

May 14, 2023

*Submitted via Environmental Registry of Ontario (ERO) Posting*

**RE: ERO Number: 019-6647  
IESO Pathways to Decarbonization Study  
Capital Power Corporation (Capital Power) Submission**

To Whom it May Concern:

Capital Power is pleased to have this opportunity to provide comments to the Ministry of Energy, (the Ministry) on the IESO's Pathways to Decarbonization Report (P2D Report) and specifically, the IESO's "no-regret" recommendations for Ontario's electricity system and market.

Capital Power is a growth-oriented North American wholesale power producer, publicly traded (TSX: CPX), and headquartered in Edmonton, Alberta. Powered by our commitment to creating a brighter world, we develop, acquire, own, and operate industry leading, utility-scale generation facilities using a variety of energy sources. Our strategy is driven by our core objectives of growing a balanced portfolio of core technologies, decarbonizing our fleet through investment in emission reductions and related technologies, and empowering our people and communities. We are committed to thoughtful, ongoing engagement with Indigenous communities, and we value the perspective we gain through this work and through engagement with our stakeholders. Our strategy is designed to have us achieve both our growth targets and our accelerated goal of being net zero by 2045. Currently, we own over 7,500 megawatts (MW) of power generation capacity at 29 facilities across North America. We own five power generation facilities in Ontario; three natural gas-fired and two wind facilities, representing roughly 1,300 MW of capacity. Our facilities in Ontario are listed below:

- 875 MW Goreway Power Station <sup>1</sup>
- 200 MW York Energy Centre
- 84 MW East Windsor Cogeneration Centre
- 105 MW Port Dover & Nanticoke Wind
- 40 MW Kingsbridge 1 Wind

In preparing and publishing its P2D Report, the IESO took an important step towards identifying technological pathways for achieving net-zero emissions in Ontario. Through its analysis of the both the Moratorium scenario and Pathways scenario, the IESO identified that (i) natural gas-fired generation would be required until at least 2035 to ensure ongoing system reliability, and (ii) that "a carefully governed and orderly approach to the energy transition will be necessary to maintain reliability and

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<sup>1</sup> In May 2023, we were awarded a contract for a 40 MW efficiency upgrade expansion at our Goreway facility, which will bring total installed capacity at Goreway to 915 MW.

manage costs.”<sup>2</sup> With respect to the role of natural gas-fired generation, the P2D Report built upon the IESO’s *Resource Eligibility Interim Report* and its finding that over the near term, natural gas-fired generation would be needed to avoid emergency actions such as conservation appeals and rotating blackouts to stabilize the grid.<sup>3</sup>

Under the Moratorium scenario in its P2D Report, the IESO found that a moratorium on additional natural gas-fired generation would not be feasible until 2027, following the planned 2023-2024 IESO procurements of additional natural gas-fired generation capacity. Under this scenario, approximately \$26 billion of investment in new infrastructure would be needed by 2035, leading to a \$1.9 billion, or eight percent net increase in annual total system costs and an eight Mt Co2e decrease in emissions by 2035.

Under the Pathways scenario, which modelled the technology pathway to achieving a zero emissions grid in Ontario by 2050, the IESO identified that between \$375 billion and \$425 billion in capital investment would be required, contributing to a 20-30% increase in current unit rates. Importantly, the Pathways scenario did not consider operability of the grid in 2050, nor did it consider adequacy of supply for the years between 2022 and 2050. Under both scenarios, the IESO used cost as a key determining factor for guiding its supply mix assumptions.

