

Elson Advocacy

February 11, 2021

BY EMAIL AND RESS

Ms. Christine Long

Board Secretary

Ontario Energy Board

2300 Yonge Street, Suite 2700, P.O. Box 2319

Toronto, Ontario M4P 1E4

Dear Ms. Long:

**Re: EB-2020-0265 – Hydro One Networks Inc. – Hawthorne to Merivale
Reconductoring Project**

Enclosed please find the interrogatories of Environmental Defence in the above proceeding.

Yours truly,



Kent Elson

cc: Parties in the above proceeding

Hydro One Networks Inc.
EB-2020-0265
Leave to Construct: Hawthorne to Merivale

Interrogatories of Environmental Defence

Interrogatory 1 (Alternative 4 Assessment)

Reference: Exhibit B, Tab 5, Schedule 1

Questions:

- (a) Please provide all documentation and calculations underlying Hydro One's assessment of alternative 4 on page 3, including its comment that "[a]fter reviewing the anticipated line losses savings over the life of the asset, Hydro One decided that the incremental increase in cost (approximately \$4.5 million) would not be offset by the additional incremental reduction in line losses." Please provide any live excel spreadsheets that were used so that the data can be easily used by our consultant.
- (b) Hydro One stated "equipment limitation at the terminal stations would not allow loading the circuit beyond the capability of that proposed in Alternative 3". Further, Hydro One has stated "the extra capacity of the circuits over Alternative 3 would also require station upgrades to be completed". Please provide a detailed description of equipment limitations at the terminal stations. Please describe, if available, operating parameters and associated costs, that would allow the larger conductor in Alternative 4 to be installed but not exceed equipment limitations at the terminal stations. Please describe the station upgrades that must be installed to utilize the extra capacity of the circuits over Alternative 3. Please provide a cost estimate of the station upgrades by major cost components (e.g., protection & contract, civil infrastructure, etc.).
- (c) With respect to the assessment of alternative 4 please explain the assumptions and provide any associated data relating to: (i) the cost-benefit analysis time horizon used, (ii) the forecast annual demand (kWh) broken down by season (i.e., summer, winter, shoulder), (iii) the forecast annual incremental loss reductions from upsizing the conductor (kWh) broken down by season, (iv) the forecast incremental loss reduction from upsizing the conductor at the peak hour (kWh), (v) the value of loss reductions (total and per kWh), (vi) the value of any incremental capacity benefits to both the Ottawa region and the Ontario bulk power system.

Interrogatory 2 (Alternative 4 Assessment)

Reference: Exhibit B, Tab 5, Schedule 1

Questions:

- (a) Please calculate the value of the loss reductions from alternative 4 (incremental to alternative 3) based on the following scenario: (i) avoided losses are valued at HOEP plus the GA (Class B \$/MWh), (ii) evaluation horizon of 50 years, (iii) load assumed to

increase 1% annually, (iv) the fact that loss reductions are highest at the peak when costs are highest is accounted for and (v) the announced carbon price increases are accounted for.

- (b) Please recomplete the analysis in (a) for a scenario where the avoided losses are valued at HOEP plus the avoided cost of generation per the latest Annual Planning Outlook supplemental data.¹
- (c) Please recomplete the analysis in (a) for a scenario where the lines are used to their capacity for imports and exports with Quebec.

For all of the above, please provide all underlying figures and calculations in a live excel spreadsheet. Please complete this on a best efforts basis. If one of the items cannot be completed, please explain why and complete the remainder of the scenario analysis. Please make and state assumptions for years beyond which there are existing forecasts based on professional judgement (e.g. the variable could increase at the level of the historic rate of change or be held static).

Interrogatory 3 (Alternative 3 Assessment)

Reference: Exhibit B, Tab 5, Schedule 1

Questions:

- (a) Please provide a breakdown of the \$4.5 million incremental increase in cost between alternative 3 and 4.
- (a) Please reproduce table 1 in Exhibit B, Tab 7, Schedule 1, Page 1 with an added column detailing the cost of alternative 4 broken into the categories in that table.

