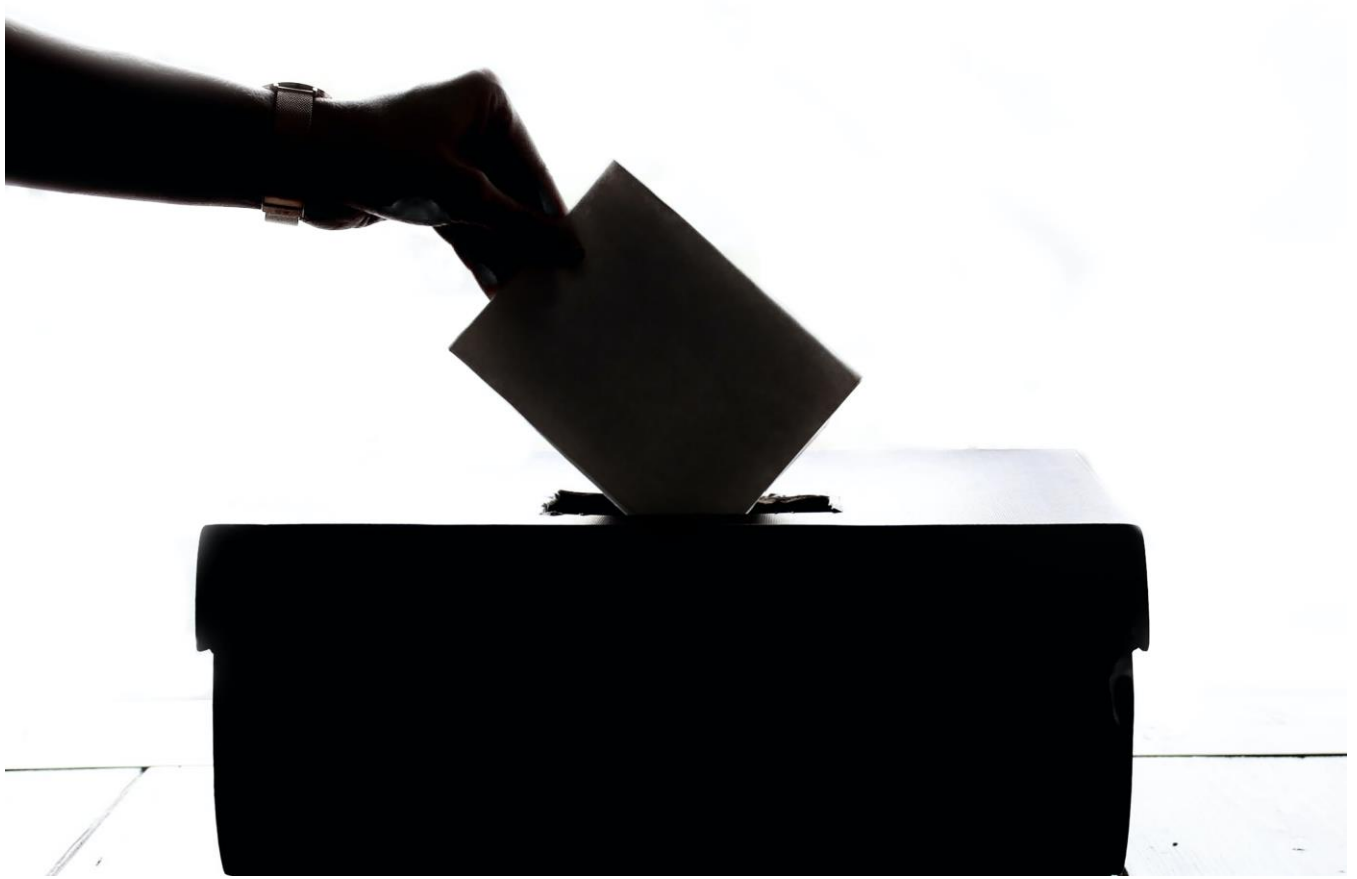
Presentation to SWITCH – SE Ontario's Alternative Energy Cluster
December 8 2023

1

Political Context & Investment Environment

Ontario election – June 2018

- Ford government elected
- *Grean Energy Act* repealed
- LRP 2 cancelled mid-process
- Contracts terminated for projects pre-COD



2018 – 2023 reality check

- Some BTM (small) solar installations
- Some incremental policy improvements for small installations
- Net metering permitted (12 month carry forward cap)
- Virtual (third party) net metering permitted
- Interconnecting costs remain a challenge

- Some BTM battery installations
- Mainly industrial customers for peak pricing GA avoidance

- No integrated resource plan (IRP)
- No new wind farms
- No new solar farms
- No open procurement processes for any renewable energy
- Skilled professionals focused on Alberta and US

- Energy systems college/trades graduates leaving Ontario
- Project work for sub trades ended
- No new renewable energy capital invested in Ontario (except M+A of existing assets)
- Adversarial messaging + litigation + change of law shock = **unwelcome investment climate**

positive stories in communities never told

So, what has been happening?

Does Ontario need or want renewable energy in our supply mix?

Capacity vs Energy

Electricity is measured in both capacity + energy.
Talking about an electricity system requires understanding both.

CAPACITY

Maximum output an electricity generator can physically produce
(kW or MW)

size

ENERGY

Amount of electricity a generator produces over a period of time
(kWh or MWh)

delivery

2

IESO Pathways to Decarbonization (P2D) Report

December 2022

P2D Report

- Ministry asked IESO to evaluate a scenario of
  - decade moratorium on new natural gas procured
  - phase out of natural gas
  - achieving zero emissions in electricity sector in Ontario.

- IESO reported back:
  - Gas generation moratorium not currently feasible
  - Currently no analogous replacement
  - Natural gas is needed for reliability
- So instead, showed ***pathway to decarbonize***, how ON could achieve a net-zero grid while maintaining system reliability
- Significant new electricity infrastructure required in short period for energy transition

P2D gas moratorium scenario

- Could not start before 2027
- Additional gas needed until then (need ~1500 MW gas procured 2025-2027 alongside batteries)
- **Natural gas fleet will increase mid-2020s**

- Will increase costs to consumers
- $26B in new infrastructure needed

- May not need to procure more gas after 2027
- Gas fleet size modelling:
    - estimates ~12,000 MW (2027)
    - reduced to ~8000 MW (2035) (5000 MW needed, 3000 MW standby)

- After nuclear refurbishments, could retire 4000 MW gas (emissions drop 60%)
- But still need some gas in GTA and some gas for system reliability

Pathway to decarbonization scenario (2050)

- More aggressive electricity demand forecast (peaks **3x higher** than today)
- Need additional new **69,000 MW** of non-emitting supply
- Assumes
  - electricity annual growth rate of **2.7%**
  - 5000 MW demand reductions from conservation
  - up to 2035 gas plants can operate to Y25
  - after 2035 gas plants retired at end of contract (standby for reliability)
  - hydrogen contributes to peaks