The IESO has acknowledged that while the findings set out in P2D do not represent an integrated system plan, they do identify challenges with respect to the costs and complexity of the transition. In the IESO’s words, the “sheer scope and magnitude” of work and investment required under both scenarios informed its recommendations for “no regret” actions. These recommendations and the entire P2D Report help establish a foundation for the work of the Electrification and Energy Transition Panel (“the Panel”), and the Ontario government’s Cost-Effective Pathways Study both of which will be undertaken in 2023.<sup>4</sup>

We believe that thoughtful consideration of the IESO’s “no-regret” actions requires a regard for potential costs, technical feasibility, and impacts on economy-wide emissions. It is in this context that we are pleased to provide the following four Core Recommendations, the details of which are included in our submission:

### **Capital Power Core Recommendations**

1. Continue to leverage existing infrastructure needed to maintain system reliability.
2. Continue the Ministry’s work of examining the regulatory framework that exists in Ontario, and implement key structural reforms needed to support ongoing competitive, private sector investment in Ontario.
3. Work across governments and jurisdictions to leverage opportunities and strengths.
4. Leverage competition and competitive pressures to drive innovation in the electricity and energy sectors.

The Appendix to our submission includes our responses to the questions included in the ERO Posting.

We appreciate the opportunity to provide comments on this important initiative and we look forward to continuing our work with and alongside the Ministry, the IESO and the Panel. We welcome the opportunity

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<sup>2</sup> IESO P2D Report at page 1.

<sup>3</sup> IESO Resource Eligibility Interim Report, available at <https://www.ieso.ca/-/media/Files/IESO/Document-Library/resource-eligibility/resource-eligibility-interim-report.ashx>. See page 11.

<sup>4</sup> IESO P2D Report at page 1.

to meet with the Ministry to share our views and answer any questions you may have regarding this submission. Please feel free to contact me directly at 647.641.4305 or [ecoyle@capitalpower.com](mailto:ecoyle@capitalpower.com).

Sincerely,



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## Capital Power Core Recommendations

### 1. Continue to leverage existing infrastructure needed to maintain system reliability.

Actions required to achieve net zero have the potential to transform Ontario's economy, but the effective governance of costs and prudent planning that leverages existing assets will be required to do so while maintaining reliability, supporting affordability, and preserving investor confidence. To minimize the impact of unintended consequences, sound public policy requires informed decisions with respect to existing resources, including natural gas-fired generation, which has been repeatedly identified by the IESO as necessary to support near term reliability in Ontario.<sup>5</sup> The importance of natural gas in ensuring the security of system is also reflected in the federal government's draft *Clean Energy Regulation Frame* which recognized a long-term role for natural gas in electricity systems given its importance in supporting reliability in some provincial electricity systems.

Opportunities to leverage previous investments are not limited to natural gas-fired generation. Ontario should also seek to optimize the value of existing renewable energy sites through repowering and hybrid technology configurations. The majority of existing renewable energy facilities are locationally advantaged in relation to transmission infrastructure, and policymakers should direct the use of revenue mechanisms for repowering these facilities through IESO procurements. Permitting challenges for new renewable energy facilities and associated new transmission remain one of the most significant hurdles to project development and delivery. Tailored permitting processes and contracting mechanisms can encourage reinvestment in existing facilities, which are well positioned to capture energy from wind and solar and deliver it to customers.

### 2. Continue the Ministry's work of examining the regulatory framework that exists in Ontario, and implement key structural reforms needed to support ongoing competitive, private sector investment in Ontario.

In 2021, the Ministry requested feedback from stakeholders with respect to its Long-Term Energy Plan framework. Capital Power provided the Ministry with the following six recommendations for improving Ontario's approach to resource procurement:

- Design and implement a framework for resource planning and procurement that: (i) relies on independent agency-led all-source integrated resource plans ("IRPs") and competitive procurement processes resulting in the award of long-term commercial contracts; (ii) honors existing contracts and leverages existing investments; and (iii) evolves the IESO-administered market ("IAM") as the market for the reliable, efficient, and competitive dispatch of resources.
- Establish the IESO as the independent agency responsible for developing an all-source IRP, administering competitive procurement of long-term contracts, and evolving the IAM in accordance with legislated purposes.
- Enhance the OEB's mandate to include responsibility for review and approval of the IESO's all-source IRP and competitive procurement in accordance with best practices and the policy direction set by government.
- Enhance the OEB's existing oversight by: (i) strengthening processes governing market rule amendments; and (ii) consolidating market monitoring, compliance, and enforcement functions under the OEB.