Interrogatory 4 (Potential Incremental Capacity)

Reference: Exhibit B, Tab 5, Schedule 1

Preamble: With respect to Alternative 4 (an upsized conductor), Hydro One notes: “the extra capacity of the circuits over Alternative 3 would also require station upgrades to be completed.”

Questions:

- (a) Are we correct in understanding that upsized conductor would still reduce losses by approximately 10% even if the above-referenced station upgrades did not occur?
- (b) Please describe any operating parameters and associated costs that would allow the larger conductor in Alternative 4 to be installed but not exceed equipment limitations at the terminal stations.
- (c) Please describe the above-mentioned station upgrades that must be installed to utilize the extra capacity of the circuits over Alternative 3.

¹ <https://www.ieso.ca/en/Sector-Participants/Planning-and-Forecasting/Annual-Planning-Outlook>

- (d) Please estimate the cost of the above-referenced station upgrades incremental to the expenditures in alternative 3.
- (e) Could the above-referenced station upgrades be undertaken in the future if the IESO sought additional capacity along these lines?
- (f) How much additional capacity would the above-referenced station upgrades and upsized conductor achieve?
- (g) Would the above-referenced station upgrade enable incremental capacity imports from Quebec beyond the 1250-1650 MW outlined in Exhibit B, Tab 3, Schedule 1, Page 2? If yes, please detail by how much (MW). If Hydro One needs to consult with the IESO on this or any other question, please do so. Please also indicate whether this has occurred in the answer.

Interrogatory 5 (Import Capacity Benefit)

Reference: Exhibit B, Tab 3, Schedule 1, Page 2

Preamble: Hydro One states:

“The 2017 Quebec interconnection study identified that 1250-1650 MW of capacity imports from Quebec would be enabled following the reinforcement of the M30A and M31A circuits. Having this non-domestic capacity to participate in Ontario’s electricity markets may improve market competition resulting in lower costs for capacity overall.”

Questions:

- (b) Please make a best efforts attempt to calculate the cost reductions that may arise via increased import capacity from Quebec as described in the preamble. Please make and state assumptions as necessary. To address the uncertainty around the quantity of likely imports, please address scenarios including where 50% of this capacity is used and where 100% of this capacity is used.
- (c) Please file the 2017 Quebec interconnection study so it can be easily and cleanly referred to through an exhibit number in this proceeding.
- (d) The quote in the preamble discusses an increase in import capacity between 1250 and 1650 MW. Please explain why a range was provided and discuss whether the actual capacity increase is more likely to be 1250 or 1650 MW based on the best current information. If the additional 400 MW required for the full 1650 MW increase requires other infrastructure projects, please discuss those and whether they are being planned and implemented.
- (e) On June 22, 2017 Hydro Quebec offered to sell Ontario 8 billion kWh per year, for 20 years, at a price of 6.12 cents per kWh.² If Hydro One has a different understanding or believes the figure is inaccurate, please explain and provide Hydro One’s best estimate.

² Letter from Steve Demers, Vice President, Hydro Quebec to Peter Gregg, CEO, Independent Electricity System Operator, (June 22, 2017).

- (f) According to news reports, in August of 2017 Hydro Quebec offered to sell Ontario 8 billion kWh per year, for 20 years, at an average price of 5 cents per kWh.³ If Hydro One has a different understanding or believes the figure is inaccurate, please explain and provide Hydro One's best estimate.
- (g) Please confirm that according to the Hydro Quebec 2019 Annual Report, in 2019 the average price of Hydro Quebec electricity exports was 4.3 cents per kWh as determined by dividing its export revenue by export volumes.⁴ If Hydro One has a different understanding or believes the figure is inaccurate, please explain and provide Hydro One's best estimate.