P2D report extracts – peaking forecast snapshot

Summer peak increasing to **>36,000 MW**

Winter peak increasing to **>60,000 MW**

Figure 8 | Annual Summer Peak Demand

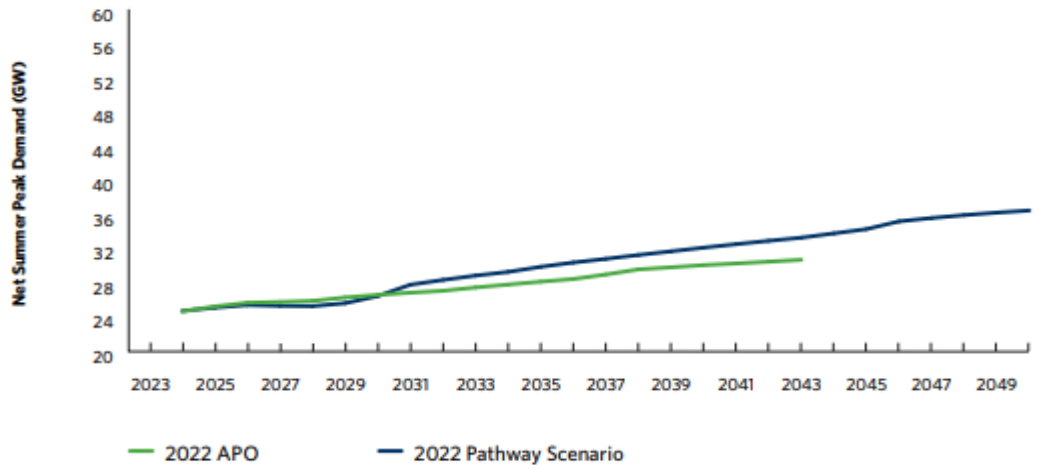
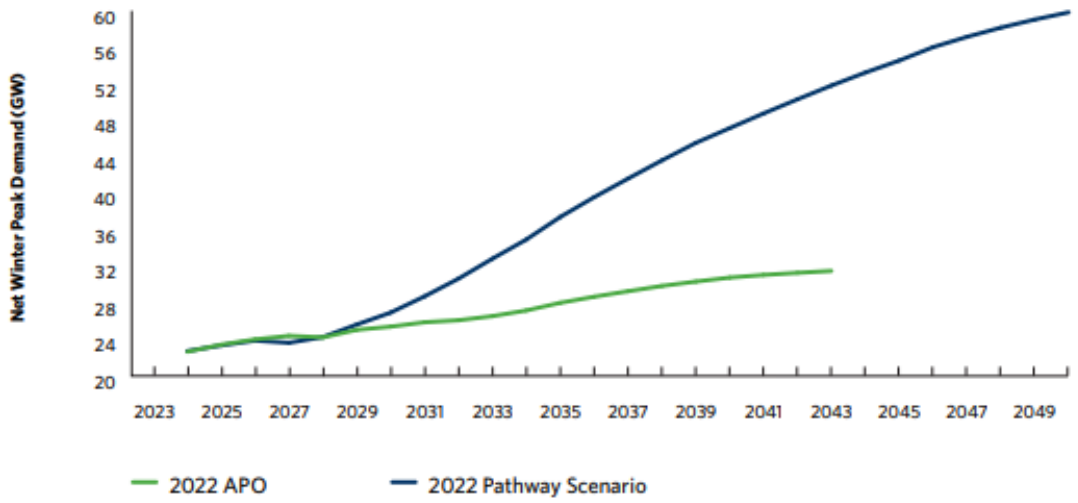
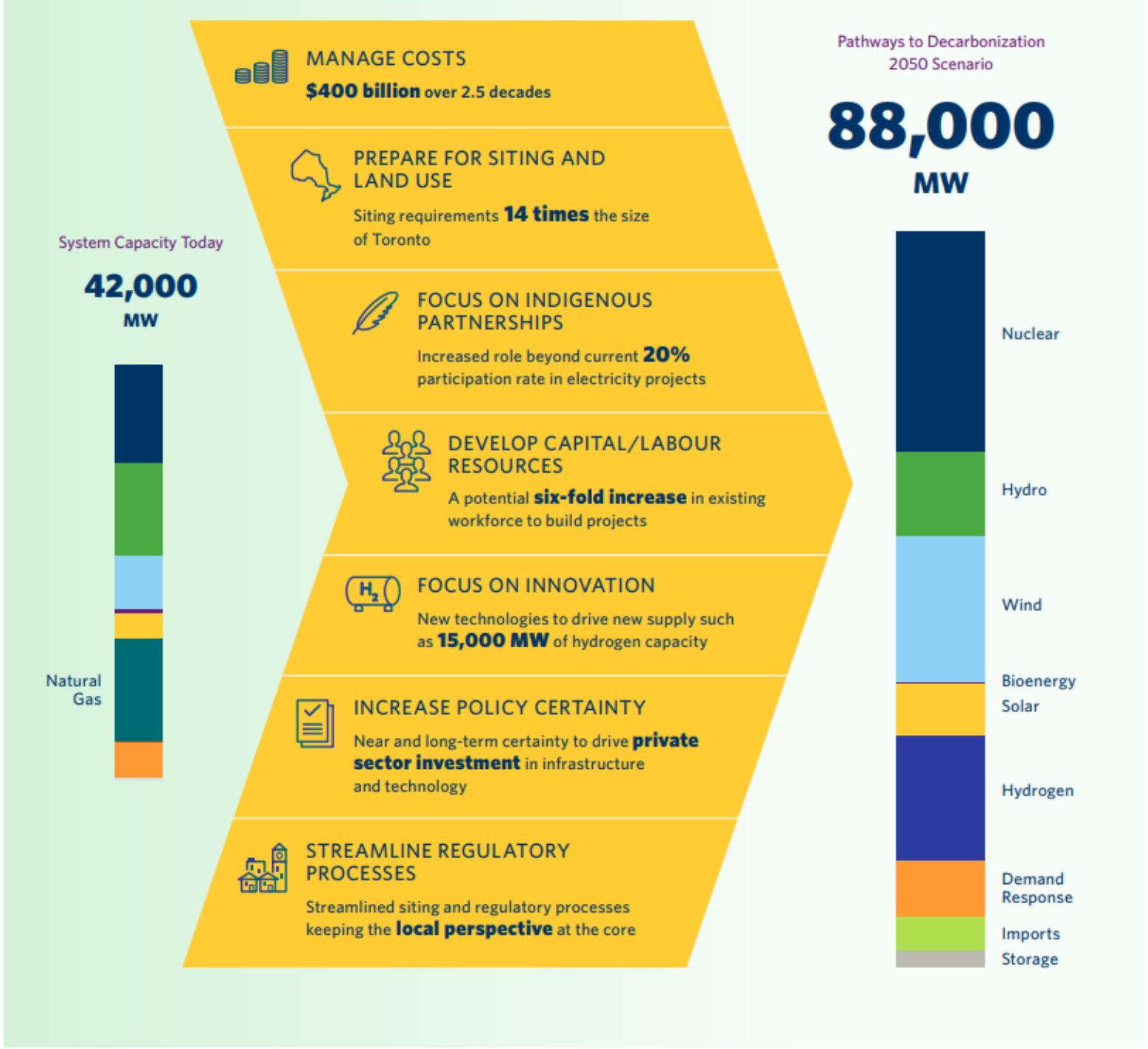


Figure 9 | Annual Winter Peak Demand




System Capacity Today
42,000
MW
Natural Gas
MANAGE COSTS
$400 billion over 2.5 decades
PREPARE FOR SITING AND LAND USE
Siting requirements 14 times the size of Toronto
FOCUS ON INDIGENOUS PARTNERSHIPS
Increased role beyond current 20% participation rate in electricity projects
DEVELOP CAPITAL/LABOUR RESOURCES
A potential six-fold increase in existing workforce to build projects
FOCUS ON INNOVATION
New technologies to drive new supply such as 15,000 MW of hydrogen capacity
INCREASE POLICY CERTAINTY
Near and long-term certainty to drive private sector investment in infrastructure and technology
STREAMLINE REGULATORY PROCESSES
Streamlined siting and regulatory processes keeping the local perspective at the core
Pathways to Decarbonization
2050 Scenario
88,000
MW
Nuclear
Hydro
Wind
Bioenergy
Solar
Hydrogen
Demand Response
Imports
Storage