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<sup>5</sup> See IESO P2D Report, IESO Resource Eligibility Interim Report, and *Decarbonization and Ontario's Electricity Sector: Assessing the impacts of phasing out natural gas generation by 2030*, available at <https://www.ieso.ca/-/media/Files/IESO/Document-Library/gas-phase-out/Decarbonization-and-Ontarios-Electricity-System.ashx>

- Ensure clear and legislatively enshrined purposes and principles to set government policy direction and govern the actions of independent agencies in enacting all-source IRP and competitive procurement processes developed through meaningful stakeholder engagement.
- Ensure the necessary conditions for effective competition by capping government-owned investment in the sector.

In the time since 2021, we have been pleased to see the IESO implement competitive procurement processes for existing and new resources. This was a critical step towards securing competitively priced electricity supply for Ontarians. During the same period, net-zero goals have been materially advanced against a backdrop of shifting geopolitical risk and macroeconomic conditions driving inflation and straining supply chains across sectors. The size and scale of the investment required to achieve net-zero goals will require significant deployment of private and public capital, and decisions by policymakers with respect to system expansion and technology integration will impact system costs for years to come. To ensure responsible governance of costs and expenditures, and incentivize efficient capital allocation, legislative, regulatory, and policy frameworks must facilitate effective oversight of government-directed investment and IESO-led procurement. It is understood that the Electricity and Energy Transformation Panel (“the Panel”) will consider oversight mechanisms as part of its review of Ontario’s policy framework, and provide its recommendations to the Minister of Energy.<sup>6</sup> We look forward to supporting the Panel’s mandate and providing feedback through its stakeholder engagement meetings.

### **3. Encourage and support coordination between levels of governments in a way that leverages Canada’s diverse resources, while respecting jurisdictional differences.**

Policy frameworks must allow for local needs and concerns to inform local decisions. Provincial electricity supply systems and networks have been developed under the authority and oversight of provincial agencies which have proved best suited to understand, approve, and direct infrastructure that meets regional needs and accommodates regional differences in resource availability. Regional differences are also reflected in jurisdictional choices respecting market structures best suited to meet the needs of provincial economies.

The relevance of these differences has been noted by Michael Cleland and Monica Gattinger:

[I]n all energy systems, precedence must be given to underlying energy requirements for system integrity and the political, social, and economic requirements for affordability and competitiveness. Failure to account clearly for these realities will create profound risks of failure.<sup>7</sup>

Jurisdictional differences do not preclude interjurisdictional co-operation. The scale of investment required to transition energy systems will necessitate co-operation and coordination across federal, provincial, and municipal levels of government. Public support for new projects will be required by permitting processes, and fiscal programs will be most impactful if government support is directed to technologies that can leverage existing systems and be granted social

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<sup>6</sup> In November 2022, Ontario’s Auditor General recommended a number of changes to the regulatory framework that would support effective oversight of energy planning. See *Value-for-Money Audit: Ontario Energy Board: Electricity Oversight and Consumer Protection*, available at:

[https://www.auditor.on.ca/en/content/annualreports/arreports/en22/AR\\_ElectricitySectorOEB\\_en22.pdf](https://www.auditor.on.ca/en/content/annualreports/arreports/en22/AR_ElectricitySectorOEB_en22.pdf).

<sup>7</sup> Cleland, Michael and Gattinger, Monica, *Net Zero: An International Review of Energy Delivery System Policy and Regulation for Canadian Energy Decision Makers*, available at [https://www.electricity.ca/files/reports/english/Net-Zero-Intl-Regulation-and-Policymaking-Report\\_Gattinger-Assoc\\_April-2022.pdf](https://www.electricity.ca/files/reports/english/Net-Zero-Intl-Regulation-and-Policymaking-Report_Gattinger-Assoc_April-2022.pdf). See page 26.

license. Capital costs are but one constraint impacting the commercialization of technology and without public support from stakeholders and Indigenous communities, technology can remain undeployable.<sup>8</sup>

Co-operative efforts between governments and jurisdictions should drive and facilitate flexibility with respect to supply mixes, recognizing there is no “one-size-fits-all” approach that will succeed in Canada. The energy systems of provinces and communities will continue to be guided by local and provincial economies, and collaboration from government actors will be needed to advance net-zero targets, leverage existing competitive advantages, and foster future innovation.

