

Gatineau End-of-Life Study Public Webinar #2- August 11, 2022

Feedback

The IESO hosted a second public webinar for bulk planning in east Ontario, the Gatineau Corridor End-of-Life (EOL) study, on August 11, 2022. The purpose of the webinar was to seek input on the draft information and recommendations. The presentation material and recorded webinar are available on the [engagement webpage](#).

This document summarizes feedback received under the following key themes:

- Study Options and Recommendations
- Study Scope and Considerations
- Future Engagements

The IESO appreciates the input, which will be considered as the Gatineau Corridor study recommendations are finalized. Feedback was received from the following parties and the full submissions can be viewed on the engagement webpage:

Feedback Received

- [City of Ottawa](#)
- [Grid Reliability Consulting](#)
- [Haudenosaunee Development Institute](#)
- [Peter Drury](#)
- [PNE Canada](#)

Theme 1- Study Options and Recommendations

Feedback Provider: Haudenosaunee Development Institute

Feedback: The IESO should concentrate their efforts on developing options that would allow for the removal of these lines from within Algonquin Park.

IESO Response: Thank you for the input. The transmission lines that run through Algonquin Park are part of the Des Joachims to Minden corridor, and are not within the scope of the Gatineau Corridor End-of-Life Study.

Feedback Provider: Grid Reliability Consulting

Feedback: Surrounding the design of the refurbishment, was consideration given to installing larger conductors (possibly with some additional strengthening of the structures) to achieve an increased thermal rating and perhaps allow only one of the two circuits (T22C OR T33E) to be refurbished? Or was this option precluded by the partial refurbishment that has already been completed over some sections of these two lines? Detailed questions related to refurbishment include:

- What is included in the proposed refurbishment, i.e. does it just include insulator and conductor replacement?
- What is the cost/km for the refurbishment?
- For the Ontario ratepayer, does the cost justify the need if there is no additional transmission capacity being created?

For the Ottawa region ratepayer, is this the time to build a system that is robust and local without depending upon an existing system that generates power in the Ottawa region which is transmitted to the west (Toronto region) only to be transmitted back to east to serve the Ottawa region?

IESO Response: The scope of the proposed refurbishment primarily consists of insulator and conductor replacement. Based on past examples of IESO re-conductoring projects, the average cost of this work is approximately \$500k/km. The purpose of the Gatineau Corridor EOL Study is to carry out a transmission assessment of the area to ensure the electricity supply to the area meets applicable planning criteria with consideration of EOL transmission equipment in the area. The refurbishment of T22C and T33E was one out of three alternatives studied to address the long-term demand forecast of Ottawa. Out of the alternatives studied, the refurbishment of T22C and T33E was recommended based on a few key reasons:

- I. Addresses the Ottawa demand forecast for the next 15 years
- II. Lowest cost alternative
- III. By preserving the supply capacity T22 and T33E provide to Ottawa, this refurbishment forms the foundation from which incremental investments (i.e. new transmission line from Cornwall into Ottawa) can be triggered in the future to accommodate additional growth beyond the next 15 years, or if higher growth materializes (i.e. electrification of transportation and heating).

As indicated in the previous Gatineau Corridor End-of-Life (EOL) study webinar [response to feedback document](#), planning criteria is focused on ensuring that the transmission system will operate reliably over a broad spectrum of system conditions and following a wide range of probable system contingencies. This broad spectrum of system conditions includes low water (drought) conditions whereby the output from hydro-electric facilities such as those on the Ottawa and Madawaska rivers are producing at low levels. For this reason, re-routing this generation to supply Ottawa is not a viable alternative to refurbishing of the Gatineau Corridor transmission lines or the other options considered in this study.

Feedback Provider: PNE Canada, City of Ottawa

Feedback: The IESO should carryout a closer review of the benefits decentral and non-wire power generation alternatives can provide to the electricity grid in terms of efficient power generation and improvement of system resilience. They should also consider updated market information for cost assumptions on various storage technologies as well as decentral power generation technologies (wind and solar generation). The IESO may wish to re-baseline these cost using bid prices for storage as part of the Long-Term RFP, provided the projects appear to be feasible and costed correctly, could provide relevant real world, Ontario-based costing numbers.

