Powering ON

Examining Ontario's Integrated Energy Plan

November 2025

David Pickup, Gurprasad Gurumurthy, Scott MacDougall

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David Pickup

Gurprasad Gurumurthy • Scott MacDougall

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The Pembina Institute
#802, 322 – 11 Avenue SW
Calgary, AB T2R 0C5
403-269-3344

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Acknowledgements

The Pembina Institute recognizes that the work we steward and those we serve span the lands of many Indigenous Peoples. We respectfully acknowledge that our organization is headquartered in the traditional territories of Treaty 7, comprising the Blackfoot Confederacy (Siksika, Piikani and Kainai Nations); the Stoney Nakoda Nations (Goodstoney, Chiniki and Bearspaw First Nations); and the Tsuut'ina Nation. These lands are also home to the Otipemisiwak Métis Government (Districts 5 and 6).

These acknowledgements are part of the start of a journey of several generations. We share them in the spirit of truth, justice and reconciliation, and to contribute to a more equitable and inclusive future for all.

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Executive summary

Ontario faces major decisions about how to power its future economy while balancing affordability, reliability and energy security. The province's first integrated energy plan (IEP), *Energy for Generations*, was released in 2025 and sets a new direction for Ontario's energy system by aligning key decision-makers, creating plans across multiple energy sectors and establishing expectations to phase out emissions — all while ensuring future energy needs are met.

We examined other jurisdictions worldwide that are wrestling with this same challenge: how do you power an increasingly electrified economy in an affordable, secure, reliable and clean way? We found that the leading electricity grids are making wind, solar and storage the backbone of their future energy systems, driven by significant cost reductions, advances in technology, and the growth in flexible grid capacity.

We also took a closer look at Ontario's IEP. Our analysis was technology neutral, evidence-based and focused on optimizing technology costs, development timelines, contributions to the grid, and emissions reductions, among other environmental impacts.

We offer two insights to Ontario electricity system planners and decision-makers as they continue to plan the province's future energy system:

Managing risks

Ontario's reliance on **gas power** in the short term and **nuclear power** in the long term is a risky choice; it is likely to decrease energy security while increasing energy costs.

Maximizing opportunities

Ontario is out of step with global trends on **renewable energy**, and should seek to deploy more of these technologies to meet its affordability and economic growth goals.

1. Introduction

Ontario's electricity system is at a crossroads as the province anticipates an unprecedented growth in electricity demand of 75% by 2050, according to the Independent Electricity System Operator (IESO).[1] The main drivers of this growth, captured in Figure 1, are:

- transportation electrification (39%)
- industrial (27%)
- commercial (20%)
- residential (electrification and population growth: 12%)

This increase reflects global trends towards electrification as clean, reliable and affordable electricity replaces fuel-based systems in buildings, transportation and industry. The growth of demand is tempered by Ontario's expanded energy efficiency framework, forecasted to reduce energy needs by an average of 32 terawatt-hours (TWh) per year.[2]

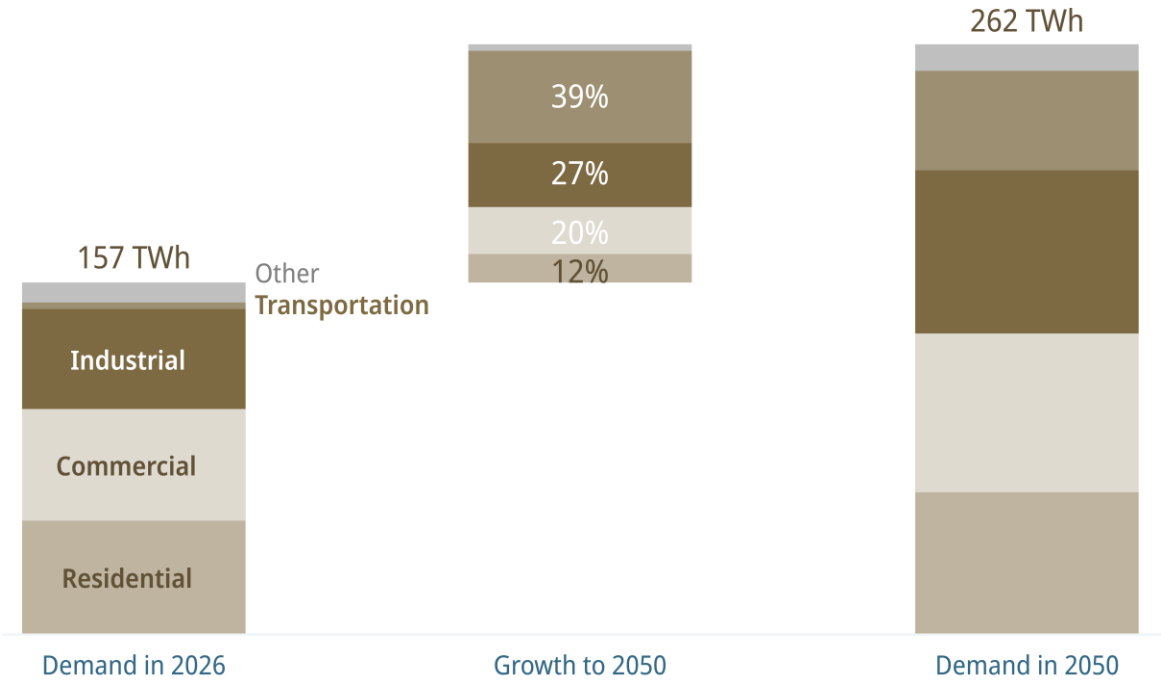

Figure 1. Demand growth drivers in Ontario

Data source: IESO. (See appendix for full reference.)

[1] Independent Electricity System Operator (IESO), "Ontario Releases Updated Demand Forecast," October 17, 2024. https://www.ieso.ca/Sector-Participants/IESO-News/2024/10/IESO-Releases-Updated-Demand-Forecast

[2] IESO, *Annual Planning Outlook: Ontario's electricity system needs: 2026–2050* (2025), 27. Accessible at https://www.ieso.ca/Sector-Participants/Planning-and-Forecasting/Annual-Planning-Outlook

The Government of Ontario set out its direction for the energy system in its first integrated energy plan (IEP), released in 2025. The plan combines planning for electricity, natural gas and other sources under four core principles: affordability, security, reliability and clean energy.[3] The plan also commits to achieving a nearly zero-emissions grid by 2050 while putting affordability first in every decision it makes.

Ontario's IEP states that it will meet growing demand through a diversified supply: an "all-of-the-above" approach. The IESO modeled an illustrative supply mix to meet this demand as part of the annual planning outlook, seeing two main shifts to 2050: tripling nuclear generation to deliver more power than Ontario's entire system today and phasing out gas generation almost entirely (see Figure 2).

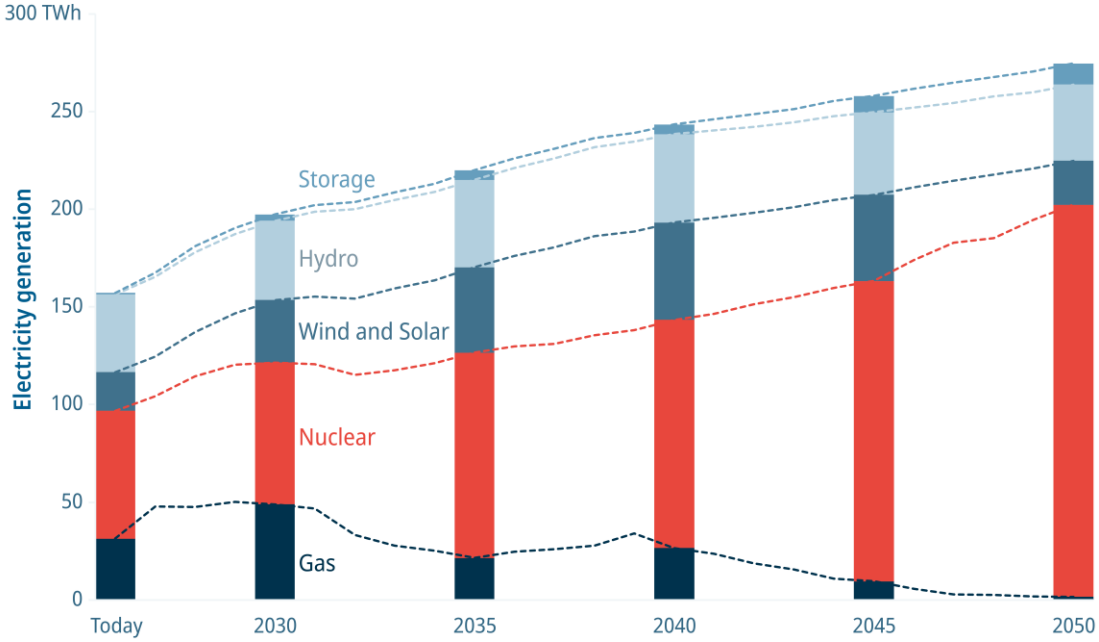

Figure 2. Modelled evolution of Ontario's electricity generation mix (2025–2050)

Data source: IESO. (See appendix for full reference.)

