ONTARIO CLEAN AIR ALLIANCE

March 8, 2022

Via Email: [redacted]

Mr. Chuck Farmer
Vice President, Planning, Conservation and Resource Adequacy
Independent Electricity System Operator
Toronto, Ontario

Dear Mr. Farmer:

Re : Pathways to Decarbonization Study

Thank you for the opportunity to provide feedback to the IESO with respect to the scope, modelling and input assumptions of its proposed *Pathways to Decarbonization Study* as outlined in its February 24th "Pathways to Decarbonization Study" PPT presentation and its March 2nd "Assumptions for Feedback" file.

Ontario's Municipalities

As you know, thirty-two Ontario municipalities, representing almost 60% of Ontario's population, have passed resolutions requesting the Government of Ontario to phase-out gas-fired electricity generation.

Specifically, Ontario's municipalities have requested the Government of Ontario to:

1. Return the gas plants' greenhouse gas (GHG) pollution to their 2017 level ASAP; and
2. Completely phase-out gas-fired electricity generation by 2030.

The Honourable Todd Smith

We are pleased to note that Ontario's Minister of Energy, the Honourable Todd Smith, has directed the IESO to develop an achievable pathway to phase-out gas power and achieve a zero-carbon electricity grid. According to Minister Smith, the pathway should consider:

- First and foremost, the reliability of the electricity system;
- The cost to electricity ratepayers;

- The timeline on which this would be achievable.

Getting Ontario to a Zero-Carbon Electricity Grid by 2030

In February Ontario Clean Air Alliance Research released its revised and updated report, *Getting Ontario to a Zero-Carbon Electricity Grid by 2030*, which outlines a pathway to simultaneously achieve all of the above-noted goals of Ontario's municipalities and Minister Smith.

Specifically, our report recommends the following action plan:

1. Ban gas-fired electricity exports to the U.S.
2. Double our spot market purchases of Quebec waterpower using our existing transmission links with Quebec.
3. Purchasing all energy efficiency savings and solar and wind power that can keep our lights on at less than the price that we pay to Ontario Power Generation for its nuclear electricity (10.5 cents per kWh in 2022).
4. Expand our transmission capacity with Quebec by up to 7,500 megawatts (MW) by upgrading our transmission links at Chats Falls (2,000 MW), Ottawa (2,000 MW), Beauharnois (2,000 MW) and Cornwall (1,500 MW) in order to increase our ability to import low-cost waterpower and to use Hydro Quebec's reservoirs as a storage mechanism for our wind and solar energy.
5. Install bi-directional chargers in our homes and buildings so that our electric vehicles (cars, school buses, fleet vehicles) can provide power back to the grid during peak demand hours.
6. Direct Ontario Power Generation (OPG) to put its five large gas-fired power plants on standby reserve from 2030 to 2040 so that they can provide emergency back-up power to our electricity grid if we temporarily have insufficient carbon-free electricity resources to meet our needs due to extreme events.

Recommended Modelling Scenarios

Therefore, it is our submission that the IESO's decarbonization study should also analyse the costs and benefits of: a) returning the gas plants' GHG pollution back to their 2017 level ASAP; and b) achieving a net zero-carbon electricity grid by 2030 under the following scenarios:

a) The IESO's 2021 Annual Planning Outlook Reference Demand Scenario Forecast; and the IESO's high demand scenario.
b) 100% of the gas plants' GHG pollution is subject to the federal carbon tax.
c) A ban on gas-fired electricity exports to the U.S.
d) IESO maximizes its spot market purchases of Quebec waterpower using our existing transmission lines before it dispatches gas-fired generation.
e) IESO purchases all energy efficiency savings and wind and solar energy that can keep our lights on at less than the price it pays OPG for nuclear electricity (e.g., 10.5 cents per kWh in 2022).
f) Expanding our transmission links with Hydro Quebec by up to 7,500 MW to permit increased imports of energy, capacity and storage services from Hydro Quebec pursuant to an optimal combination of spot market, medium and long-term contracts.

g) Installing bi-directional chargers and establishing an EV rate to achieve all cost-effective and achievable energy storage services and peak hour electricity supply services from our EV batteries by providing EV owners with financial incentives to charge their EVs during off-peak hours and provide power back to the grid during peak demand hours.
h) Using existing gas-fired generation capacity to provide Ontario's required reserve margin until 2040. That is, keep gas-fired generation capacity on standby reserve to provide emergency back-up to our electricity grid during extreme events.