P2D Report

- Scope and magnitude of system changes are huge

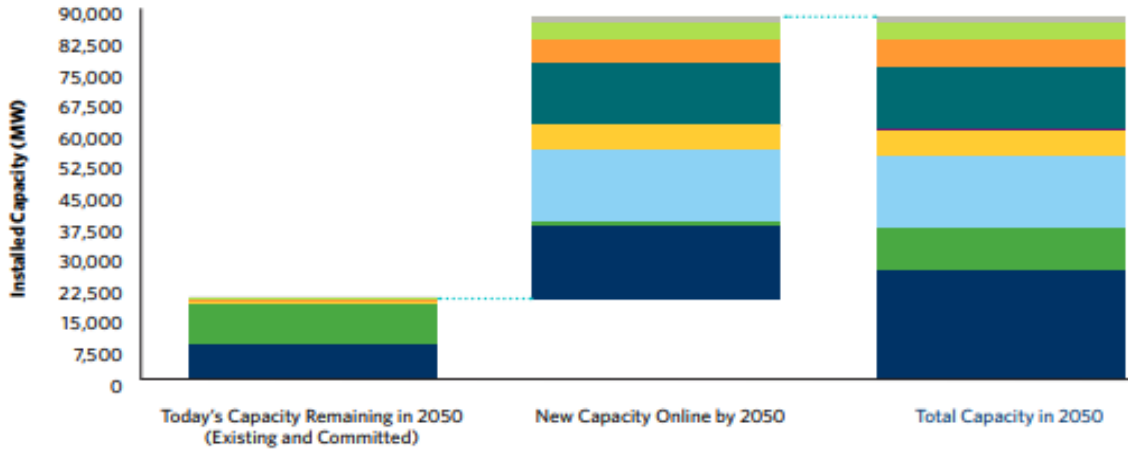
- IESO identifies "**no regret**" actions to be taken now:
  - accelerate efforts to acquire non-emitting supply
  - implement CDM directives
  - start EA work for
    - long-duration storage
    - hydroelectric
    - TX infrastructure
  - Invest in emerging low-carbon fuels
  - Galvanize indigenous communities + stakeholders **+ *municipalities***
  - Prepare regulatory/permitting processes for scale

P2D REPORT

- Key assumptions:
  - Assumes decarbonization of broader economy means **transition to electricity** for energy
  - Assumed offshore wind may be available (despite current moratorium)
  - Assumes **DER growth** but doesn't quantify b/c bulk system assessment

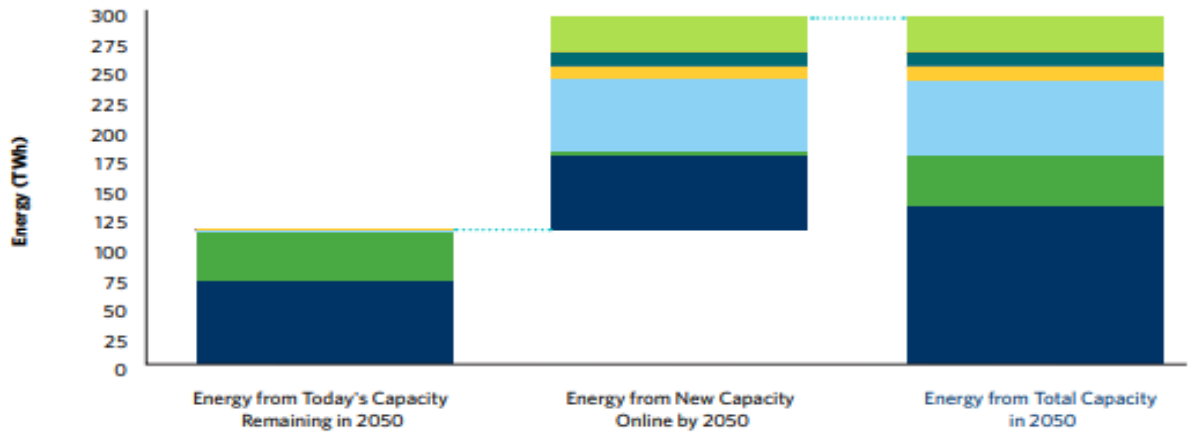
- What will be procured? (P2D scenario)
  - Need 17,800 MW new nuclear
  - Need 17,600 MW new wind
  - Need 650 MW new hydroelectric
  - Need new solar in interim years ~6000MW levels off at 2036
  - Solar value diminishes as we shift to winter peak
  - Current battery procurement plus need ~2000 MW new long duration batteries in late 2030s

Figure 12 | Pathway Scenario – Installed Capacity in 2050



Storage	0	2,000	2,000
Imports	331	3,800	4,131
Demand Response	808	5,936	6,744
Hydrogen	0	15,000	15,000
Bioenergy	41	0	41
Solar	259	6,000	6,259
Wind	160	17,600	17,760
Hydroelectric	9,348	657	10,005
Nuclear	8,653	17,800	26,453
Total MW	**19,600**	**68,793**	**88,393**

Figure 13 | Pathway Scenario – Energy in 2050



Storage	0	0	0
Imports	0	30	30
Demand Response	0	0	0
Hydrogen	0	12	12
Bioenergy	0	0	0
Solar	1	11	12
Wind	2	62	63
Hydroelectric	41	3	44
Nuclear	70	63	133
Total TWh	**113**	**181**	**294**

3

IESO Annual Planning Outlook (APO)

December 2022

IESO Annual Planning Outlook (APO)

APO DOES:

- Identify future system needs + influencing factors
- Inform the next Annual Acquisition Report (AAR)
- Forecasts demand + supply + TX assumptions
- Considers:
  - economic growth; load growth
  - decarbonization trends
  - electrification trends

APO DOES NOT:

- Speculate on supply mix
  (that is set by Ontario government policy)

IESO Annual Planning Outlook (APO)

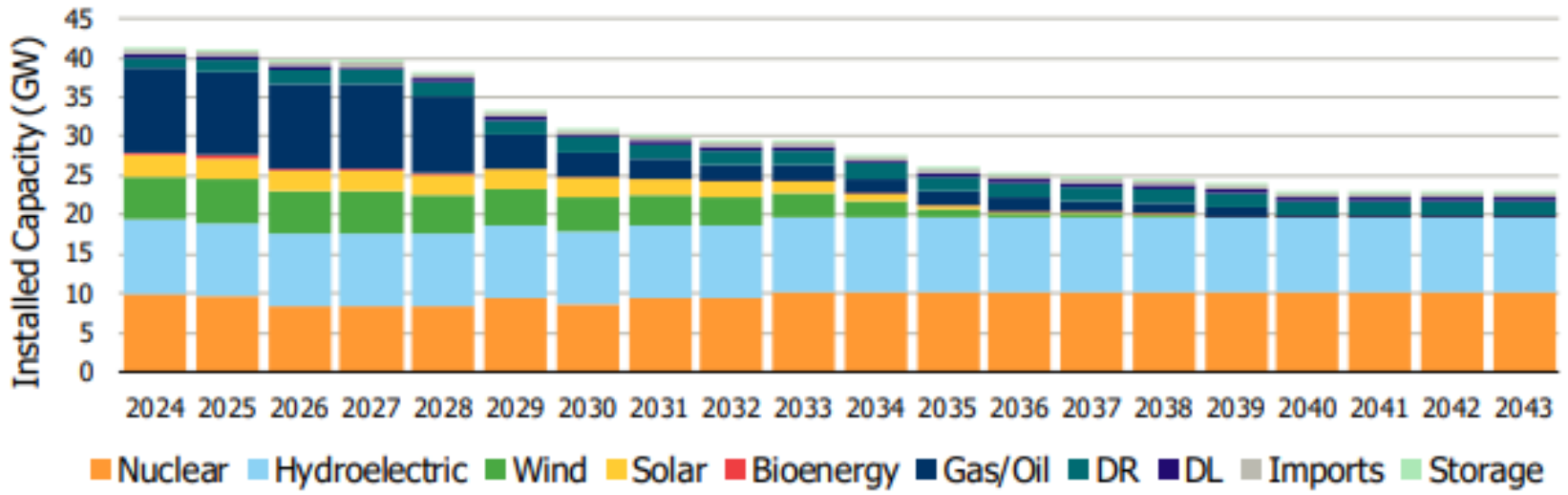
- Concludes "*moderate rise in the average growth of demand*" to ~**1.9%** annually.
- Ontario is in period of demand growth, trending to dual peaking summer + winter.