Ontario wants to keep electricity costs low and maintain a reliable and secure supply, like all jurisdictions, while also reducing emissions to almost zero by 2050. This report highlights two intertwined critical changes needed to de-risk Ontario's approach to achieve those goals:

- Manage the risks of over-reliance on nuclear and gas.
- Maximize the opportunities of renewables and storage.

[3] Ontario Ministry of Energy and Mines, *Energy for Generations: Ontario's Integrated Plan to Power the Strongest Economy in the G7* (2025). https://www.ontario.ca/page/energy-generations

1.1 Roles in Ontario's electricity system

Both the Government of Ontario and the IESO play important roles in the operations and planning of the energy system (see Table 1) and work closely together. For this reason we consider the government's integrated energy plan and the IESO's annual planning outlook as comprising the provincial policy direction and forecast on the future energy system, and the scope of our review in this report.

The Ontario Energy Board[4] and Ontario Power Generation[5] also have roles within the energy system, but they are not ultimately accountable for managing the current and future energy system.

Table 1. Roles of the provincial government and operator in the energy system

	Government of Ontario, Ministry of Energy and Mines	Independent Electricity System Operator (IESO)
Core roles and responsibilities	• Oversee the regulatory framework for electricity pricing. • Develop policies to mitigate energy prices for Ontario consumers and businesses.[a]	• Manage the power system in real-time. • Plan for the province's future energy needs. • Enable energy conservation. • Oversee and improve Ontario's electricity markets.[b]
Scope of energy sources considered	Integrated: electricity, natural gas, hydrogen, storage, and other energy sources.[c]	Electricity only.[c]
Key planning documents and cycle	Integrated energy plan (IEP); regular five-year cycle starting in 2025.[d]	Annual planning outlook (APO), released every year.
Role in building the future energy system	• Set policy, including goals and objectives for the energy system. • Direct the IESO and other bodies to take action to achieve these.[e]	• Forecast Ontario's energy needs. • Plan electricity system infrastructure. • Secure resources and services to meet energy and reliability needs.[f]

[a] Government of Ontario, "Ministry of Energy and Mines." https://www.ontario.ca/page/ministry-energy-and-mines

[b] IESO, "Connecting Today. Powering Tomorrow." https://www.ieso.ca/

[c] *Energy for Generations*, 6.

[d] *Energy for Generations*, 119.

[e] Government of Ontario, *Electricity Act, 1998*, SO 1998, c. 15, Sch A., ss. 25.29 and 25.30. https://www.ontario.ca/laws/statute/98e15#BK56

[f] IESO, "Planning for the Future." https://www.ieso.ca/Learn/About-the-IESO/Planning-for-the-Future

[4] Ontario Energy Board, "Mission and Mandate." https://oeb.ca/about-oeb/mission-and-mandate

[5] Ontario Power Generation, "Memorandum of Agreement." https://www.opg.com/about-us/governance-regulation/memorandum-agreement/

2. Managing risks from nuclear and gas power

2.1 Short-term risk: Increasing use of gas power

Ontario plans to expand the role of gas in electricity over the next decade, followed by a near-phase out by 2050. The province currently relies on gas for 17% of its electricity supply. This is expected to grow to over 25% by the end of the decade to offset significant scheduled refurbishments of Ontario's nuclear fleet, before gradually decreasing to less than 1% in 2050 (see Figure 3).

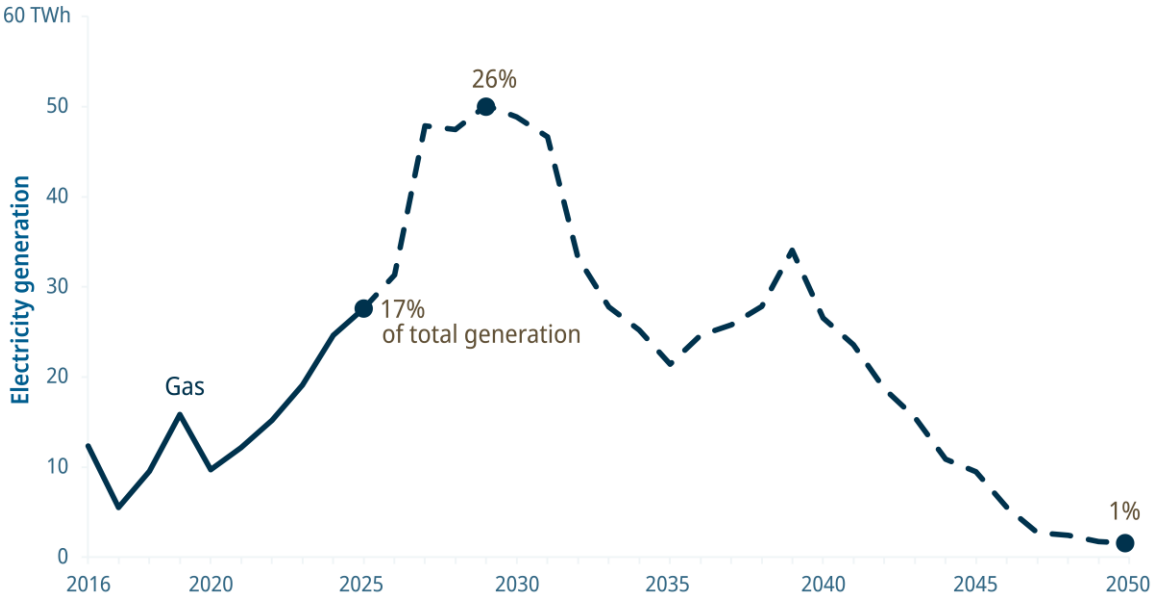

Figure 3. Modelled share of gas generation in Ontario (2016–2050)

Data sources: IESO, Ontario Ministry of Energy and Electrification. (See appendix for full references.)

Ontario's gas is mainly imported from the U.S. (70%) with the remainder (30%) coming through two pipelines from Alberta. [6] Cheaper U.S. gas means that one of the Canadian pipelines (TC Mainline) runs at around half its capacity.[7] This leaves Ontario with a difficult decision if it increases the use of gas to power short-term electricity growth. It can either increase the amount

[6] Enbridge Gas, *5-Year Gas Supply Plan* (2025), 50. https://www.enbridgegas.com/-/media/Extranet-Pages/Regulatory-Filings/RateCases/Other-Regulatory-Proceedings/EB-2025-0065-5-Year-Gas-Supply-Plan/Gas-supply-plan.pdf?rev=35bf1c63111c474fbd55c697d12c2c4e

[7] Canada Energy Regulator, *"TransCanada (TC) Canadian Mainline,"* August 2025, Northern Ontario Line throughput compared to capacity. https://apps.cer-rec.gc.ca/PPS/en/pipeline-profiles/transcanada-canadian-mainline-tc

of gas imported through the U.S., which risks energy security during a time of highly uncertain trade relations, or it can increase the gas throughput from the Canadian pipeline, which would increase the cost to consumers and industry.

Compounding the cost risk, our analysis shows that the more reliant a grid is on gas generation, the higher the chance of electricity bill volatility since gas prices are subject to commodity market swings.[8] The IEP recognizes that stable and affordable electricity prices are key for industry and household prosperity, and its reliance on gas power puts those goals at risk.[9]

Recognizing the reliance on imported natural gas, Ontario is exploring the feasibility of a new west-to-east Canadian gas pipeline to enhance energy security and reduce U.S. imports,[10] though no specific project proposal currently exists. A future hypothetical pipeline would be built far beyond when gas use for electricity is expected to decline in Ontario, meaning that a new gas pipeline does not solve Ontario's short-term energy security risk.