Interrogatory 6 (Import Capacity Benefit)

Reference: Exhibit B, Tab 3, Schedule 1, Page 2

Preamble: See the following excerpt from Financial Accountability Office of Ontario, *Electricity Trade Agreement: An Assessment of the Ontario-Quebec Electricity Trade Agreement*, (Spring 2018), page 7:

“Currently, Quebec buys electricity from Ontario when demand and prices in Ontario are low and sells electricity back into the Ontario market when demand and prices are high. In 2017, Quebec purchased 2.0 TWh of electricity from Ontario at an average price of \$9.4/MWh and sold 5.8 TWh of electricity into the Ontario market at an average price of \$21.5/MWh.¹”⁵

Questions:

- (a) Please confirm that this report indicates that the average price of Ontario's spot market electricity purchases from Quebec was 2.2 cents per kWh in 2017. If Hydro One has a different understanding or believes the figure is inaccurate, please explain and provide Hydro One's best estimate.
- (b) Does Hydro One have better or newer figures indicating the average price of Ontario's spot market electricity purchases from Quebec?
- (c) Please file a copy of this report so it can be easily and cleanly referred to through an exhibit number in this proceeding.

Interrogatory 7 (Time Horizon)

Reference: Exhibit B, Tab 5, Schedule 1

Questions:

³ Pierre Couture, “Hydro Quebec l’Ontario en ligne de mire”, Journal de Montreal, (August 16, 2017), <https://www.tvanouvelles.ca/2017/08/16/lontario-en-ligne-de-mire>.

⁴ Hydro Quebec, 2019 Annual Report, <https://www.hydroquebec.com/data/documents-donnees/pdf/annual-report-2019-hydro-quebec.pdf>.

⁵ <https://www.fao-on.org/web/default/files/publications/Electricity%20April%202018/ElectricityTrade0418.pdf>.

- (a) What time horizons does Hydro One generally use for economic evaluations of reconductoring projects?
- (b) How long will the depreciation period be for the costs incurred for the proposed project?
- (c) Please estimate how long the lines and towers in question in this proceeding will continue to operate before needing replacement due to age/reliability.
- (d) Generally speaking, how long do hydro towers of the type at issue in this proceeding continue to remain in good working order before needing to be replaced?
- (e) When were the hydro towers in question first built?
- (f) Will the replacement of portions of the hydro towers as part of this project (as required for the heavier conductors) likely extend their useful life or defer the need for replacement?

Interrogatory 8 (Demand Forecast)

Reference: Exhibit B, Tab 5, Schedule 1

Questions:

- (a) Please provide the best available forecast flow (in MWh) for the lines in question in hourly increments over as long of a period as possible. If hourly data is not available, please provide the data in as granular of a format as possible (i.e. daily, monthly, seasonal). Please provide this in a live excel spreadsheet so it can be used by Environmental Defence's consultant.
- (b) Please provide the annual flow for the lines in question over (i) the past 10 years [historical] and (ii) the next 10 years [forecast].
- (c) Please provide the historic throughput over these lines in hourly increments for the three most recent years. Please provide this in a live excel spreadsheet so it can be used by Environmental Defence's consultant. If hourly data is not available, please provide the data in as granular of a format as possible (i.e. daily, monthly, seasonal).
- (d) Please provide the capacity (in MW) of (i) the lines in question currently, (ii) the lines in question if the proposed alternative (#3) is implemented, (iii) the lines in question if a larger conductor is used (alternative #4), and (iv) the lines in question if a larger conductor is used (alternative #4) and station upgrades are made to enable the additional capacity made possible by the larger conductors. For all of the above, please indicate if the capacity is different by season (i.e., winter, summer, and shoulder).
- (e) Please provide the forecast flows for the lines in question for a scenario where Ontario enters into a firm electricity import contract with Quebec that would utilize the full 1250 or 1650 MW import capacity increase enabled by this project. Please provide this on an (i) hourly basis, (ii) seasonal basis and (iii) annual basis.
- (f) Please complete the following table mapping the throughput over these lines for the most recent year data is available based on the loading of the lines at the time.