Figure 6 | 2023 Installed Capacity by Fuel Type[7]

Nuclear	10.5 GW	26%
Gas/Oil	10.6 GW	26%
Hydroelectric	9.4 GW	23%
Wind	5.5 GW	13%
Solar	2.7 GW	6%
DR	1.2 GW	3%
DL	0.3 GW	1%
Bioenergy	0.4 GW	1%
Imports	0.4 GW	1%
Storage	0.03 GW	0.1%

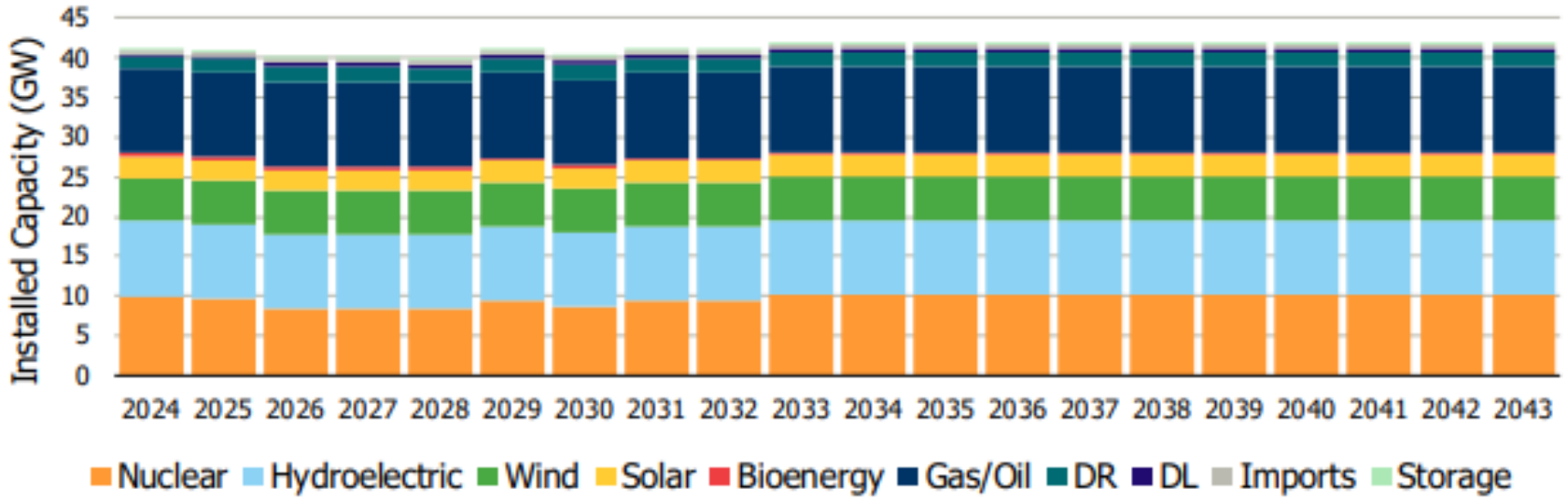
Case 1 scenario (existing contracts)

Figure 7 | Installed Capacity (Case 1)



Case 2 scenario (re-contracting)

Figure 8 | Installed Capacity (Case 2)



Case 1 scenario - effective capacity (not nearly enough)

Figure 9 | Summer Effective Capacity (Case 1)

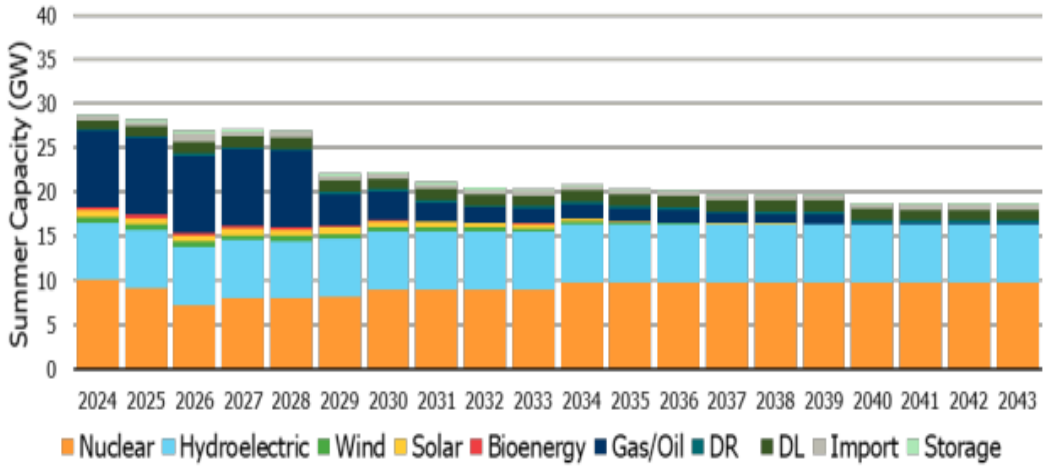
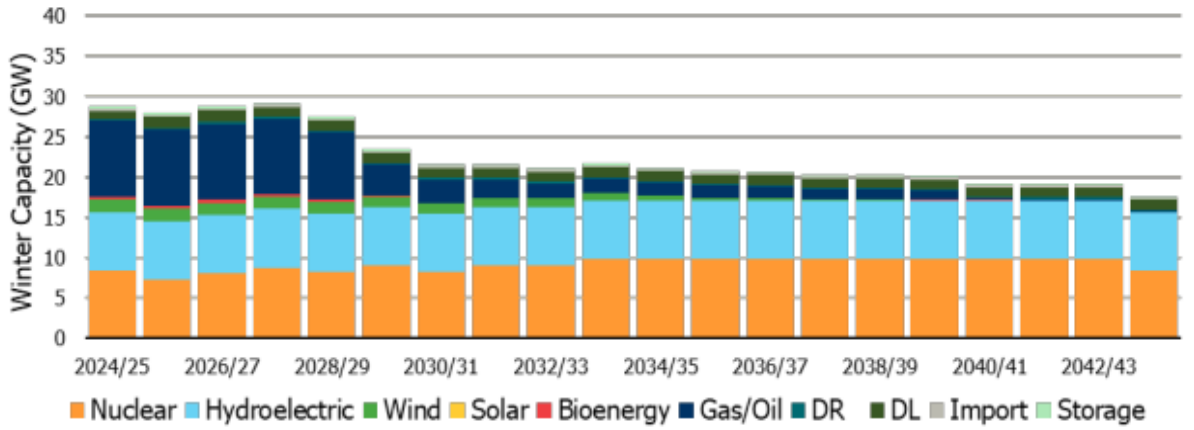


Figure 11 | Winter Effective Capacity (Case 1)



Case 2 - effective capacity (not enough)

Figure 10 | Summer Effective Capacity (Case 2)