Beyond 2035, Ontario anticipates a gradual phase-out of gas in the electricity system, limiting the ability of gas to serve as an "insurance policy" to maintain system reliability.[11] Ontario's current plans to meet growing energy demand centre on expanding nuclear generation, as we discuss next.

2.2 Long-term risk: Delivering new nuclear projects on time and on budget

Ontario's main proposed solution to growing its energy supply is a buildout of nuclear plants beginning in the 2030s. As illustrated in Figure 4, the IESO's analysis shows:

- nuclear generation tripling between today and 2050 — from 65 TWh to 201 TWh, a level that exceeds the entire electricity system's output today (157 TWh)
- nuclear contributing a greater percentage to total generation, from 41% today to 73% in 2050

[8] Will Noel, Lia Codrington, Scott MacDougall, *I'll Have What They're Having: Lessons Learned from Six Jurisdiction Leading in Wind and Solar Deployment* (2024), 8. https://www.pembina.org/sites/default/files/2024-12/Ill_have_what_theyre_having.pdf

[9] *Energy for Generations*, 12.

[10] Government of Ontario, "Ontario Launches Feasibility Study to Build East-West Pipeline and Energy Corridor," media release, October 30, 2025. https://news.ontario.ca/en/release/1006674/ontario-launches-feasibility-study-to-build-east-west-pipeline-and-energy-corridor

[11] *Energy for Generations*, 97.

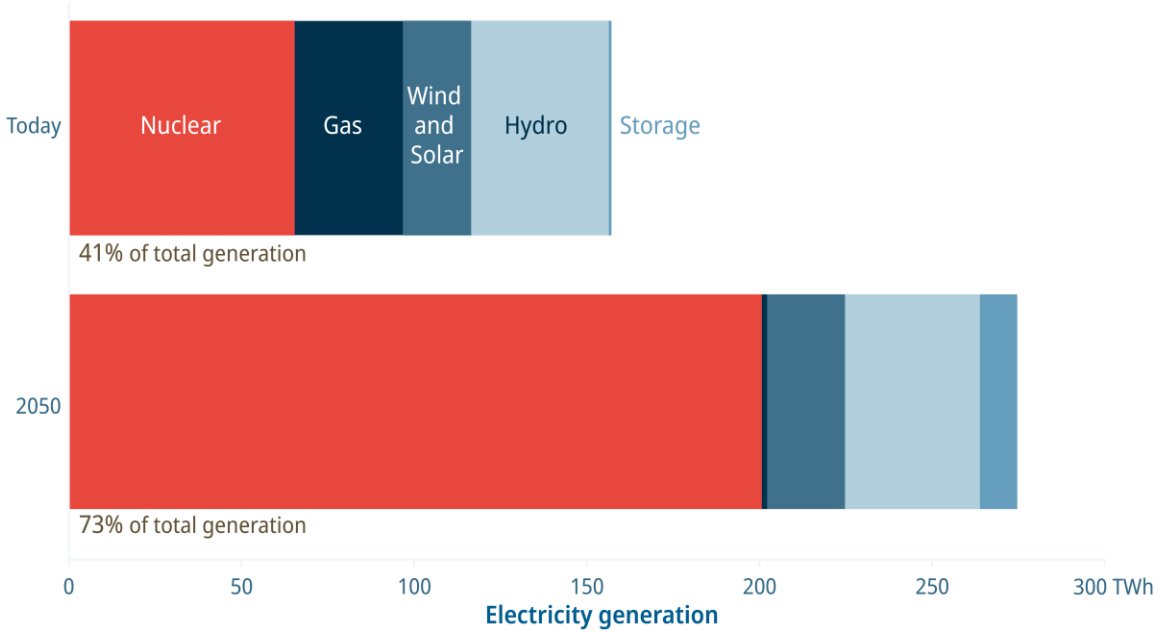

Figure 4. Projected growth in nuclear generation (2026–2050)

Data source: IESO. (See appendix for full reference.)

Ontario is currently refurbishing some of its existing nuclear plants to extend their life, which will maintain that existing nuclear generation.

The forecast growth in nuclear generation is driven by new projects, including Canada's first four 300 MW small modular reactors (SMRs) at Darlington, four large 1,200 MW units at the existing Bruce Power nuclear site and eight large 1,000 MW units at the Wesleyville site where an unfinished oil-fired power plant sits.[12] Collectively, these projects would add 14,000 MW of new generation capacity to Ontario's grid (see Figure 5), more than Ontario's currently installed nuclear capacity.[13]

[12] *Energy For Generations*, 50.

[13] IESO, *Reliability Outlook: An adequacy assessment of Ontario's electricity system, October 2025 – March 2027* (2025), Table 4-1. https://www.ieso.ca/en/Sector-Participants/Planning-and-Forecasting/Reliability-Outlook

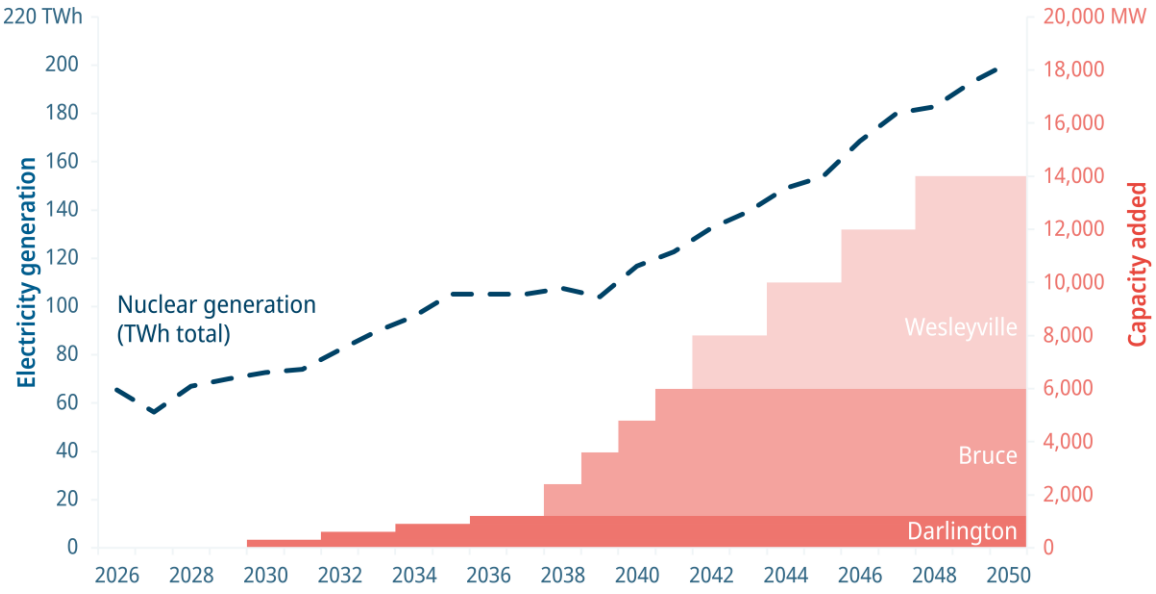

Figure 5. Illustrative nuclear generation (IESO) and new nuclear buildout (Government of Ontario)

Data sources: Government of Ontario, IESO. (See appendix for full references.)

Historically, new nuclear plants have been completed behind schedule and over budget. Recent nuclear projects around the world reflect this trend, with new facilities typically coming online six years late and at double the initial estimated cost. Applying these factors to Darlington's SMR project provides a revised delivery date of 2042 (rather than 2036) and a cost of over $40 billion (rather than $20.9 billion). (See Figure 6.)

Ontario has demonstrated its expertise in delivering refurbishments of nuclear units on time, which extends their lifespans.[14] However, building new nuclear plants is fundamentally different to refurbishing existing ones, involving greater complexity, new regulatory frameworks, and engineering challenges that far exceed those encountered in refurbishment projects. Additionally, the global projects assessed used established nuclear designs, whereas Darlington will be the first grid-scale SMR built in a G7 country.[15] This only increases the likelihood of a delay and cost overruns, with ratepayers ultimately taking on this risk.