Loading	Annual kWh at loading level
Up to 10 MW	
10 MW to 20 MW	
...	

Interrogatory 9 (Loss Reductions)

Reference: Exhibit B, Tab 5, Schedule 1

Questions:

- (a) Please estimate the incremental loss reductions (%) as between alternative 3 and 4 based on the loading of the lines. Please do so by completing the below table. If Hydro One believes another format for this information would be helpful, please also provide the information in that alternative format.

Loading	Losses (%) – Status Quo	Losses (%) – Alt 3	Losses (%) – Alt 4
10 MW			
20 MW			
30 MW			
...			

- (b) Please provide the historic transmission losses over these lines in hourly increments for the three most recent years. Please provide this in a live excel spreadsheet so it can be used by Environmental Defence's consultant. If hourly data is not available, please provide the data in as granular of a format as possible (i.e. daily, monthly, seasonal).
- (c) Please reproduce the response to (b) with the transmission losses that would have occurred if alternative 3 had been in place. Please provide this in a live excel spreadsheet so it can be used by Environmental Defence's consultant.
- (d) Please reproduce the response to (b) with the transmission losses that would have occurred if alternative 4 had been in place. Please provide this in a live excel spreadsheet so it can be used by Environmental Defence's consultant.
- (e) Please estimate the losses that would arise in the scenario outlined in Interrogatory 6(e) [full utilization of the lines] on an hourly and annual basis. If hourly data is not available, please provide the data in as granular of a format as possible (i.e. daily, monthly, seasonal).
- (f) Please provide the equations necessary to calculate the losses per hour based on the loading (MW) with the (i) status quo, (ii) alternative 3, and (iii) alternative 4 (i.e. equations that will output the losses (kWh) based on a given loading (MW)).
- (g) To the extent that it is different from the answer to (f), please provide the equation(s) Hydro One used to calculate losses for alternatives 3 and 4.

Interrogatory 10 (Carbon Pricing)

Reference: Exhibit B, Tab 5, Schedule 1

Questions:

- (a) Please provide the forecast carbon intensity of electricity (t CO₂e / kWh) forecast over as long of a period as is available and based on the latest available information, which we assume to the data tables published along with the IESO's latest Annual Planning Outlook.
- (b) Please provide the forecast carbon intensity of electricity (t CO₂e / kWh) forecast over as long of a period as is available at the provincial peak hour.
- (c) Please comment on whether carbon pricing applies to power generation in Ontario.
- (d) Please comment on whether carbon pricing will apply to power generation in Ontario in the future under the federal governments announced increases to the carbon price up to 2030.
- (e) Please provide the annual carbon price announced by the federal government recently for each year up to 2030.
- (f) Please estimate the cost of carbon based on (e) per kWh in Ontario up to 2030.

Interrogatory 11 (Value of Electricity Savings)

Reference: Exhibit B, Tab 5, Schedule 1

Questions:

- (a) Please file the three most recent versions of the IESO's CDM Cost-Effectiveness Test Guides, including the appendices on avoided costs.
- (b) Please file a copy of the avoided cost data published by the IESO in its latest Annual Planning Outlook.⁶ Please discuss in detail whether this could be used to economically evaluate transmission loss reductions.
- (c) Please provide a figure illustrating the latest information on when Ontario will face an electricity capacity deficit and the size of that deficit.
- (d) Please confirm that provincial generation capacity is built to meet the electricity demand at its peak. If not, please explain. Please describe whether the relevant peak is hourly or a 5-minute interval.
- (e) Please confirm that transmission losses are greatest at the time of peak electricity demand. If not, please explain.
- (f) Please provide the losses on the lines in question over each of the past 5 years (both % and kWh) at (i) the province's coincident peak demand hour, (ii) the province's coincident peak demand 5-minute interval, (iii) the peak hour for the lines in question, and (iv) the peak 5-minute interval for the lines in question. Please complete this table:

Losses on the Hawthorne to Merivale Line at the Provincial and Local Peaks			
	Throughput (kWh)	Losses (%)	Losses (kWh)
2015			
Ontario's coincident peak demand hour			
Ontario's coincident peak demand 5-minute interval			

⁶ <https://www.ieso.ca/-/media/Files/IESO/Document-Library/planning-forecasts/apo/APO-Avoided-Costs.ashx>.