#### **4. Leverage competition to drive innovation in the electricity industry.**

The magnitude of the capital requirements to achieve net-zero targets while meeting demand growth driven by electrification will necessitate private sector investment. Many of the technologies required to achieve net zero are emergent, and commercialization will require conditions that support system-wide innovation. This is unlikely to occur without conditions that also support competition. We recognize that the intense capital requirements of energy systems, at scale, require tailored market interventions to ensure that the interests of consumers are protected. However, competition remains the best policy tool for fostering advancements in cost-saving innovation.

In the years since Ontario liberalized its electricity market, the share of resources owned by Crown corporations has increased materially. While public ownership may in some cases serve to advance strategic industries, it is competitive pressures that discipline costs and drive innovation over the long run. Accordingly, the importance of preserving investor confidence in the private sector should be factored into any consideration of policies relating to Crown ownership of resources. Such policies should be developed alongside regulatory mechanisms that ensure proposed investments from crown corporations remain subject to competitive pressures, or ensure such proposed investments relate to technologies or opportunities where private sector investment cannot reasonably be expected. Proposed investments from crown corporations not subject to competitive processes should be assessed through an independent and transparent cost-benefit analysis.

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<sup>8</sup> See Cembalest, Michael, *Growing Pains: Renewable Energy in Transition*, JP Morgan 13<sup>th</sup> Annual Energy Paper (JPM Energy Report) at page 2, and page 10. Available at <https://assets.ipmprivatebank.com/content/dam/jpm-wm-aem/campaign/energy-paper-13/growing-pains-renewable-transition-in-adolescence.pdf>.

## Appendix - Capital Power Responses to ERO Posting Questions

1. *What are your thoughts on the appropriate regulatory requirements to achieve accelerated infrastructure buildout? Do you have specific ideas on how to streamline these processes?*

Accelerated infrastructure buildout will require an effective framework for forecasting, resource planning, procurement, permitting, and construction. At the same time, processes to facilitate consultation with Indigenous communities and stakeholder engagement must include safeguards that preserve opportunities for meaningful participation. These opportunities are critical for hearing stakeholder concerns, establishing public support, and securing social license to operate facilities in communities. To preserve opportunities for participation and engagement, while accelerating infrastructure buildout, policymakers should look to drive efficiencies across and between the IESO, the OEB and the MECP, as described below:

- **IESO procurement schedules need to anticipate inter-agency dependencies and capacity, as well as seasonal and market demands on labour and supply chains.** Through participation in the IESO's E-LT1 process, we have observed that one of the most significant risks impacting development schedules is the time spent from the date when a need is communicated by the IESO to the market, the conclusion of the RFP process, and the IESO's contracted commercial operation dates ("COD"). Given Ontario's current framework, it would be unusual for grid-connected power projects to be permitted and developed without a supply contract with the IESO, which highlights the importance of IESO procurement processes in creating demand on agency resources, but also opportunities to optimize the existing regulatory approval frameworks. Qualified Applicants and successful proponents in an IESO-led RFP process should be prioritized in the permitting process, at the pre-consultation stage and during application review. Where the IESO has identified an expedited process (e.g., E-LT1) prioritization should be given to those proponents participating in the expedited process, and both IESO contracts and timelines need to reasonably facilitate and incentivize development activity.
  - **Protracted permitting timelines are exacerbated by ad hoc, inefficient, and siloed planning processes between the IESO and the OEB. To address this, recommended actions are:**
    - Increase MECP resources. One of the major constraints leading to protracted permitting timelines is insufficient human resources. A large number of streamlined and Class EA processes, as well as permitting, will need to be undertaken in a short period of time to meet IESO schedule requirements. IESO, MECP and OEB should be required to coordinate and ensure internal resources can accommodate the volume of expected approvals in advance of the submission dates.
    - Shorten the MECP one-year service standard for Environmental Compliance Approvals or ensure resources can meet the one-year service standard.
    - Ensure resources, systems, and processes are designed to provide timely support from Ministry of Energy and/or MECP related to identification of potentially affected or interested Indigenous communities. We note that the Ministry of Energy will provide a list of interested Indigenous groups to proponents undertaking greenfield developments following the Class EA process. Proponents following the Environmental Screening Process should also be provided with this information by Ministry of Energy.
2. *What are your expectations for early engagement and public or Indigenous consultations regarding the planning and siting of new generation and storage facilities?*

Capital Power has no comment on this issue at this time.