[14] Ontario Power Generation, "Darlington Refurbishment is a made-in-Ontario success story," August 9, 2023. https://www.opg.com/releases/darlington-refurbishment-is-a-made-in-ontario-success-story/

[15] Forrest Crellin, "Nuclear projects seen slowing after record 2024 output, report says," *Reuters*, September 22, 2025. https://www.reuters.com/business/energy/nuclear-projects-seen-slowing-after-record-2024-output-report-says-2025-09-22/

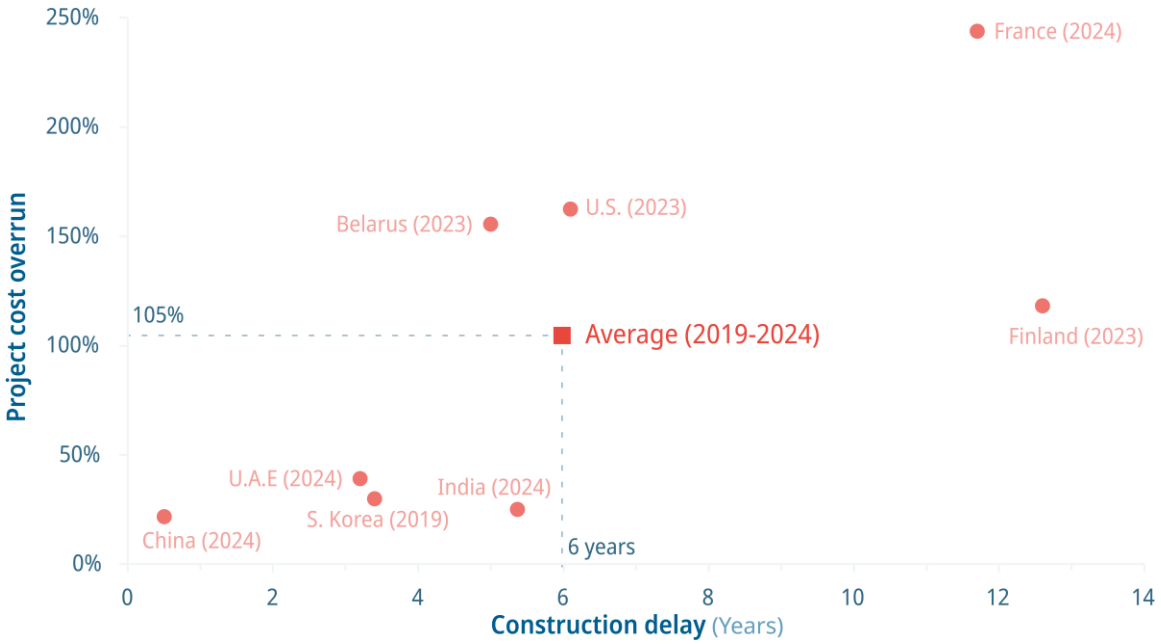

Figure 6. Delay and cost overruns for global projects delivered over the past six years

Data sources: IEA, Mycle Schneider and Antony Froggatt, World Nuclear Association. (See appendix for full references.)

Applying the risk of a six-year delay to Ontario's entire nuclear buildout program reveals the potential for significant gaps in electricity supply in the late 2030s and 2040s, as shown below.

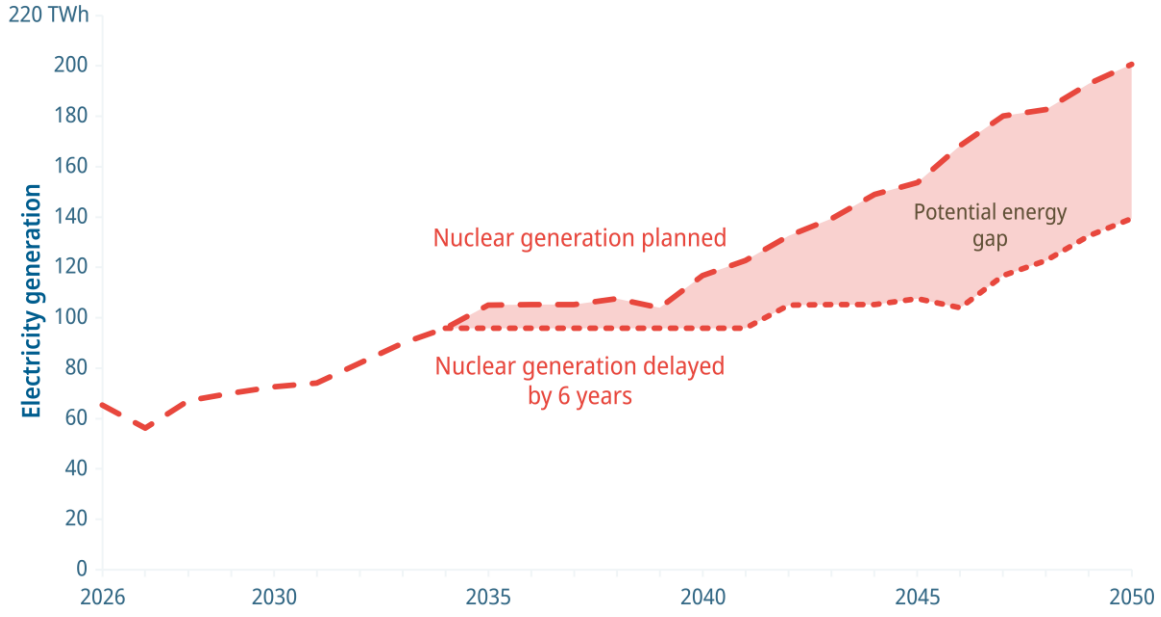

Figure 7. Supply gap caused by a potential six-year delay in nuclear buildout

Data source: IESO. (See appendix for full reference.)

If nuclear projects encounter delays, the IESO would need to identify and procure alternative energy supply to meet those needs. In the absence of other ready-to-deploy scalable alternatives, or in the event of late-stage delays, it is likely that increased gas power from existing and new plants will fill the gap, as it has done during the nuclear refurbishment projects. This would lead to increased emissions, as well as prolonging the previously described risks to energy security and costs.[16] Notably, if gas fills the gap all the way to 2050, Ontario would generate the same amount of electricity from gas in 2050 as it does in 2030 (see Figure 8).

Although the future costs of natural gas and potential disruptions to the supply chain are highly uncertain, they pose more impactful risks if gas is playing a larger role in the system.

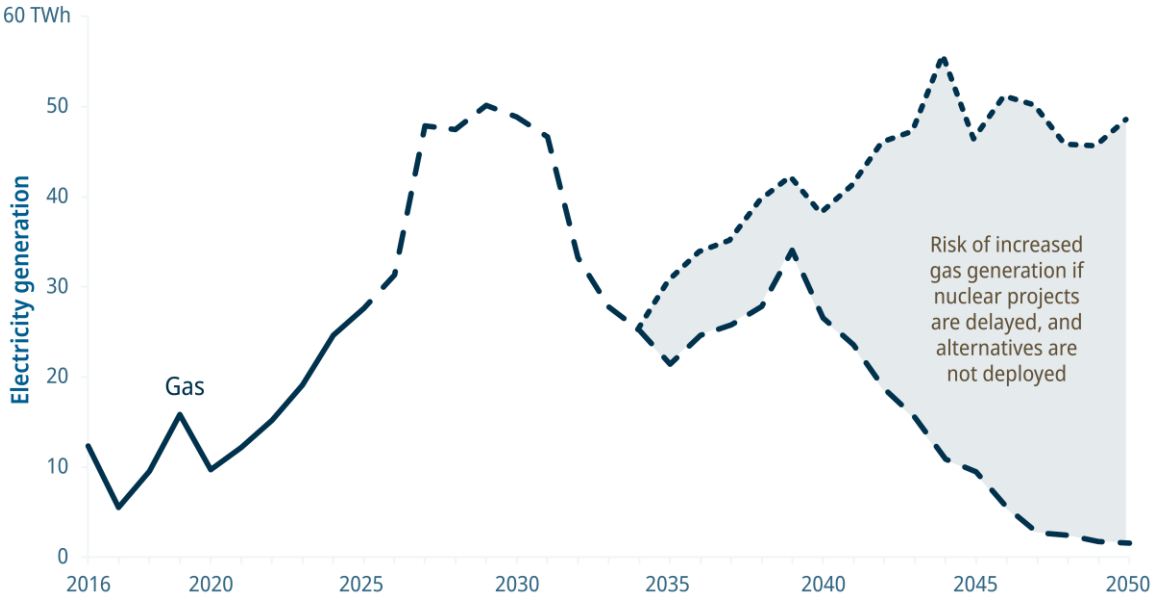

Figure 8. Potential risk of increased gas generation if nuclear buildout is delayed

Data sources: Pembina analysis based on IESO and Ontario Ministry of Energy. (See appendix for full references.)