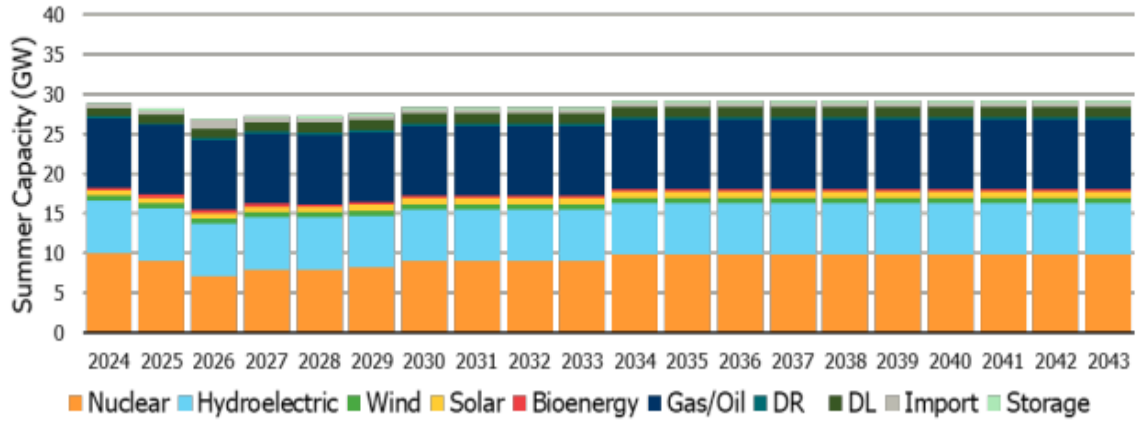
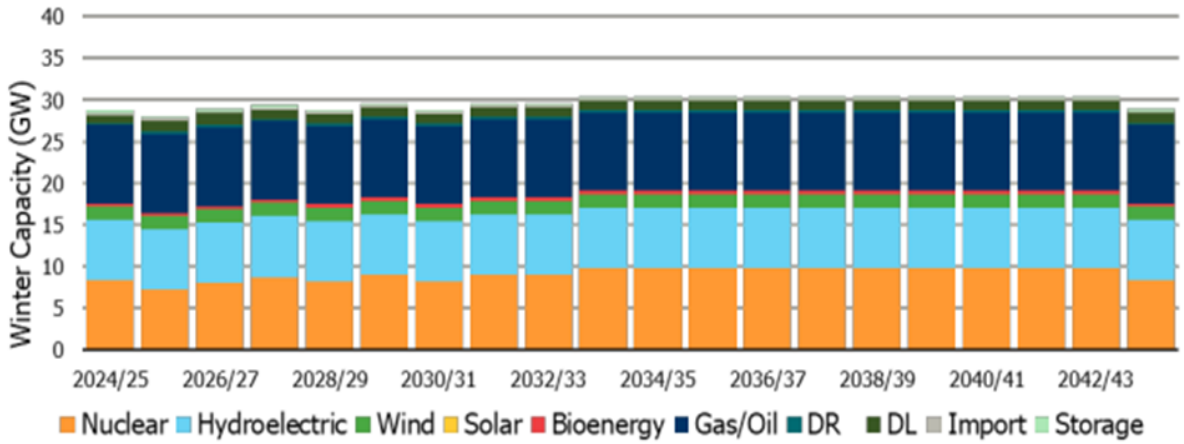


Figure 12 | Winter Effective Capacity (Case 2)



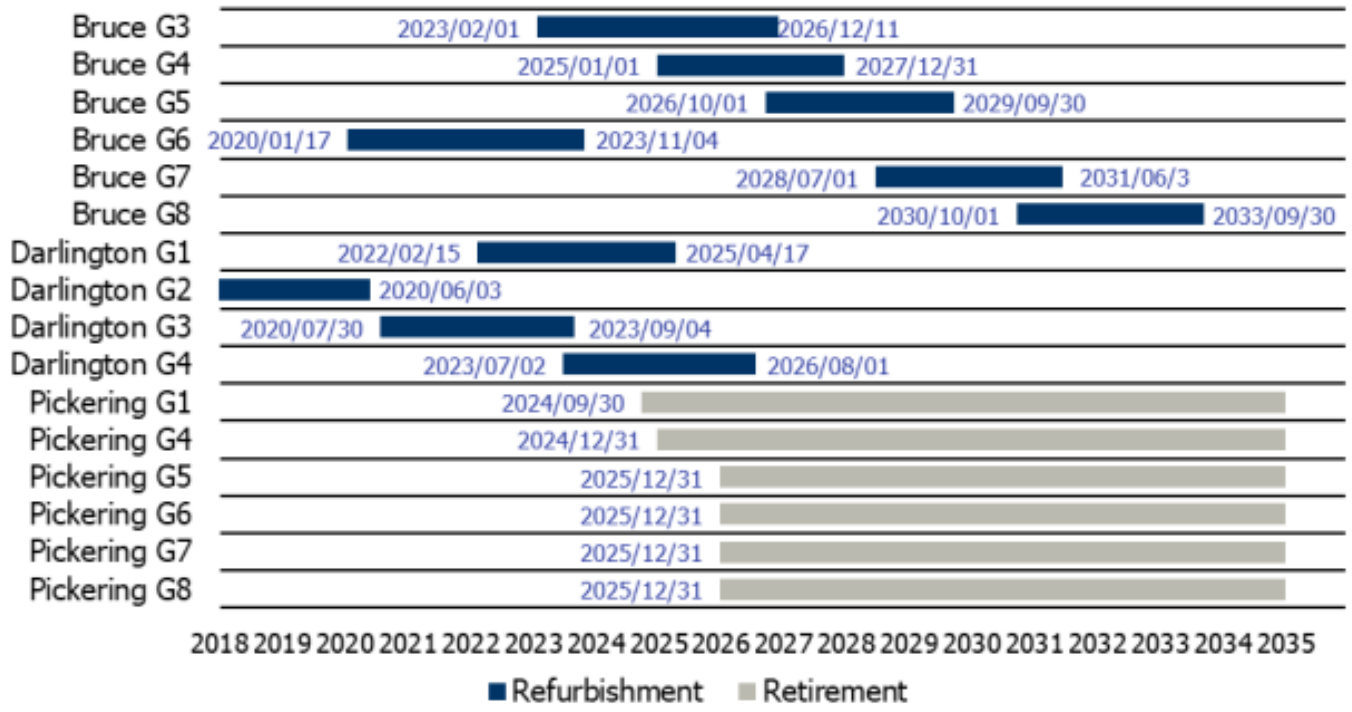
IESO Annual Planning Outlook (APO)

- Converging dynamics means “anticipated capacity **shortfalls** in the mid-2020s”
  - Demand growth
  - Nuclear refurbishments
  - Expiring generation contracts

Nuclear refurbishment + retirement

- Pickering retirement end of 2025 (potential extension to end of summer 2026)
- Refurbishments at Darlington and Bruce (many until 2029)

Figure 13 | Nuclear Refurbishment and Retirement Schedule[11]