IESO Response: In IESO planning studies, value is assessed against a suite of system needs, as applicable, including energy, capacity and ancillary services benefits in order to improve capacity, security and reliability of electricity service. With more operational experience of new technologies, other opportunities for value stacking may be considered.

The IESO is also supportive of insights into new sources of cost information. Consideration of data sources generally occurs at the beginning of the public engagement processes, whereby the best available data is decided.

To supplement publically available economic data, the IESO also periodically undertakes cost analysis using the best available information to further develop cost breakdowns for electricity system infrastructure in Ontario. Once available, bid prices for storage as part of the Long-term RFP will be incorporated into this cost analysis work and considered in costing assumptions.

Feedback Provider: City of Ottawa

Feedback: The options analysis should include energy losses (transmission vs. battery cycling) in the discussion. This is perhaps small, but as the assets are long life it possibly merits consideration. The IESO should also develop a way to include embedded carbon implications of the wires vs. non-wires alternatives. As the work proceeds into procurement, requesting lower carbon construction methods should be prioritized. This could include requests to use lower carbon materials of construction and construction methods which minimize use of high carbon fuels.

IESO Response: The IESO is working on the development of a transmission planning guideline focused on the consideration of transmission losses as part of the transmission planning process.

While the guideline is still under development¹, the draft methodology and considerations developed thus far can be leveraged to examine the effects of transmission losses on the options analysis of the Gatineau Corridor EOL Study. The guideline takes a two step approach to evaluating the effects of transmission losses, the first step being a screening mechanism to determine whether there are opportunities where transmission loss savings can influence the options analysis and selecting a preferred option. The screening mechanism takes a bright line approach, if the cost difference between options falls within an established threshold then a detailed loss assessment would be carried out. While the exact threshold is yet to be determined, the cost difference of the considered options which range between \$100 M and \$1 B is orders of magnitude larger than the threshold values being discussed. A detailed cost assessment was not carried out as the effects of transmission losses is not expected to have an effect on the cost analysis and subsequently the draft recommendation.

Since the IESO does not own or currently procure transmission assets, there is currently no control the IESO can have over construction methods and materials related to their embodied carbon.

Feedback Provider: Grid Reliability Consulting

Feedback: Additional information is requested on the viability of re-routing the generation facilities on the Ottawa & Madawaska Rivers. Even under higher water conditions, the contribution that these generating facilities could make to the Ottawa Area Load Meeting Capabilities would appear to be seriously constrained since there are only two circuits connecting the Gatineau Corridor into Merivale TS - circuit T33E/E34M from Clarington via Almonte & circuit C3S/M32S from Chats Falls. Is the primary reason for refurbishing the Gatineau Corridor north of Havelock therefore to avoid bottling OPG's generation and to be able to accommodate the peak output from the generating facilities on the Madawaska & Ottawa Rivers (including HQ's portion of Chats Falls)?

IESO Response: The output from the hydroelectric generation in the region is not constrained by the transmission system. The purpose of refurbishing the circuits is to maintain the supply capacity provided by these two transmission lines meet Ottawa demand, which is over and above the supply capacity provided by the hydroelectric generation.

Feedback Provider: Peter Dury

Feedback: Further clarity is requested on the Ottawa area Load Meeting Capabilities. Replacing the existing single-circuit 115kV line between St Lawrence TS and Merivale TS with a new 230kV double-circuit one would not only address concerns about an extreme contingency involving the Hawthorne-to-Merivale corridor, but should allow an increase in the Ottawa Area LMC. Detailed questions include:

- What exactly is the critical contingency condition that limits?
- What remedial action was assumed to re-prepare the system for the subsequent contingency was also requested?

¹ More information regarding the Consideration of Losses in the Transmission Planning Process and its engagement activities can be found in the engagement section of the IESO website linked [here](#).