[16] Office of the Auditor General of Ontario, *Report on Progress to Reduce Greenhouse Gas Emissions* (2025). https://www.auditor.on.ca/en/content/specialreports/specialaudits/en2025/AR-PA_PtoRGGE_en25.html

3. Maximizing opportunities in renewables and storage

3.1 Renewables and storage can support Ontario's goals

Ontario is not alone — other jurisdictions around the world face similar decisions about the future of their electricity systems. Increasingly, they're choosing renewables and battery storage as the backbone of their modern energy systems. Low-cost, quick to deploy and scale, and with long-term resilience benefits, renewables are the top choice for electricity systems looking to meet demand growth. Evidence of this trend includes:

- Since 2022, renewables have added more than twice as much new generation as fossil fuel sources globally, with this trend expected to accelerate over the coming years.[17]
- Low-carbon sources surpassed 40% of total global electricity generation in 2024,[18] and renewables recently overtook coal as the largest global source of electricity.[19]
- New renewables projects made up almost three-quarters of the global growth in power generation in 2024.[20]

Ontario would also find that increasing renewable electricity deployment aligns well with its system goals of affordable, reliable and clean electricity to support economic growth.

Ontario is out of step with global trends on renewables

IESO's analysis of the future role of wind and solar differs significantly from other models. While other major Canadian and international analyses project significant growth over the next couple of decades (in the range of 4 to 13 times higher), the IESO's modelling sees

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[17] International Energy Agency (IEA), "Year-on-year global change in electricity generation by source, 2019-2027," February 11, 2025. https://www.iea.org/data-and-statistics/charts/year-on-year-global-change-in-electricity-generation-by-source-2019-2027

Bloomberg New Energy Finance, *New Energy Outlook 2025*. https://about.bnef.com/insights/clean-energy/new-energy-outlook/ Bloomberg New Energy Finance, *New Energy Outlook 2025*. https://about.bnef.com/insights/clean-energy/new-energy-outlook/

[18] Ember, *Global Electricity Review 2025* (2025), 9. https://ember-energy.org/latest-insights/global-electricity-review-2025/

[19] Ember, *Global Electricity Mid-Year Insights H1 2025* (2025), 14. https://ember-energy.org/latest-insights/global-electricity-mid-year-insights-2025/

[20] IEA, *Global Energy Review 2025* (2025), under Electricity. https://www.iea.org/reports/global-energy-review-2025/electricity

approximately the same amount of renewable energy generation in 2050 as today (see Figure 9). The significant growth in total energy needs and nuclear generation leads to renewables' share of electricity supply dropping from 11% today to 8% in 2050. This is far below the current and future plans of leading jurisdictions.

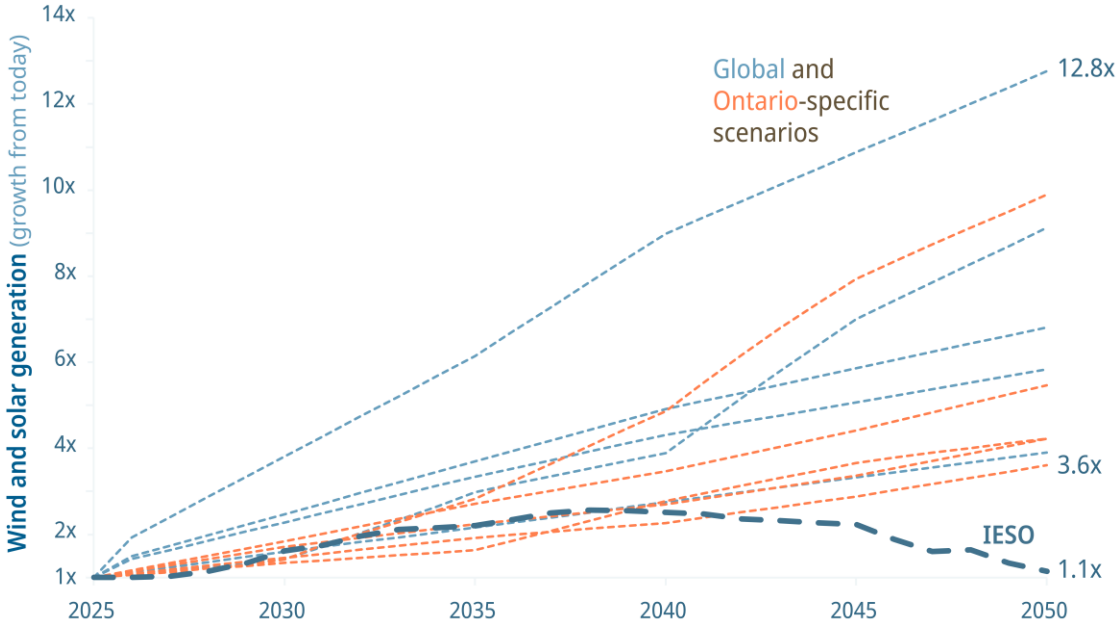

Figure 9. IESO's modelled wind and solar generation vs. scenarios by other major entities

Data sources: Canada Energy Regulator, Exxonmobil, IESO, International Energy Agency, Navius Research. (See appendix for full references.)

Cost reductions in solar and wind are driving higher ambition

Wind and solar paired with storage is already cost-competitive with new gas plants in Ontario following trends in the United States and globally,[21] and their costs are expected to decline by a

[21] Clean Energy Canada, *A Renewables Powerhouse* (2023), 6. https://cleanenergycanada.org/wp-content/uploads/2023/01/RenewableCost_Report_CleaEnergyCanada_Feb2023.pdf

NREL (National Renewable Energy Laboratory), "Electricity Annual Technology Baseline (ATB) Data Download," 2024. https://atb.nrel.gov/electricity/2024/data

Lazard, *Levelized Cost of Energy* (2025), 8. https://www.lazard.com/media/uounhon4/lazards-lcoeplus-june-2025.pdf

Joachim Seel et al., *Utility-Scale Solar, 2024 Edition* (Lawrence Berkeley National Laboratory (2024), slide 43. https://live-lbl-eta-publications.pantheonsite.io/sites/default/files/2024-10/utility_scale_solar_2024_edition_slides.pdf

further 40% by 2035,[22] while gas costs are anticipated to rise due to supply chain barriers.[23] Most of the general public are likely not aware of how quickly and dramatically costs for wind and solar have fallen. Since 2009, the cost of solar has plummeted 88% and wind costs dropped 74%.[24] Lithium-ion batteries, which boost renewable energy system reliability, have seen their costs fall by 90 per cent since 2010.

And these costs are expected to keep falling. In this "electrotech" world, costs fall by around 20% every time global deployment doubles.[25]

This extraordinary improvement in the economics and availability of renewables has caused a fundamental shift in electricity generation towards clean power, with jurisdictions scaling up their deployment of these technologies.[26] Among the jurisdictions leading the way are South Australia, New York State and the European Union:

- South Australia is expecting to meet all its electricity needs from wind and solar by 2027 and will maintain grid reliability and affordability through energy storage, interties and back-up fuel-based generation.[27] Millions of Australians will be offered free electricity generated by solar during the middle of the day in 2026.[28]
- New York State's Draft Energy Plan models 70% of its electricity from renewables in 2033 and 88% in 2040, up from 37% in 2025.[29]

[22] BloombergNEF, "Global Cost of Renewables to Continue Falling in 2025 as China Extends Manufacturing Lead," media release, February 6, 2025. https://about.bnef.com/insights/clean-energy/global-cost-of-renewables-to-continue-falling-in-2025-as-china-extends-manufacturing-lead-bloombergnef/

[23] Jared Anderson, "US gas-fired turbine wait times as much as seven years; costs up sharply," *S&P Global*, May 20, 2025. https://www.spglobal.com/commodity-insights/en/news-research/latest-news/electric-power/052025-us-gas-fired-turbine-wait-times-as-much-as-seven-years-costs-up-sharply

[24] Max Roser, "Why did renewables become so cheap so fast?" Published online at OurWorldinData.org. Updated April, 2025. https://ourworldindata.org/cheap-renewables-growth

[25] Ember, " The Electrotech Revolution: The shape of things to come," September, 2025. https://ember-energy.org/app/uploads/2025/09/Slidedeck-The-Electrotech-Revolution-PDF.pdf

