December 31, 2024

BY EMAIL: [redacted]

[redacted]

Lesley Gallinger
CEO, Independent Electricity System Operator (IESO)

Jana Mosley
CEO, Toronto Hydro

Dear Ms. Gallinger & Ms. Mosley:

Re: Submissions with respect to your December 5, 2024 Webinar re: Toronto's Integrated Regional Resource Plan

I am writing to provide you with the Ontario Clean Air Alliance's (OCAA) submissions with respect to your proposed Integrated Regional Resource Plan (IRRP) to meet Toronto's electricity needs for the next 20 years, as outlined during your December 5, 2024 webinar.

1. **Phasing Out the Portlands gas plant by 2035**

On June 26, 2024, the City of Toronto passed a resolution requesting the IESO and Toronto Hydro to develop an IRRP that will phase-out: "gas-fired electricity generation at the Portlands Energy Centre by 2035, except in extreme, exceptional and emergency circumstances totalling less than 88 hours per year."

The OCAA supports the City of Toronto's request.

The OCAA also recommends that the IRRP include interim gas power reduction targets for the Portlands Energy Centre for 2030, 2031, 2032, 2033 and 2034.

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2. Rapidly increasing local renewable energy and storage

The June 26, 2024 City of Toronto resolution also requests that the IESO and Toronto Hydro develop an IRRP that will: "rapidly increase local renewable energy and storage".

Unfortunately, you are proposing to exclude Lake Ontario wind power and EV batteries from your IRPP despite the fact that these two options could make very substantial contributions towards phasing-out the Portlands gas plant by 2035 and providing Toronto with a reliable and affordable supply of power.

a) Lake Ontario wind power

According to the IESO, it will **not** analyze the costs and benefits of investing in Lake Ontario wind power to phase-out the Portlands gas plant due to the fact that in 2011 the McGuinty Government issued a press release announcing a moratorium on offshore wind power.

The IESO's rationale for refusing to analyze the costs and benefits of Lake Ontario wind power is without merit for numerous reasons.

First, the McGuinty Government's news release is not legally-binding. There is no Government of Ontario regulation that prohibits wind power in our Great Lakes.

Second, the rationale for the 2011 moratorium was to permit "further scientific research" so that future decisions could be based "on the best available scientific data."[1] The Ontario Ministry of Natural Resources did subsequently undertake a couple of studies on the impacts of offshore wind farms on fish and fish habitat. The reports' authors, Sarah Niienhuis and Erin Dunlop, found that offshore wind projects can be implemented with minimal aquatic impacts.[2]

Third, in 2022, the IESO released its *Pathways to Decarbonization* report, which analyzed the costs and benefits of phasing-out all of Ontario's gas plants. The *Pathways* analysis assumed that Ontario would install 2,500 megawatts (MW) of wind power in our Great Lakes.[3] If the IESO can analyze the costs and benefits of Great Lakes wind power to help phase-out all of Ontario's gas plants, it can also analyze the costs and benefits of Lake Ontario wind power to help phase-out the Portlands gas plant.

It does not make sense to refuse to analyze an option that could make a large contribution to phasing-out Portlands and meeting Toronto's future electricity needs.

The Portlands gas plant has a capacity of 550 MW. Next door to Portlands is the shuttered Hearn gas plant which had a capacity of 1,200 MW.

[1] Government of Ontario News Release, "Ontario Rules Out Offshore Wind Projects", (February 11, 2011).
[2] https: //www.ontario.ca/page/research-related-renewable-energy-projects
[3] *Pathways to Decarbonization: Appendix B*, page 29.

A 550 MW to 1,200 MW Lake Ontario wind farm would produce 2.4 to 5.2 terawatt-hours (TWh) of electricity per year[4], which is up to 2.5 times the output of the Portlands gas plant in 2023 (2.1 TWh)[5].

These wind farms would have lakebed footprints of approximately 1.1 to 2.4 km^2 [6]. The total surface area of the Canadian section of Lake Ontario is 10,000 km^2.

The OCAA recommends that the IESO and Toronto Hydro assess the costs and benefits of investing in Lake Ontario offshore wind power to help phase-out the Portlands gas plant and meet Toronto's future electricity needs.

b) EV Batteries

When combined with bi-directional chargers, electric vehicle (EV) batteries can provide power back to the grid during peak demand hours.