- Would bringing the TransCanada Napanee generating station into service immediately following the outage to the first 500kV line would be beneficial by providing an injection directly into the 230kV system connected into St Lawrence TS?
- What transmission element becomes limiting for an enhanced Ottawa Area LMC of 1950MW and also whether this is a 'local' restriction (i.e. is it confined to just a particular section of a circuit)?
- Could you please confirm that load rejection would not be required in order to achieve an LMC of 1950MW for the Ottawa Area?
- What LMC for the Ottawa Area would be possible with circuits T22C & T33E refurbished?
- Which transmission element of the two 230kV supply corridors becomes the limiting component?
- What LMC for the Ottawa Area would be possible with circuits T22C & T33E refurbished?
- Which transmission element of the two 230kV supply corridors becomes the limiting component?
- Should the Non-Wires Alternative values be the same as the improvements in the LMCs that the new 230kV double-circuit line to Dobbin TS and the refurbishment of the Gatineau Corridor will achieve i.e 170MW & 250MW respectively?

IESO Response:

	Feedback	IESO Response
1	What exactly is the critical contingency condition that limits?	<p>In the existing system, which includes the Gatineau corridor EOL circuits, the critical contingency for Ottawa is the loss of the two 500 kV circuits X522A and X523A (Lennox to Hawthorne) which results in thermal overloading of 230 kV circuits L24A (St. Lawrence to Hawthorne) and P15C (Cherrywood to Dobbin). This limit is observed when Ottawa demand reaches 1,700 MW.</p> <p>The three options considered and their associated critical contingencies and limiting elements are described below:</p> <p>1. The limit is improved to 1,950 MW by refurbishing the Gatineau corridor EOL circuits, transmission reinforcement between Cherrywood and Dobbin, and the incorporation of a Remedial Action Scheme in the Ottawa area. The critical contingency remains to be the loss of the two 500 kV circuits X522A and X523A (Lennox to Hawthorne) which results in thermal overloading of 230 kV circuits L24A (St. Lawrence to Hawthorne) and voltage instability at Hawthorne.</p>

		<p>2. The limit is improved to 2,050 MW by decommissioning two of the Gatineau corridor EOL circuits (T22C/T33E), 230 kV transmission reinforcement between St. Lawrence and Merivale, transmission reinforcement between Cherrywood and Dobbin, and the incorporation of a Remedial Action Scheme in the Ottawa area. The critical contingency remains to be the loss of the two 500 kV circuits X522A and X523A (Lennox to Hawthorne) causing voltage instability at Hawthorne.</p> <p>3. The limit is improved to 2,150 MW by decommissioning two of the Gatineau corridor EOL circuits (T22C/T33E), 500 kV transmission reinforcement between St. Lawrence and Hawthorne, transmission reinforcement between Cherrywood and Dobbin, and the incorporation of a Remedial Action Scheme in the Ottawa area. The critical contingency remains to be the loss of the two 500 kV circuits X522A and X523A (Lennox to Hawthorne) causing voltage instability at Hawthorne.</p>
2	What remedial action was assumed to re-prepare the system for the subsequent contingency was also requested?	No further action was taken to adjust the system after the first outage (contingency).
3	Would bringing the TransCanada Napanee generating station into service immediately following the outage to the first 500kV line would be beneficial by providing an injection directly into the 230kV system connected into St Lawrence TS?	Napanee generation was in-service to meet system's peak demand.
4	What transmission element becomes limiting for an enhanced Ottawa Area LMC of 1950MW and also whether this is a 'local' restriction (i.e. is it confined to just a particular section of a circuit)?	Please see response to question #1 in this table.
5	Could you please confirm that load rejection would not be required in order to achieve an LMC of 1950MW for the Ottawa Area?	As allowed by the criteria, 150MW of load was used in the Ottawa area for all options.
6	What exactly is the critical contingency condition that limits?	Please see response to question #1 in this table.