[26] United Nations, *Seizing the moment of opportunity: Supercharging the new energy era of renewables, efficiency, and electrification* (2025), 7. https://www.un.org/sites/un2.un.org/files/un-energy-transition-report_2025.pdf

[27] Government of South Australia, *South Australian Energy Development Plan* (2024), 9.73 https://www.energymining.sa.gov.au/__data/assets/pdf_file/0010/1100215/2024-Energy-Development-Plan.pdf

[28] Monty Jacka, "Some Australian states are set to get a free electricity period every day," Australian Broadcast Corporation, Nov 3, 2025. https://www.abc.net.au/news/2025-11-04/solar-sharer-free-energy-three-hours-outlier-states/105968998

[29] State of New York, *Draft 2025 Energy Plan* (2025), 54. https://energyplan.ny.gov/Plans/Draft-2025-Energy-Plan

- The European Union is expecting to achieve 70% of its electricity from renewable sources by 2030, up from 47% today.[30]

Ontario's grid can remain reliable with more renewables

A criticism often levelled at wind and solar power is that their variable generation impacts the reliability of the grid. While each electricity grid is shaped by its unique climate, geography, demand and resource availability, global experience shows that a strong, reliable grid with high levels of wind and solar is achievable. It can be done with a combination of flexibility options, including energy storage, transmission interconnections and demand response, alongside hydroelectric and peaking gas generation facilities. In fact, the more flexible a grid's capacity, the easier it is to integrate large amounts of wind and solar.

Many other jurisdictions have more renewables with fewer flexibility options than Ontario, as shown in the graph below, suggesting that Ontario already has the tools to significantly increase wind and solar generation in its system. Additional contracted flexibility resources will increase the province's flexible capacity from 44% today to 52% of peak demand in 2028.

Beyond this jurisdictional analysis, recent technical research by the IESO indicated that a system with high levels of renewables and energy storage can achieve both affordability and reliability goals.[31] Further analysis exploring an appropriate level of renewables and storage deployment to meet affordability and reliability needs is critical to demonstrating the role that these technologies can play in the future energy system.

[30] European Commission, "EU is progressing towards its 2030 climate and energy goals while tackling high energy prices, State of the Energy Union Report 2025 shows", media release, Nov 5, 2025. https://ec.europa.eu/commission/presscorner/detail/en/ip_25_2586

International Renewable Energy Agency, "Strategic Investment Critical for Energy Transition Success in EU," media release, 23 June 2025. https://www.irena.org/News/pressreleases/2025/Jun/Strategic-Investment-Critical-for-Energy-Transition-Success-in-EU

[31] IESO, *Hybrid Resource Portfolio Equivalency Assessment* (2025), 25. Accessible at https://ieso.ca/Get-Involved/Innovation/Research-and-Technical-Papers/Technical-papers

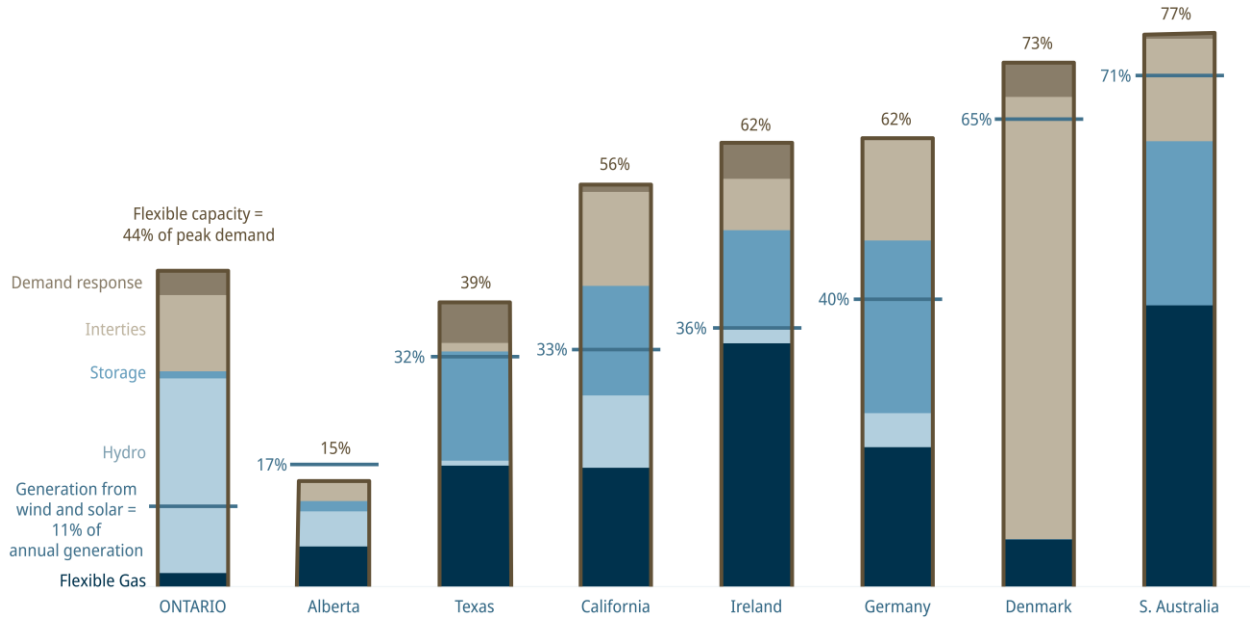

Figure 10. Comparison of flexible capacity in electricity systems across the globe

Data sources: AESO; Arne Olson et al.; Australian Energy Market Operator; California ISO; EirGrid; Electric Reliability Council of Texas; Ember; Energy Charts; Energy Storage Ireland; Government of South Australia; Grid United; IESO; Ontario Energy Board; Power Technology; Will Noel, Lia Codrington, and Scott MacDougall. (See appendix for full references.)

3.2 Renewables and storage opportunities for economic growth

The global race to develop and deploy clean energy technologies to replace fossil fuels presents tremendous economic opportunities.[32] Deploying these technologies can make energy bills more affordable while delivering economic growth both locally and provincially.

Domestic supply chains built on domestic markets

Clean energy supply chains, which are highly interconnected, international and interdependent, are an area of opportunity for Ontario. An expanded domestic market for renewables and storage supports Ontario's push towards a stronger domestic supply chain. The mining and manufacturing sectors have the resources, skills, geography and workforce to capitalize on the clean energy transition both locally and abroad. Critical minerals for battery and grid equipment manufacturing offer two examples of alignment between clean technology deployment and domestic supply chain growth:

[32] António Guterres, Secretary-General of the United Nations, "A Moment of Opportunity," speech and report, 22 July 2025. https://www.un.org/en/climatechange/moment-opportunity-2025

Critical minerals for battery manufacturing: Ontario is rapidly advancing its 2022–2027 critical minerals strategy and building a comprehensive battery supply chain, backed by key private and public sector investments, with high-profile projects such as:

- Volkswagen's electric vehicle (EV) battery manufacturing plant in St. Thomas ($7 billion)[33]
- Stellantis-LG's battery manufacturing plant in Windsor ($5 billion)[34]
- Asahi Kasei's battery separator plant in Port Colborne ($1.7 billion)[35]
- Siemens' research and development centre on AI manufacturing technologies for battery production in Oakville ($150 million)[36]
- Electra's battery-grade cobalt refinery in Temiskaming Shores ($100 million)[37]
- Frontier Lithium's lithium refinery in Thunder Bay (proposed, and recently fast-tracked)[38]

While the current manufacturer emphasis is on EV supply chains, these facilities could also serve the domestic electricity market, supplying battery energy storage for the grid, among other manufactured items. This opportunity aligns well not only with the province's critical minerals strategy but also with the federal government's recent announcement that critical minerals

[33] Office of the Premier, "Volkswagen's New Electric Vehicle Battery Plant Will Create Thousands of New Jobs," media release, April 21, 2023. https://news.ontario.ca/en/release/1002955/volkswagens-new-electric-vehicle-battery-plant-will-create-thousands-of-new-jobs

[34] Mehanaz Yakub, "NextStar Energy begins battery module production in Windsor," *Electric Autonomy Canada*, October 23, 2024. https://electricautonomy.ca/ev-supply-chain/2024-10-23/nextstar-battery-windsor-production-canada/