Comments on the IESO's "Assumptions for Feedback" file

1. According to the IESO, its analysis will cap the amount of gas-fired generation that can be displaced by energy efficiency investments at the level identified in its most recent electricity conservation and demand management (CDM) achievable potential study.

   The IESO's most recent study identified that energy efficiency investments could reduce our electricity demand by 17.1 billion kWh by 2030 at an average cost of 3.3 cents per kWh; and by 23.8 billion kWh by 2038 at an average cost of 3.9 cents per kWh.

   There is no good reason why our energy efficiency investments should be capped at 3.3 to 3.9 cents per kWh. **To minimize our cost of decarbonizing our electricity grid the IESO must pursue all energy efficiency investments that can keep our lights on at less than the price it is paying OPG for nuclear electricity (e.g., 10.5 cents per kWh in 2022). It doesn't make sense to re-build our aging nuclear reactors or build a new GTA nuclear reactor if energy efficiency investments can decarbonize our electricity grid at a lower cost.**

2. According to the IESO, it will also cap the amount of gas-fired generation that can be displaced by distributed energy resources (e.g., wind, solar, EV batteries, district and thermal energy) at the levels identified in its still unfinished *2022 Distributed Energy Resource Achievable Potential Study.* However, this study has a number of limitations. For example, it is only looking at directly contracted resources, leaving out the huge potential for resources that participate independently based on electricity pricing, such as time-of-use rates. Once again, it appears that the IESO is planning to arbitrarily cap cost-effective zero-carbon resource options. **To minimize our cost of decarbonizing our electricity grid, the IESO must procure all distributed energy resources that can keep our lights on at less than the price it is paying OPG for nuclear electricity.**

3. The IESO should specifically model the cost (including $/kW) and potential (MW) that could be achieved from bi-directional electric vehicle chargers. Electric vehicles with bi-directional chargers could more than meet all of Ontario's peak power needs at a cost lower than gas plants. These resources are not fully accounted for under the IESO's assumptions because they are not part of the CDM Potential Study and large-scale mass-market programs that function based on price signals are excluded from the *2022 Distributed Energy Resource Achievable Potential Study.* The full potential for electric vehicles with bi-directional chargers must be included.

4. The IESO should specifically model the cost (including $/kW) and potential (MW) that could be achieved from thermal storage. Thermal storage can flatten the demand from electric heating by using electricity to generate and store heat at night (e.g. in special bricks) and release it during daytime peak hours. It is best when coupled with heat pumps. Nova Scotia and Quebec are providing incentives for thermal storage units, including residential units that can be coupled with a heat pump.[1] There are units on the market now that can provide over 80,000 BTU/hr during the day based on a 12-hour nighttime "charge."[2] They are also capable of utility control if desired. This can reduce the electricity used to heat almost any home during the peak daytime hours almost to zero.

   This technology does not appear to be included under any of the headings in the IESO's study assumptions. It should be considered alongside other resources to ensure that the most cost-effective options are chosen.

5. According to the IESO, the earliest possible in-service date for OPG's proposed new GTA nuclear reactor is 2032. Furthermore, according to the IESO, the proposed GTA reactor has a Commercial Readiness Index of 1. That is, according to the IESO, it is a "commercially untested and unproven…..proposition driven by technology advocates with little or no evidence of verifiable technical or financial data to substantiate claims."

   It does not make sense to waste our money on a new GTA nuclear reactor given that energy efficiency and renewables are proven technologies that can cost-effectively decarbonize our electricity grid now without producing nuclear wastes that we don't know what to do with.

6. The IESO's Assumptions file appears to suggest that it will only consider electricity imports from Manitoba and Quebec if they are available during every single hour of the year despite the fact that it is willing to consider Ontario generation options (e.g., nuclear) that are not available during 100% of the hours of the year. For example, on average, the Darlington Nuclear Station has only produced electricity during 83% of the hours of the year.