In the U.K., Octopus Energy provides free EV charging to EV owners who agree to provide power back to the grid during peak demand hours.

According to a September 2024 City of Toronto forecast, Toronto will have 74,632 to 343,789 EVs by 2030. Assuming EV bi-directional chargers with a capacity of 9.6 kW[7], these EVs could provide up to 3,300 MW of power to the grid during peak demand hours. That is, they have the potential to provide more power to the electricity grid than the Portlands gas plant.

Although many EVs do not have bi-directional capabilities today, more and more have that capability every year, and it is likely that there will be even more EVs by 2035 and that an even greater proportion will have bi-directional capabilities. All of Toronto's 1.1 million passenger vehicles will eventually be EVs with bi-directional capabilities, and so investments in the technology now will bring about even greater benefits in the future.

[4] According to the IESO, offshore wind farms will have a 50% annual capacity utilization rate. See *Pathways to Decarbonization: Appendix B*, page 29.
[5] Email to Jack Gibbons, OCAA from Stephen Smith, Environmental Specialist, Atura Power (April 29, 2024).
[6] Assuming each wind turbine has a capacity of 5 MW and a footprint of 100 square metres.
[7] The Ford F-150 EV's bi-directional charger has a capacity of 9.6 kW.

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It is interesting to note that Toronto was home to one of the largest early vehicle-to-grid pilot programs (in which IESO partnered), which delivered high driver participation rates (90%) and had 97% availability of vehicles during relevant peak demand periods.[8]

Nevertheless, according to the IESO it will not analyze the costs and benefits of using EV batteries to provide power back to the grid because of uncertainty with respect to their input assumptions. This is not a valid reason to refuse to assess the potential benefits of EVs and bi-directional charging since there is also uncertainty with respect to all the other options that can potentially meet our electricity needs during the next 20 years.

The OCAA recommends that the IESO and Toronto Hydro assess the costs and benefits of paying Toronto's EV owners to provide power back to the grid during peak demand hours to help phase-out the Portlands gas plant and meet Toronto's future electricity needs.

3. Maximize cost-effective energy efficiency

The June 26, 2024 City of Toronto resolution also requests that the IESO and Toronto Hydro develop an IRRP that maximizes cost-effective energy efficiency.

According to the IESO and Toronto Hydro, they will determine Toronto's cost-effective energy efficiency potential by comparing: a) the cost of saving a kilowatt-hour (kWh) by investing in energy efficiency measures; to b) the cost per kWh of new electricity supply. The higher the cost of new electricity supply, the greater our cost-effective energy potential and vice versa.

According to the IESO's *2024 Annual Planning Outlook*, Ontario's incremental electricity supply needs will be met by a combination of nuclear, gas, wind, water, solar and imports. Specifically, according to the IES0, 67% of Ontario's new electricity supply (kWh) between 2025 and 2044 will be nuclear.[9] Furthermore, according to the IESO, the cost of new nuclear supply is 2 to 3 times more expensive than new wind and solar generation.[10]

a) Underestimating the cost of new electricity supply

Nevertheless, the IESO is proposing to calculate the cost effectiveness of energy efficiency measures by falsely assuming that they cannot reduce the need for new nuclear generation. That is, the IESO is proposing to assume that energy efficiency measures can only reduce the need for lower cost electricity supply options (e.g., renewables, gas and imports).[11] Needless to say, if this false assumption is not corrected, the IESO's and Toronto Hydro's analysis will dramatically

[8] https://peakpowerenergy.com/project/peak-drive-pilot-project/
[9] IESO, *2024 Annual Planning Outlook,* Data Tables, Figure 27.
[10] IESO, *2024 Annual Planning Outlook: Resource Costs and Trends*, page 5.
[11] See the "Avoided Cost" and "Avoided Cost – Marginal Resource Data" files in the 2024 Modules, Methodology, and Supplementary Data subsection of the *2024 Annual Planning Outlook* webpage.

underestimate the potential for energy efficiency investments to lower our electricity bills by reducing the need for high-cost new nuclear reactors.