[35] Ontario Economic Development, Job Creation and Trade, "Asahi Kasei Breaks Ground on Electric Vehicle Battery Separator Plant in Port Colborne," media release, November 14, 2024. https://news.ontario.ca/en/release/1005335/asahi-kasei-breaks-ground-on-electric-vehicle-battery-separator-plant-in-port-colborne

[36] Ontario Economic Development, Job Creation and Trade, "Ontario Welcomes Siemens' $150 Million Investment to Establish New Technology Centre in Oakville," media release, March 31, 2025. https://news.ontario.ca/en/release/1005715/ontario-welcomes-siemens-150-million-investment-to-establish-new-technology-centre-in-oakville

[37] Ontario Economic Development, Job Creation and Trade, "Ontario Welcomes $100 Million Investment in Province's Critical Mineral Processing Supply Chain," media release, September 12, 2025. https://news.ontario.ca/en/release/1006454/ontario-welcomes-100-million-investment-in-provinces-critical-mineral-processing-supply-chain

[38] Ontario Economic Development, Job Creation and Trade, "Ontario Welcomes Frontier Lithium's Critical Mineral Refinery in Thunder Bay," media release, March 4, 2025. https://news.ontario.ca/en/release/1005683/ontario-welcomes-frontier-lithiums-critical-mineral-refinery-in-thunder-bay

Ontario Energy and Mines, "Ontario Fast-Tracks First Project Under New 'One Project, One Process'" media release, October 29, 2025. https://news.ontario.ca/en/release/1006672/ontario-fast-tracks-first-project-under-new-one-project-one-process

projects will be a priority.[39] The Stellantis-LG plant is already pivoting from EV batteries to energy storage systems, showing the adaptability of this manufacturing capacity to meet new market needs.[40]

Ontario is already a national leader in deploying battery energy storage systems, with the IESO procuring a substantial amount of battery storage.[41] The largest battery storage system in Canada started operating in Ontario in 2025, adding 250 MW to the provincial grid, with more being built over the coming years.[42] Energy Storage Canada estimates the potential in Ontario for between 8.3–16.8 GW of short-duration energy storage and 2.5–4.6 GW of long-duration storage by 2050,[43] which could provide a ready market for any domestically produced storage technologies.

Grid equipment manufacturing: Transformers and switchgear are core equipment for electricity and are seeing record demand due to both growth in electricity use and replacement of aging infrastructure.[44] Ontario already has a strong position in this market, with Guelph-headquartered Hammond Power Solutions one of the leading dry-type transformer manufacturers in North America.[45] Ontario recently supported an investment of $207 million by Northern Transformer Corporation to establish a new manufacturing facility in Innisfil, showing the opportunity for local manufacturing opportunities amidst global trade uncertainty.[46]

[39] Government of Canada, "Major Projects Office: Initial Projects under Consideration," September 12, 2025. https://www.canada.ca/en/one-canadian-economy/news/2025/09/major-projects-office-of-canada-initial-projects-under-consideration.html

[40] Sanjay Maru, "NextStar Energy to build energy-storage batteries next as Windsor, Ont. plant adapts to EV market slowdown", *CTV News*, November 3, 2025. https://www.ctvnews.ca/windsor/article/nextstar-energy-to-build-energy-storage-batteries-next-as-windsor-ont-plant-adapts-to-ev-market-slowdown/

[41] IESO, "Ontario's electricity system moves forward with largest energy storage procurement ever in Canada," media release, May 16, 2023. https://www.ieso.ca/Corporate-IESO/Media/News-Releases/2023/05/Ontarios-electricity-system-moves-forward-with-largest-energy-storage-procurement-ever-in-Canada

[42] Government of Ontario, "Ontario Breaks Ground on Canada's Largest Battery Storage Project," media release. November 12, 2025. https://news.ontario.ca/en/release/1006716/ontario-breaks-ground-on-canadas-largest-battery-storage-project

[43] Power Advisory LLC, *Energy Storage Canadian Market Outlook*, prepared for Energy Storage Canada (2025), slide 11. https://www.energystoragecanada.org/energy-storage-canadian-market-outlook

[44] Herman K. Trabish, "Transformer supply bottleneck threatens power system stability as load grows," Utility Dive, February 12, 2025. https://www.utilitydive.com/news/electric-transformer-shortage-nrel-niac/738947/

[45] Hammond Power Solutions, "Our Company." https://americas.hammondpowersolutions.com/our-company

[46] Ontario Economic Development, Job Creation and Trade, Energy and Mines, "Ontario Welcomes $207 Million Investment in the Advanced Manufacturing Sector," media release, September 18, 2025. https://news.ontario.ca/en/release/1006488/ontario-welcomes-207-million-investment-in-the-advanced-manufacturing-sector

Renewables and storage can drive local economic growth

Beyond the broader economic benefits of expanding manufacturing and domestic markets, renewables and storage provide immediate, tangible benefits to local communities.[47] These include diversifying the income of rural landowners through land lease payments, generating investments in local projects through community benefit agreements, and increasing municipal revenue through property taxes paid by projects.

- Rural landowners: Leasing land to renewable energy projects can offer a stable source of income while enabling them to continue to farm. In some cases, renewables projects offer additional opportunities such as sheep grazing under solar panels, as seen in Alberta.[48] When done well, projects can minimize negative impacts to land and soil quality while enhancing biodiversity and ecosystem resilience.[49]
- Local communities: The construction and maintenance of renewable energy projects create jobs and boosts supporting industries such as hospitality services. Many host communities negotiate agreements with developers for investment in community infrastructure such as upgrading recreational facilities.[50]
- Municipalities: Tax revenue from renewable energy projects provides stable funding that can be used to support long-term planning, local infrastructure, public services, and schools. Some communities in Alberta are already receiving over a quarter of their total operating tax revenue from renewable energy projects.[51]

[47] Lia Codrington, *Power Playbook – Part 1: Preparing for renewable energy proposals (*Pembina Institute, 2025). https://www.pembina.org/pub/power-playbook

[48] Lee Hart, "Solar and sheep provide valuable farm diversification," *Alberta Farmer Express*, September 14, 2025. https://www.albertafarmexpress.ca/news/solar-and-sheep-provide-valuable-farm-diversification/

[49] Jason Wang, Guide to Renewable Energy and Battery Storage Projects (Pembina Institute, 2025). https://www.pembina.org/pub/guide-renewable-energy-battery-storage-projects

Solar Energy UK, Solar Habitat 2024: Ecological Trends on Solar Farms in the UK (2024). https://solarenergyuk.org/resource/solar-habitat-2024-ecological-trends-on-solar-farms-in-the-uk/

[50] Sophie Hartly and Elizabeth Weise, "Wind and solar aren't politically popular, but they've been profitable for 2 Indiana counties," *Indianapolis Star*, October 16, 2025. https://www.indystar.com/story/news/environment/2025/10/16/wind-and-solar-politically-unpopular-profitable-for-two-rural-indiana-counties/86586784007/
Sabin Center for Climate Change Law, "Community Benefits Agreements Database." https://climate.law.columbia.edu/content/community-benefits-agreements-database

[51] Business Renewables Centre-Canada, "Municipalities see near doubling of renewable energy tax revenues in one year," August 6, 2024. https://businessrenewables.ca/news/municipalities-see-near-doubling-renewable-energy-tax-revenues-one-year

Local community decisions on energy projects must be based on facts

It is both critical that energy projects gain the support of local communities and that Ontario grow the supply of power where and when it is needed to meet demand growth.

Ontario is ensuring that municipalities are active partners for new electricity resources, with project proponents required to receive local approval before submitting to a competitive procurement.

However, organized and targeted opposition, supplemented by disinformation campaigns supercharged by AI-based tools, can mean that local communities make decisions based on inaccurate or misleading information.[52]

As the Ontario government has made clear, local communities have both the first and the final say in energy infrastructure that is built in their communities. However, it is critical that these decisions are made with accurate information about the benefits, risks and costs associated with the choices these municipalities are making. This is a responsibility that the governments, IESO, developers, and other stakeholders share to ensure evidence-based decision making at all levels.

3.3 How Ontario can capitalize on renewable energy

The evidence is clear: the world is moving towards an electrified economy driven by the deployment of low-cost renewable energy, supported by energy storage which can be built quickly and at low costs compared to other alternatives. Ontario has the foundation to make the most of this transition. Below are several steps the province can take to fully realize the benefits, including establishing a healthy diversity of energy sources in its electricity grid.