Resource Adequacy

- Short Term? **NO**
- Medium Term? **NO**
- Long Term? **NO**

Capacity needs emerge in 2025

Figure 19 | Summer Capacity Surplus/Deficit

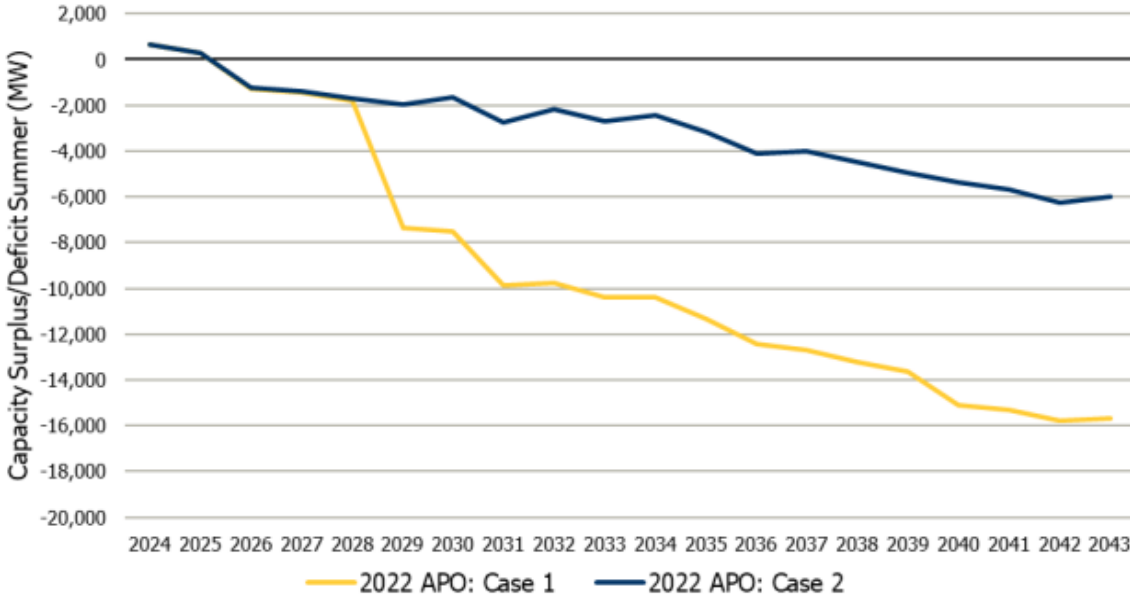
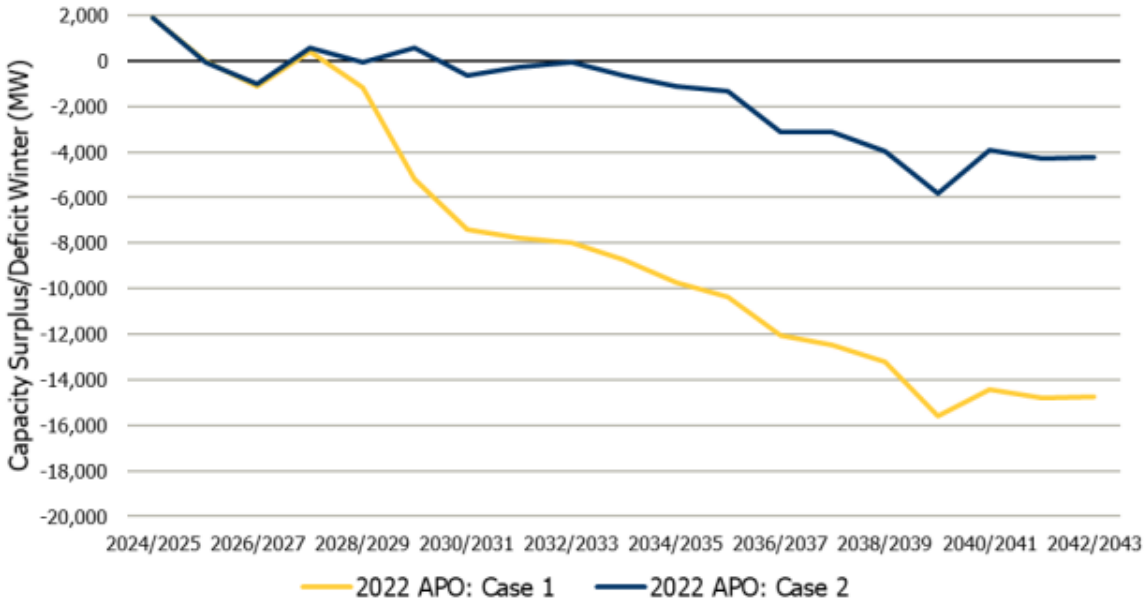


Figure 20 | Winter Capacity Surplus/Deficit



Energy needs emerge in 2029

Figure 21 | Energy Adequacy Outlook (Case 1)

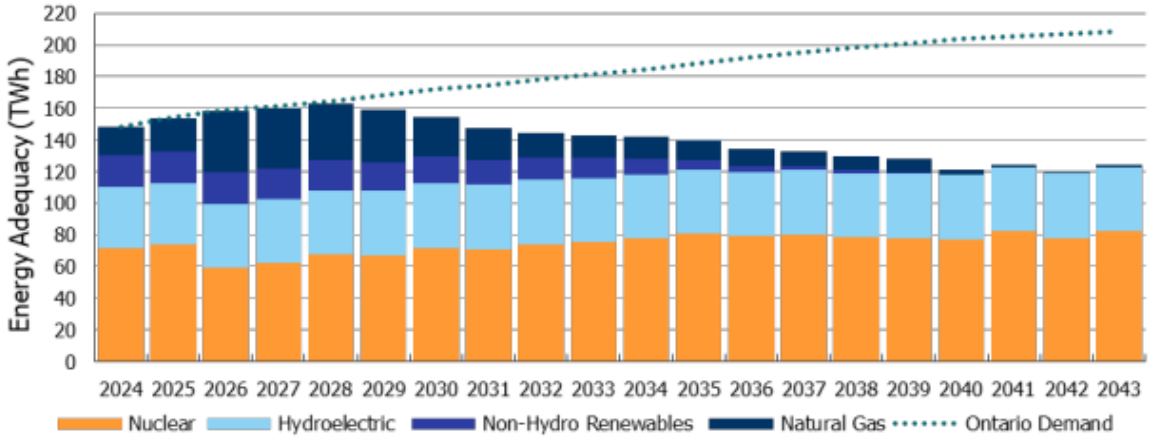
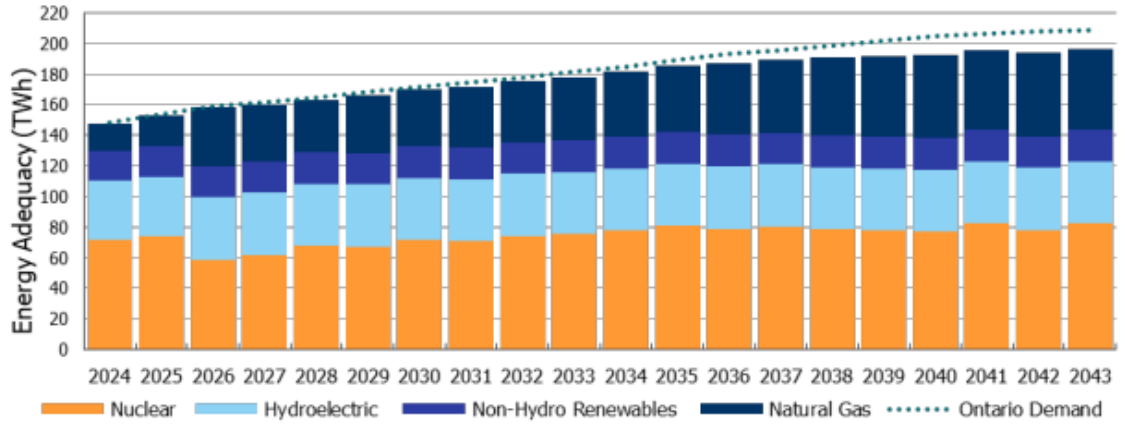
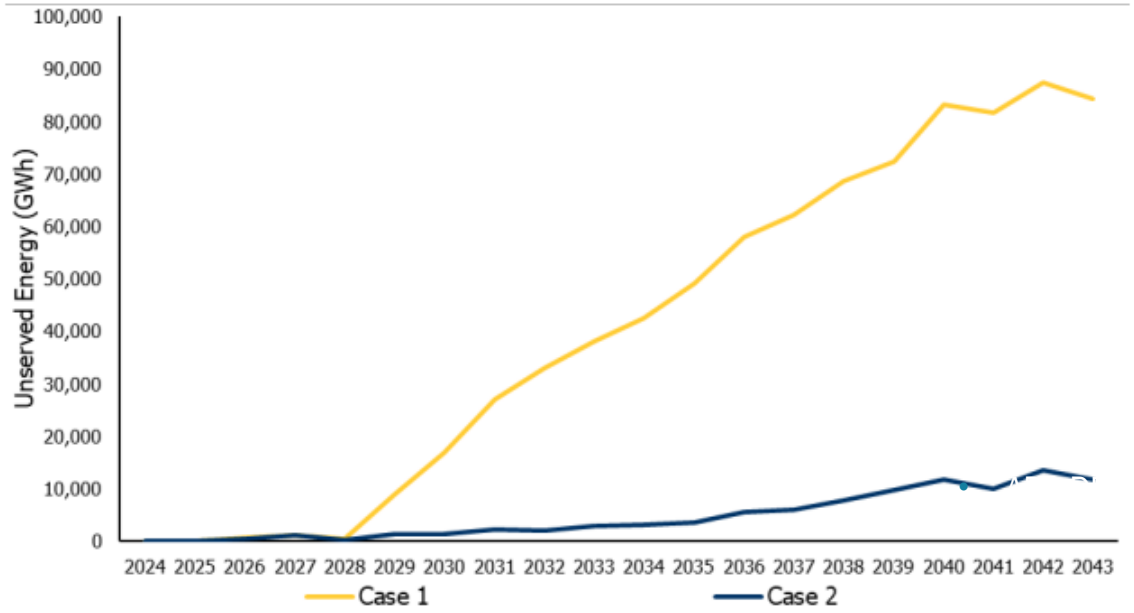