3. *Do you believe additional investment in clean energy resources should be made in the short term to reduce the energy production of natural gas plants, even if this will increase costs to the electricity system and ratepayers? What are your expectations for the total cost of energy to customers (i.e., electricity and other fuels) as a result of electrification and fuel switching?*

Our Core Recommendations are responsive to this question. We are unaware of any credible study for Ontario's market that has not found or assumed that natural gas-fired generation would be required in 2035 and beyond. We note the study by Power Advisory LLC that was commissioned by the Atmospheric Fund in 2022 considered additional pathways to decarbonization and also projected an ongoing role for natural gas-fired generation under each of the scenarios selected.

When comparing the costs and benefits of renewable energy and gas-fired generation, policymakers need to consider not just the Levelized Cost of Energy ("LCOE") of a specific technology, but the "all-in" or delivered cost of the investment. Michael Cembalest of J.P. Morgan has published extensively on the important limits of LCOE as measure of resource cost, finding that LCOE "is a distraction if you're trying to understand total system costs of electricity" as LCOE fails to account for: (i) the need for backup power, storage and reserve margins to maintain system reliability, (ii) the value of electricity supplied at different times of the day or year, (iii) the need to overbuild wind and solar capacity to meet demand in deeply decarbonized systems.<sup>9</sup>

At this time, when establishing demand curves, all US capacity markets use gas as the most cost-effective technology able to supply capacity to meet reserve margin requirements, as the competitiveness of intermittent resources is diminished due to their low contribution to reliability as measured by commonly accepted metrics. Reliability challenges are expected to become more pronounced as the system transitions, with periods of severe stress expected during extreme weather events when intermittent resources cannot produce needed dispatchable, fuel-assured electricity.

Capital Power has not modelled the expected total cost of energy to customers in Ontario but based on published analysis and findings from other jurisdictions, we understand the costs and technical feasibility of replacing natural gas-fired generation in the short term to remain significant challenges. For example:

- PJM has modelled the expected replacement MWs needed from renewable resources to replace 1 MW of natural gas-fired generation and found the following to be average values: Solar – 5.2 MW; Onshore Wind – 14.0 MW; Offshore Wind – 3.9 MW.
- As renewable penetration increases, the effective load carrying capacity of standalone renewable resources decreases due to portfolio effects of increased intermittent renewable supply on the system. For an example of how this has been modelled in other markets, see Energy Transition in PJM<sup>10</sup> and see MISO's 2022 Regional Resource Assessment.<sup>11</sup>
- Accurate cost forecasts require reliable demand forecasts. Along with the electrification of industrial demand, digitalization will also be a key driver of load growth and demands for computing power required to fuel technological adoption will need to be forecasted. For instance, policymakers will need to consider whether Ontario is expected to see growth in data centers similar to that in PJM, which has observed a 300% increase in data center growth. It's expected that increases in digital technology and machine learning will, over time, increase the efficiency of energy consumption but policymakers will

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<sup>9</sup> JPM Energy Report.

<sup>10</sup> Energy Transition in PJM: Resource Retirements, Replacements & Risks Energy Transition in PJM, available at <https://www.pjm.com/-/media/library/reports-notice/special-reports/2023/energy-transition-in-pjm-resource-retirements-replacements-and-risks.ashx>. See page 14.

<sup>11</sup> Available at:

<https://www.misoenergy.org/planning/policystudies/RRA/#nt=%2Frratype%3AReport&t=10&p=0&s=FileName&sd=desc>



still be challenged to ensure sufficient supply of affordable electricity to fuel energy intensive computing processes, alongside broader economic and industrial growth.