Plan for more renewables and storage

The Ontario government and the IESO set the direction for the electricity system. Therefore, the first and most important step is for the government and IESO to increase the proportion of

[52] Rory White, "A Weaponized AI Chatbot Is Flooding Canadian City Councils with Climate Misinformation", *Desmog*, May 28, 2025. https://www.desmog.com/2025/05/28/a-weaponized-ai-chatbot-is-flooding-canadian-city-councils-with-climate-misinformation/

renewable energy and storage in their policy documents and long-term outlook given its low costs and speed to deploy. More specifically:

- The government has committed to a five-year cycle of integrated energy planning, starting in 2025 with the IEP. Both nuclear and gas have specific policy statements, but renewables and storage are only discussed in the context of competitive procurements open to all technologies. We recommend that the government establish policy direction specifically on the role of renewables and storage in the future energy system.
- The IESO is the primary body for modelling the future electricity system through its APO and its existing models underrepresent the potential of renewable energy compared to other analyses globally and locally. We recommend that future iterations of the APO's capacity expansion modelling explore and explain the reasons why renewable deployment in Ontario is expected to be out of alignment with global trends. They should also explain the potential impact of increasing renewables on meeting the government's "affordability first" directive.

Create a fair and effective public procurement process

Ontario is acquiring new energy and capacity resources through a second long-term procurement process handled by the IESO (LT2), targeting 7,500 MW of new projects over the coming years.[53] However, there are barriers to renewables participating in this process:

- For the first time, municipalities are being asked to receive and evaluate a potentially large number of energy development proposals and grant their support to those that are deserving. Municipalities have had to design and implement the proper procedures to do so, all while including community engagement in the process, and there have been a few common challenges that have made it harder for them to grant their support. For further information, see our series of guides for municipalities that supplement the IESO's guidance, along with recommendations for the IESO for future procurement rounds developed in collaboration with municipal staff.[54]

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[53] Ontario Energy and Electrification, "Ontario Expands Largest Competitive Energy Procurement in Province's History," media release, December 11, 2024. https://news.ontario.ca/en/release/1005479/ontario-expands-largest-competitive-energy-procurement-in-provinces-history
Note: the 7,500 MW target is flexible based on system need, so the actual procured number may be lower or higher depending on the mix of technologies that are chosen.

[54] Lia Codrington, *Power Playbook* (Pembina Institute, 2025). https://www.pembina.org/pub/power-playbook

Lia Codrington, "Optimizing the municipal support process for Ontario's energy projects," *Pembina Institute*, September 11, 2025. https://www.pembina.org/blog/optimizing-municipal-support-process-ontarios-energy-projects

IESO, "Long-Term RFP: Community Engagement". https://www.ieso.ca/Sector-Participants/Engagement-Initiatives/Engagements/Long-Term-RFP-Community-Engagement

- The procurement is stated as "technology-agnostic," but there are core design decisions that do not deliver a truly balanced procurement. This includes:
  - natural gas generators being reimbursed for 75% of the gas network upgrades they would require,
  - banning only solar projects from prime agricultural land, and
  - having a minimum expectation that all capacity projects deliver eight hours of continuous power — double the four-hour level which was required in the last procurement where energy storage systems were highly successful.[55] .[56]

We recommend that the province create a fair and effective procurement process, sending the message that Ontario is open for renewables to compete fairly. By doing so, the province can unlock new generation that can be built quickly and affordably to meeting growing demands while growing its domestic supply chain opportunities. It can also avoid exposure to a volatile global gas market, in the case of gas plants, and the likely delays and cost overruns associated with nuclear power plants.

Enable private sector procurement

Competitive auctions like the LT2 process are globally the main procurement mechanism for utility-scale renewables, representing 60% of additions expected for the rest of the decade, but they are not the only way that renewables projects get built. Market-based mechanisms, including corporate power purchase agreements, represent another 28% of the globally forecasted renewables deployment in the coming years, and in the United States account for more than half of expected growth.[57] Importantly, projects built under a market-based mechanism deliver the same economic benefits to rural landowners, local businesses and municipalities as publicly procured projects. Market-based mechanisms also complement public procurements like the LT2 process.

Association of Municipalities of Ontario, "AMO's Guidance Resources for Electricity Procurements". https://www.amo.on.ca/policy/land-use-planning-resources-and-climate-change/amos-guidance-resources-electricity

[55] IESO, Long-Term 1 RFP and Expedited Process. https://www.ieso.ca/Sector-Participants/Resource-Acquisition-and-Contracts/Long-Term-RFP-and-Expedited-Process

[56] IESO, *Long-term 2 Capacity Services (Window 1) Request for Proposals* (2025). https://www.ieso.ca/-/media/Files/IESO/Document-Library/long-term-rfp/capacity/LT2c-1-20250911-RFP-Consolidated-with-Addendum-1-and-2.pdf

Ontario Energy and Electrification, "Province Launches Largest Competitive Energy Procurement in Ontario History," media release, August 28, 2024. https://news.ontario.ca/en/release/1004981/province-launches-largest-competitive-energy-procurement-in-ontario-history

[57] IEA, *Renewables 2025: Analysis and Forecasts to 2030* (2025), 53–54. https://www.iea.org/reports/renewables-2025

Ontario companies are hungry to purchase clean power, as found in a recent analysis by the Business Renewables Centre–Canada. Commitments by the largest 100 companies in Canada indicated a total of 4.2 GW of demand for new renewable energy projects between now and 2040, the highest of any province in Canada. Over half of this demand (2.5 GW) is needed by 2030, highlighting an immediate opportunity for project development and investment.[58]

Current regulations do not permit the direct corporate procurement of electricity projects in Ontario beyond certain large energy consumers.[59] This means that private investors may look to other North American jurisdictions to fulfil their needs. We recommend that Ontario reform its regulatory framework to quickly remove this barrier and unleash corporate investment in renewables projects.

[58] Business Renewables Centre-Canada, *From Pledge to Power: Translating ESG Goals into Renewable Energy Demand* (2025). https://businessrenewables.ca/resource/pledge-power

[59] IESO, "Corporate Power Purchase Agreements (C-PPAs) for ICI Participants." https://www.ieso.ca/Sector-Participants/Settlements/Corporate-Power-Purchase-Agreements-for-ICI-Participants

Appendix A. Figure references

Figure 1. Demand growth drivers in Ontario

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Figure 2. Modelled evolution of Ontario's electricity generation mix (2025–2050)

IESO, *Annual Planning Outlook (APO): Capacity Expansion Scenario, Costs, and Emissions* (2025), 12. Accessible at https://www.ieso.ca/Sector-Participants/Planning-and-Forecasting/Annual-Planning-Outlook under the heading "2025 Modules, Methodology, and Supplementary Data."

Figure 3. Modelled share of gas generation in Ontario (2016–2050)

IESO, "Generator Output by Fuel Type Monthly Report." https://reports-public.ieso.ca/public/GenOutputbyFuelMonthly/

IESO, *APO: Capacity Expansion Scenario, Costs, and Emissions*, 12.

Ontario Ministry of Energy and Electrification, "Ontario Energy Report Supporting Data," June 4, 2024. https://data.ontario.ca/dataset/ontario-energy-report-supporting-data

Figure 4. Projected growth in nuclear generation (2026–2050)

IESO, *APO: Capacity Expansion Scenario, Costs, and Emissions,* 12.

Figure 5. Planned nuclear generation and new nuclear buildout

Government of Ontario, *Energy for Generations*, 53.

IESO, *APO: Capacity Expansion Scenario, Costs, and Emissions*.

Figure 6. Potential delay and cost overruns for Ontario's new SMR project, based on global projects delivered over the past six years

International Energy Agency, *The Path to a New Era for Nuclear Energy,* (2025), 22–24. https://www.iea.org/reports/the-path-to-a-new-era-for-nuclear-energy

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Figure 7. Supply shortfall caused by a potential six-year delay in nuclear buildout

IESO, *APO: Capacity Expansion Scenario, Costs, and Emissions,* 12.

Figure 8. Dependence on gas generation from delayed nuclear buildout

IESO, "Generator Output by Fuel Type Monthly Report."

IESO, *APO: Capacity Expansion Scenario, Costs, and Emissions*, 12.

Ontario Ministry of Energy, "Ontario Energy Report Supporting Data."

Figure 9. IESO's annual planning outlook for wind and solar generation vs. scenarios by other major entities

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Figure 10. Comparison of flexible capacity in electricity systems across the globe

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