Hawthorne to Merivale peak demand hour			
Hawthorne to Merivale peak demand 5-minute interval			
...			
2019			
Ontario's coincident peak demand hour			
Ontario's coincident peak demand 5-minute interval			
Hawthorne to Merivale peak demand hour			
Hawthorne to Merivale peak demand 5-minute interval			

- (g) Please estimate the losses on the Hawthorne to Merivale line (% and kWh) with demand of 648MW (the current capacity) for an hour with (i) the status quo, (ii) alternative 3, and (iii) alternative 4 (larger conductor).
- (h) Please estimate the losses on the Hawthorne to Merivale line (% and kWh) with demand of 1080MW (the capacity for alternative 3) for an hour with (i) alternative 3, and (ii) alternative 4 (larger conductor).

Interrogatory 12 (Previous Studies)

Reference: Exhibit B-3-1, Attachment 1

Preamble: The IESO's letter states:

“As reported in the 2017 Interconnection report, detailed engineering studies done by Hydro One indicated that the overhead M30/31A circuits are capable of being uprated by replacing the existing conductors with twin conductors at a cost of about \$20 million.”

Questions:

- (a) Please file the studies referred to above which resulted in the \$20 million cost estimate.
- (b) What kind and capacity of twin conductors were proposed in the studies referred to above. Please compare those to the conductors cited under alternative 3 and 4.

Interrogatory 13 (In-Service Date)

Reference: Exhibit B, Tab 1, Schedule 1, Page 3; Exhibit B-3-1, Attachment 1

Preamble:

Hydro One states: “The proposed in-service date for the Project is December 2023, assuming construction commencement in October 2021.”

The IESO letter states: “Hydro One has indicated that a target in-service date of December 2022 is feasible. The IESO supports targeting for this in-service date and will provide assistance, as required, to Hydro One in implementing this project.”

Questions:

- (a) Please explain in detail why the in-service date has moved from December 2022 to December 2023.
- (h) Please reproduce the project schedule at Exhibit B, Tab 11, Schedule 1 with the most expedited schedule that Hydro One believes is possible. Please include an explanation indicating where Hydro One thinks it may or may not be able to expedite the steps.

Interrogatory 14 (Loss Reductions Valuation)

Reference: Exhibit B, Tab 5, Schedule 1

Questions:

- (b) Please confirm whether utilities include the cost of avoided generation capacity when valuing transmission loss reductions in (i) New York, (ii) Vermont, and (iii) California. Please provide underlying documentation.
- (c) Please confirm whether National Grid UK includes the cost of avoided generation capacity when valuing transmission loss reductions. Please provide underlying documentation.
- (d) Please provide a figure indicating the forecast electricity capacity surplus/deficit over as long of a period as such a forecast is available.
- (e) What is the average price of nuclear power as included in the HOEP in the most recent year available?
- (f) What is the average price of hydro power as included in the HOEP in the most recent year available?
- (g) Please describe how OPG’s regulated generation revenue requirement is charged to customers through the HOEP and GA, and the proportion in each.
- (h) When Hydro One was most recently delivering energy efficiency programs, what values did it assign to the avoided cost of generation capacity for each kWh saved.
- (i) Please provide all the avoided cost figures and methodologies that Hydro One has used in the past five years to value the avoided costs associated with energy efficiency programs (e.g. the relevant CDM guidelines or internal evaluation guidelines).