   In addition, the IESO is proposing to cap imports from Manitoba and Quebec at 500 and 3,300 MW respectively.

   The IESO's proposals to arbitrarily limit electricity imports from Manitoba and Quebec are not in the best interests of Ontario's electricity consumers.

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[1] Hydro Quebec: https://www.hydroquebec.com/residential/energy-wise/windows-heating-air-conditioning/thermal-storage/; Nova Scotia Power: https://www.nspower.ca/your-home/energy-products/electric-thermal-storage;

[2] Steffes, Off-Peak Heating, https://www.steffes.com/wp-content/uploads/2020/12/Steffes-Forced-Air-Furnace.pdf

Quebec's demand for electricity spikes sharply upwards on a few very cold winter days. When these needle peaks occur Quebec may not have power available for export. But these needle peaks last for less than 1% of the hours of the year. As a result, during at least 99% of the hours of the year Quebec has surplus power available for export to Ontario at very reasonable prices. For example, during the first three-quarters of 2021 Hydro Quebec's average electricity export price (spot and long-term contract) was 4 cents per kWh or less than half of OPG's current price for its nuclear electricity (10.5 cents per kWh).

If the IESO wishes to import electricity from Hydro Quebec during every single hour of the year, it should meet with Hydro Quebec to discuss how Hydro Quebec could meet such a request by: a) increasing the energy efficiency of its domestic customers to free up more of its existing heritage waterpower capacity for export; and/or b) building new wind or solar generating stations. It this context, it is important to note that wind and solar, not waterpower, are Quebec's lowest cost options for *new* electricity supply.

7. The objective for the pathways modelling is listed as "Evaluate policy opportunities to enable net zero emissions by 2050 or earlier timeframe." The objective should be "Evaluate policy opportunities to enable net zero emissions as soon as possible".

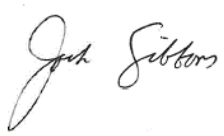
8. The pathways modelling will apply a carbon price that increases by $15/tonne CO2e each year. That is appropriate and important. The moratorium modelling will apply a carbon price that reaches $170 and does not increase. This is inappropriate and inaccurate because the actual marginal cost of decarbonizing our economy will be more than $170/ tonne. Rational decarbonization planning must include realistic carbon prices to ensure an appropriate comparison between alternatives and the selection of the most cost-effective options. In addition, the assumptions document should make it clear that the cost of carbon will be applied to all electricity generation carbon emissions. Although some emissions are currently exempt, that does not prevent the inclusion of carbon pricing for the purpose of future planning.

9. We applaud the IESO for modelling the decarbonization of space and water heating based on electrification. This is by far the most cost-effective solution and the electricity planning should account for this. Pipeline companies may ask the IESO to change this assumption to include renewable natural gas ("RNG") and hydrogen for space and water heating. The IESO should not accede to this request. There are three reasons why RNG and hydrogen are inappropriate for space and water heating: (a) electrification is far less expensive, (b) limits on RNG feedstocks and hydrogen blending rates mean these cannot significantly decarbonize space and water heating, and (c) these fuels must be reserved for the hardest-to-decarbonize sectors, such as aviation or industrial processes that require energy dense fuels. For more details see pages 18 to 21 of our report *A Plan for Green Buildings, Jobs and Prosperity for Ontario*.

10. The IESO should express the outcomes of this report in unit prices, such as dollars per MWh, not as gross figures. Expressing outcomes as gross cost figures can be highly misleading to readers and policy makers because they ignore that (a) electrification will save a great deal in petroleum

and fossil gas costs and (b) new electricity infrastructure can be funded with the revenue from higher consumption. Indeed, electrification can reduce energy bills even if it increases the need for new electricity infrastructure as long as it also flattens the demand for electricity (i.e. increases the utilization rate of the infrastructure). The more kWhs that flow through the same wires, the cheaper those wires are per kWh. The IESO's study should include assumptions regarding beneficial electrification and specifically express costs as unit prices to appropriately reflect the results.

Yours sincerely,



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