The OCAA recommends that the IESO and Toronto Hydro quantify Toronto's cost-effective energy efficiency potential by comparing the costs of energy efficiency measures to the costs of all of Ontario's proposed new electricity supply options, including high-cost new nuclear reactors.

Similarly, the OCAA recommends that the IESO and Toronto Hydro quantify Toronto's cost-effective local renewable energy and storage potential by comparing their costs to the costs of all of Ontario's proposed new electricity supply options, including high-cost new nuclear reactors.

b) Underestimating the Cost of New Nuclear Reactors

Lowballing capital cost estimate

To add insult to injury, the IESO's *2024 Annual Planning Outlook* also includes low-ball estimates of the cost of new nuclear reactors. Specifically, the IESO's capital cost forecast for new nuclear generation is 30% lower than the Tennessee Valley Authority's ("overnight") estimate and 37% lower than actual cost per MW of Georgia Power's Vogtle nuclear station, which was completed in 2024.[12]

Capacity utilization forecast is not evidence-based

The IESO is also low-balling the cost per kWh of new nuclear generation by adopting optimistic assumptions about their annual capacity utilization rates that are not supported by Ontario's

[12] According to the IESO, a new nuclear reactor would have a capital cost of $13.8 million per kW. Georgia Power's 2,228 MW Vogtle nuclear plant cost 35 billion (US$) or $15.7 million per MW (US$) or $21.8 million per MW (CDN$). The Tennessee Valley Authority (TVA) is proposing to build a new nuclear reactor at Clinch River, Tennessee. According to its *Integrated Resource Plan 2025*, the overnight capital cost of the first unit would be $17.9 million per MW and $12.5 million per MW for subsequent units. Therefore a 4-unit station would have an average capital cost of $13.9 million per MW (US$) or $19.3 million per MW (CDN$). Overnight cost is the total cost of a construction project if no interest charges are incurred during construction – as if the project was completed "overnight". In fact, long-duration nuclear projects incur very significant interest charges. Therefore, their actual costs are significantly higher than their overnight costs. IESO, *2024 Annual Planning Outlook: Resource Costs and Trends,* (March 2024) page 5; Drew Kann, "New Vogtle nuclear reactor now online, completing expansion", *Atlanta Journal-Constitution,* (April 29, 2024); and TVA, *Integrated Resource Plan 2025*, (September 2024), pages E-3 and E-9.

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historical experience. Specifically, the IESO is assuming that the lifetime annual capacity utilization rates of new nuclear reactors will be 93%[13] despite the fact that the lifetime annual capacity utilization rates of Ontario's existing nuclear fleet are substantially less than 93%. In fact, according to the International Atomic Energy Agency, as of December 2023, the lifetime annual capacity utilization rates of the Pickering, Bruce and Darlington Nuclear Stations were 71.4%, 77.6% and 78.6% respectively.[14]

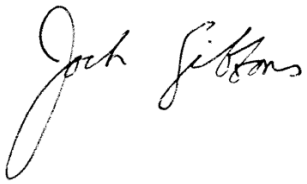
The OCAA recommends that the IESO and Toronto Hydro use unbiased, evidence-based estimates of the cost and performance of new nuclear reactors to evaluate the cost-effectiveness of energy efficiency investments and local renewable energy and storage options.

c) Evaluating all of Toronto's cost-effective energy efficiency investment opportunities

As noted above, the IESO and Toronto Hydro are proposing to quantify Toronto's energy efficiency potential by comparing the cost of saving a kWh to the cost of producing a kWh of new electricity supply. To accurately quantify Toronto's **total** cost-effective energy efficiency potential, their analysis must include **all** our energy efficiency measures that can meet our needs at a lower cost than new supply. For example, they must not underestimate our energy efficiency potential by only including energy efficiency measures that are, say, at least twice as cost-effective as new supply.

The OCAA recommends that the IESO and Toronto Hydro quantify Toronto's total cost-effective energy efficiency potential by evaluating all energy efficiency measures that can keep our lights on at a lower cost than new electricity supply.

Yours sincerely,



Jack Gibbons

Chair

[13] IESO, *Annual Planning Outlook: Resource Costs and Trends,* (March 2024), page 5.
[14] https://pris.iaea.org/PRIS/CountryStatistics/ReactorDetails.aspx?current=43