Figure 22 | Energy Adequacy Outlook (Case 2)



APO

Figure 26 | Potentially Unserved Energy



- TX system congestion, constraints and thermal limitations identified
- CASE 1 SCENARIO identifies
  - >16,000 MW **unserved energy** needs during forecast period
    - 6000 WM baseload plus
    - 10,000 MW peaking/intermittent
  - unserved energy = not enough power
  - unserved energy system-wide after all generation facilities dispatched, or
  - local/regional unserved energy if TX transfer limits reached
- **Serious concerns start in 2029**
- **4000 MW new capacity target for first Long Term RFP**
- Increased attention being paid to transmission (TX) lines as critical for reliability

4

IESO Annual Acquisition Report (AAR)
2023

2023 AAR

- Q1-Q2 consultations
- Q3-Q4 more consultation + industry comments
- Considerable constructive comments that the IESO must provide more certainty on:
  - Re-powering
  - Renewables procurement for COD dates beyond 2030
  - Methodical and recurring commitment to procuring renewables to
    - retain global investors
    - allow developers to foster relationships with communities + **municipalities** + indigenous partners
- Not finalized
- IESO decided build feedback into next APO/AAR in 2024.

5

IESO Reliability Outlook

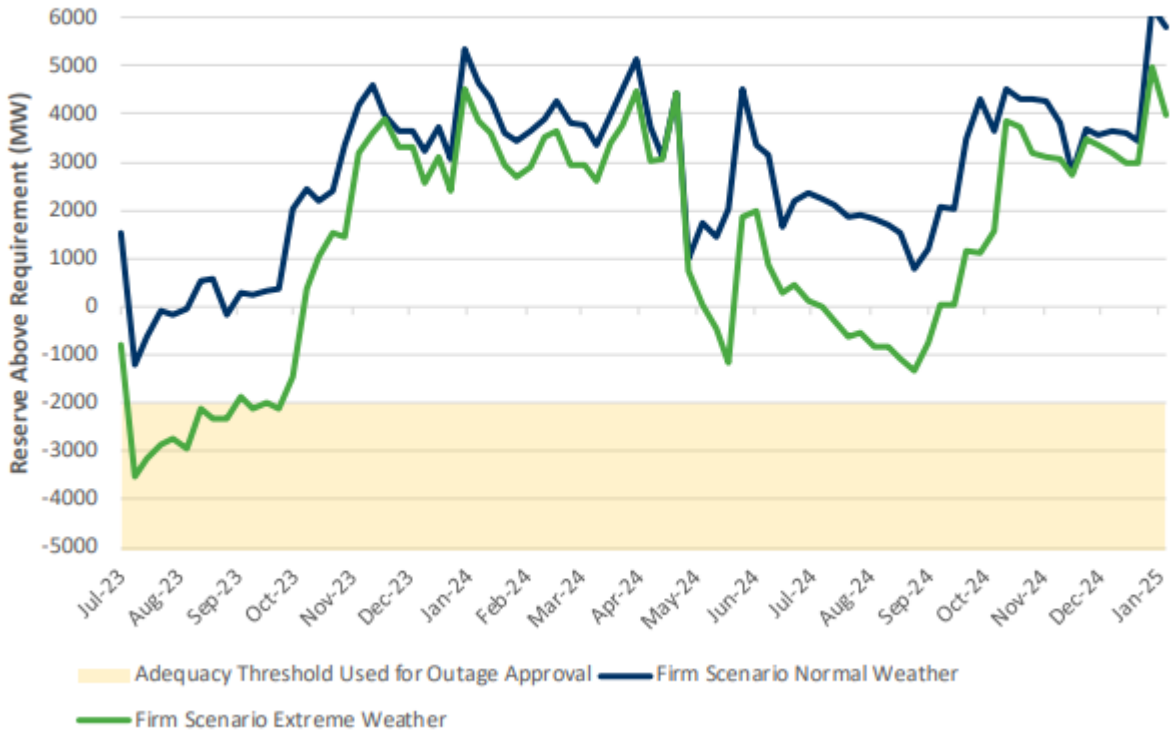
July 2023 - December 2024

Electricity Adequacy Assessment (EAA)

EAA

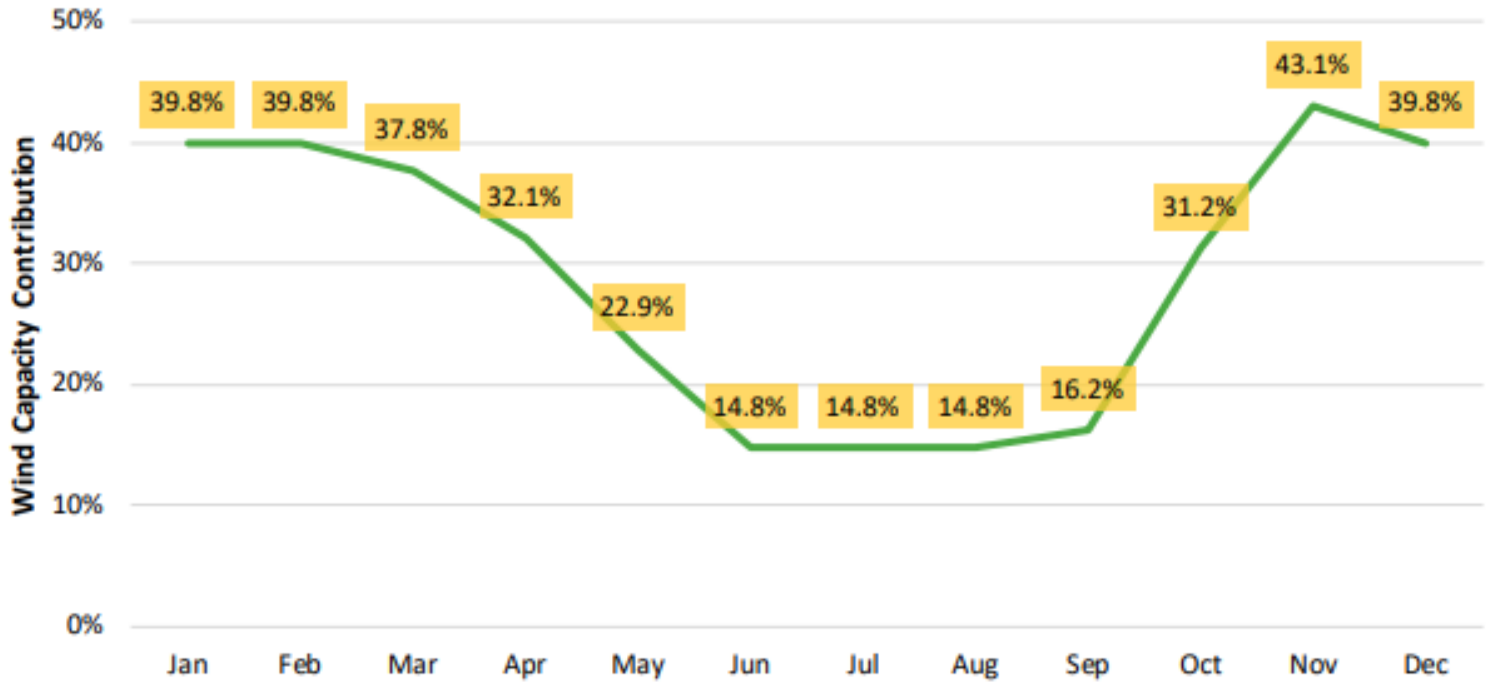
- Forecasted sufficient reserves for winters of 2023-24 and 2024-25
- Forecasted reserves were below requirements for certain weeks in summer 2023
- Planned outages (nuclear + gas) get rescheduled
- Supply tightness dictates permitted planned outage / maintenance scheduling until things relax