4. *Are you concerned with potential cost impacts associated with the investments needed? Do you have any specific ideas on how to reduce costs of new clean electricity infrastructure?*

The cost impacts associated with achieving net zero are a significant concern and must be a key consideration, along with reliability. Our Core Recommendations address how to reduce the costs of new clean electricity infrastructure, which can be done through leveraging existing resources and ensuring that the framework incentivizes the development of competitive technologies and innovative commercialization pathways.

5. *Do you have any comments or concerns regarding the development and adoption of hydrogen or other low-carbon fuels for use in electricity generation? What are your thoughts on balancing the need for investments in these emerging technologies and potential cost increases for electricity consumers?*

We believe that hydrogen has potential in the future to be used as a fuel source for electricity generation and we support Ontario's efforts to explore the potential of hydrogen through its Hydrogen Innovation Fund, and Low-Carbon Hydrogen Strategy. Major infrastructure investments will be required to produce, transport, and store H<sub>2</sub> given its unique chemical properties including its low energy density on a volumetric basis. Additionally, major turbine OEMs don't expect combustion turbines of being capable of burning 100% H<sub>2</sub> until 2030, and H<sub>2</sub> capability will likely require upgrades to existing natural gas-fired combustion turbines. Technical and commercial challenges are expected to persist, but with coordination across stakeholders we believe that private sector innovation could be a catalyst for lowering costs and developing systems, partnerships, and networks that can support the production and consumption of H<sub>2</sub>.

Ultimately, the use of H<sub>2</sub> may not be technically or economically viable for all natural gas resources. As such, the IESO should also consider the use of negative abatement solutions such as direct air capture (DAC) to offset emissions through carbon removal from the atmosphere. As outlined by the UN International Panel on Climate Change (IPCC) and the Canada Healthy Environment and Healthy Economy (HEHE) plan, negative abatement solutions are required to reach net zero. DAC is a maturing technology whose technical viability has been proven and will scale over time. It is supported by a federal investment tax credit (ITC) and its costs are expected to decline over time. DAC has the potential to be a cost-effective solution whose carbon removal offsets can then be paired with existing natural gas resources to achieve net-zero emissions while preserving affordability and reliability for electricity consumers. A regulatory framework would need to be put in place to enable carbon removal offsets, and we expect the government of Canada's work in this respect to provide a helpful model that can be adopted and adapted to the provinces.

6. *Following the end of the current 2021-2024 energy efficiency framework how could energy efficiency programs be enhanced to help meet electricity system needs and how should this programming be targeted to better address changing system needs as Ontario's demand forecast and electrification levels grow?*

Capital Power has no comment on this issue at this time.

7. *A recently released assessment estimates that there may be potential to develop 3,000 to 4,000 megawatts of new hydroelectric generation capacity in northern Ontario and 1,000 megawatts in southern Ontario. What are your thoughts on the potential for development of new hydroelectric generation in Ontario by private-, Indigenous- and government-owned developers? While the capital costs for hydroelectric generation may be higher than nuclear, wind, solar, and natural gas, do you support investing in large scale hydroelectric assets that may operate for over a hundred years?*

We are supportive of Ontario's initiatives to encourage and facilitate investment from Indigenous and government owned developers. The development of large-scale hydro facilities and necessary transmission will require frameworks that support public consultation and stakeholder engagement. As we have noted above, capital costs are but one consideration when considering the system costs of investment. Accordingly, we don't believe this question can be answered solely on the basis of capital cost depreciation. Answering this question

will require an understanding of the cost impact to ratepayers, taxpayers, and the natural environment. Regulatory agencies should be resourced, and frameworks developed to support evidence-based assessments of costs and benefits flowing from strategic energy planning options.

8. *Transmission will also be required to balance intermittent supply with dispatchable supply (such as natural gas and energy storage) and meet demand in regions with retiring assets. What steps should be taken to ensure that transmission corridors can be preserved, and lines can be built as quickly and cost effectively as possible?*

Capital Power has no comments on this issue at this time.