Figure 4-3 | Comparison of Normal and Extreme Weather: Firm Scenario Reserve Above Requirement



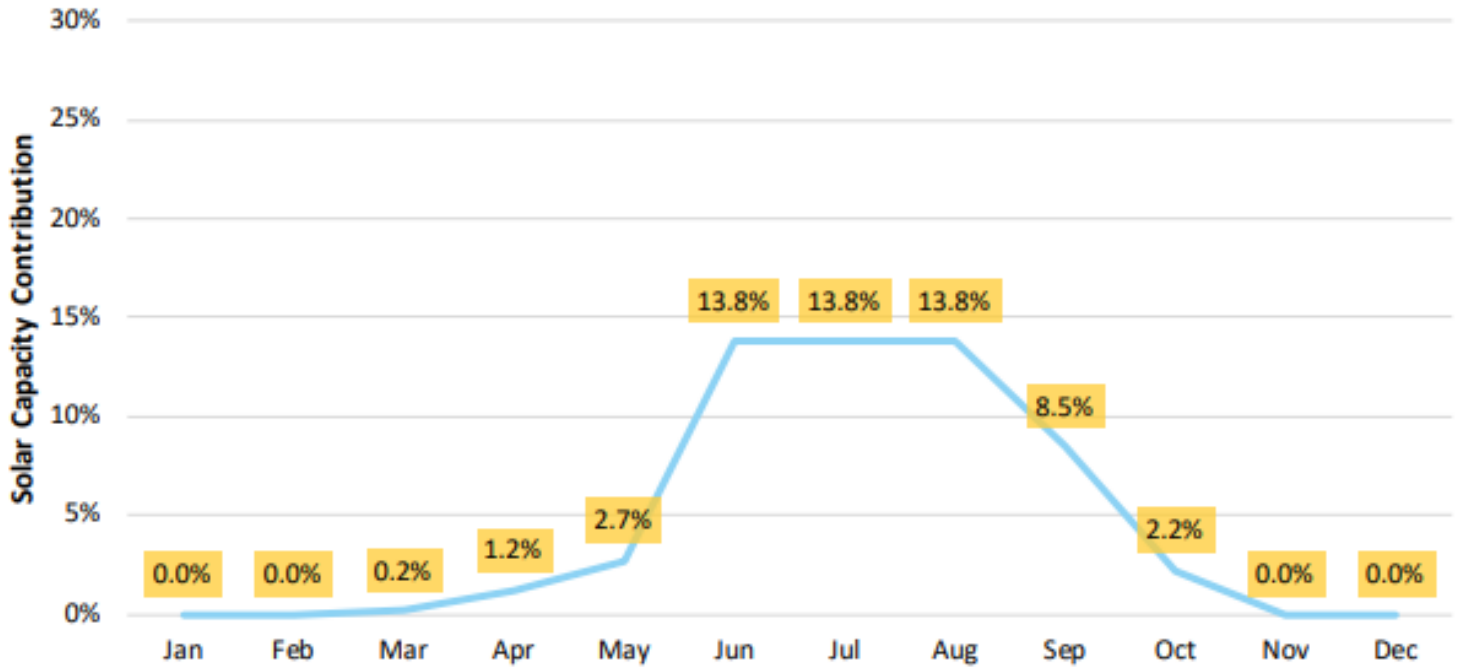
Wind capacity contribution

Figure 4-1 | Monthly Wind Capacity Contribution Values



Solar capacity contribution

Figure 4-2 | Monthly Solar Capacity Contribution Values



keeping perspective

Peak resources available summer 2023

Table 4-1 | Existing Grid-Connected Resource Capacity

Fuel Type	Total Installed Capacity (MW)	Forecast Capability at 2023 Summer Peak Normal Weather (MW)	Forecast Capability at 2023 Summer Peak Extreme Weather (MW)	Number of Stations	Change in Number of Stations	Change in Installed Capacity
Nuclear	13,144	8,560	8,560	5	0	55
Hydroelectric	8,922	5,055	4,434	76	0	-64
Gas/Oil	10,470	9,453	9,041	33	0	-12
Wind	4,883	720	720	41	0	0
Biofuel	296	286	286	7	0	0
Solar	478	66	66	10	0	0
Demand Measures	-	740	740	-	-	-
Firm Imports (+) / Exports (-) (MW)	-	223	0	-	-	-
Total	**38,193**	**25,103**	**23,847**	**172**	**0**	**-20**

6

POWERING ONTARIO'S GROWTH
ONTARIO'S PLAN FOR A CLEAN ENERGY FUTURE

Ministry of Energy

July 10, 2023

Powering Ontario's Growth

- Highlight's **current clean energy advantage**
- Focus on **affordability**
- Recognizes **electrification trend**
- Predicts **continued growth**
- Slim commentary on solar + wind

- Chapters on:
  - New nuclear
  - Nuclear refurbishment
  - Darlington SMR build
  - **Competitive procurement for new generation (wind, solar, hydro, biogas) + storage (batteries)**
  - Pumped storage
  - DERs
  - Natural gas generation
  - Reconstructing small hydroelectric
  - Optimize OPG large hydroelectric fleet to increase generation
  - TX expansion
  - **Supporting growth in Eastern Ontario and Ottawa region**
  - Hydrogen strategy

- An integrated energy plan will come through the Electrification and Energy Transition Plan (EETP)

- Repeated mantra of keeping costs down

Procurement RFPs rolling out

• **Expedited** Long Term Procurement 1 RFP	E-LT1 (closed)
• Long Term Procurement 1 RFP	LT1 (open now)
• Long Term Procurement 2 RFP	LT2 (likely 2024)
• Long Term Procurement 3 RFP	LT3 (likely 2025)
• Long Term Procurement 4 RFP	LT4 (TBD)

Procurement RFPs rolling out

E-LT1 (closed)	• IESO awarded contracts early 2023 • Mainly: natural gas; battery energy storage systems (BESS)
LT1 (open)	• IESO is procuring **capacity**: natural gas; battery energy storage systems (BESS) • TX interconnection capacity in SE Ontario, so considerable developer interest here • Highly competitive • Valuable points for municipal support resolutions (MSRs) • Dec 12, 2023 - bids due • June 30, 2024 - contracts awarded to successful projects
LT2 (next year)	• IESO will procure energy • Seeking dispatchable generation assets (may be co-located with storage) • Under design discussion now - many questions
LT3, LT4 and beyond and MTP programs	• Details TBD • Little doubt both energy and capacity will be required to be procured for COD dates into the 2030-2035 COD timeframe

Thank you.

SE Ontario's **energy future** is important to us as we assist our communities in navigating changes.

Lisa Asbreuk
Partner
Corporate/Commercial/Energy Law
Cunningham Swan LLP

lasbreuk@cswan.com
613-546-8080