7	Which transmission element of the two 230kV supply corridors becomes the limiting component?	Please see response to question #1 in this table.
8	What LMC for the Ottawa Area would be possible with circuits T22C & T33E refurbished?	Please see response to question #1 in this table.
9	Which transmission element of the two 230kV supply corridors becomes the limiting component?	Please see response to question #1 in this table.
10	Should the Non-Wires Alternative values be the same as the improvements in the LMCs that the new 230kV double-circuit line to Dobbin TS and the refurbishment of the Gatineau Corridor will achieve i.e 170MW & 250MW respectively?	<p>Peterborough to Quinte West LMC – Non-wires Alternative</p> <p>Notes: The Non-wires alternative has been sized to 100 MW to address the demand forecast. The incremental benefit (70 MW) of the transmission option is acknowledged as an additional benefit for the Peterborough to Quinte West area if demand grows beyond the current demand forecast</p> <p>Ottawa LMC – Non-wires Alternative</p> <p>Notes: The Non-wires alternative has been sized to 480 MW to address the demand forecast while enabling the decommissioning of T22C and T33E</p> <p>The Non-wires alternative described here relies on improvements being made upstream to mitigate thermal overloads of P15C (either transmission reinforcement into Dobbin TS or a resource alternative)</p> <p>With the upstream thermal limitations mitigated, Ottawa LMC is limited by voltage instability. Decommissioning of T22C and T33E will reduce the voltage stability limit to roughly 1550 MW. With 480 MW of non-wires alternative solution plus the implementation of a remedial action scheme can accommodate the full 20 year demand forecast.</p>

Feedback Provider: Peter Drury

Feedback: Further clarity is requested on extreme Contingency involving the Hawthorne - Merivale Corridor. I disagree with a statement in the IESO presentation which states that consideration of an 'extreme event' such as the loss of an entire transmission corridor and its effect on the reliability of the local Ottawa Area is beyond the requirements of applicable planning criteria. ORTAC (Clause 2.7.3) refers to the NPCC requirement that analytical studies shall be conducted to determine the effect of certain extreme contingencies, and where serious consequences are identified, an evaluation must be conducted of possible measures to mitigate the consequences.

While the loss of the Hawthorne to Merivale corridor would result in a significant loss of load within the City of Ottawa, the bigger concern would be the length of time before that supply could be restored. For the Hawthorne - Merivale corridor, for which only a very limited alternative source of supply would be available via circuits T33E/E34M (from Clarington TS via Almonte TS) and circuits C3S/M32S (from Chats Falls, via South March TS), restoration of the bulk of the interrupted load would necessitate at least one of the 230kV circuits of the Hawthorne - Merivale corridor to be returned to service. Depending on the severity of the damage sustained by this corridor, this could take days, not hours.

IESO Response: As indicated in the Gatineau Corridor End-of-Life (EOL) study webinar [response to feedback document](#) the IESO's transmission planning is focused on ensuring that the transmission system will operate reliably over a broad spectrum of system conditions and following a wide range of probable system contingencies which include "critical contingencies". These planning events and performance requirements are established through a number of planning criteria and standards by the North American Electric Reliability Corporation (NERC), the Northeast Power Coordinating Council (NPCC), and the IESO. The planning events covered by the criteria and standards are not intended to cover every possible scenario, but rather are focused on identifying an acceptable level of performance for probable events. All three options examined as part of the Gatineau Corridor EOL study meet applicable planning criteria and standards.

Additionally, the planning criteria for examining "extreme contingencies" is detailed in NPCC Directory #1 – Table 2. As part of the IESO's compliance activities to ensure NPCC criteria is adhered to, the IESO has evaluated the extreme contingencies in the Ottawa area (under the conditions specified) and has demonstrated that the Ottawa area meets planning criteria. All three options evaluated in the Gatineau plan will also continue to meet planning criteria.

Regarding the last point on load restoration after an extreme contingency, and as the feedback suggests, it is expected that there will be load loss in west Ottawa after an extreme contingency and its also expected that load restoration may be lengthy depending on the severity of the event and the damage caused. Planning criteria for load restoration is covered under ORTAC section 7.2, however this section does not apply to extreme contingencies.

Theme 2- Study Scope and Considerations:

Feedback Provider: Haudenosaunee Development Institute, Grid Reliability Consulting

Feedback: It appears that the IESO is not focused on providing a transmission system that provides the capabilities for increased generation in Eastern Ontario. Just refurbishment will not increase the transfer capability for the Corridor and thus limits our ability to expand our generation capabilities. A new transmission line into the Ottawa area from the north would accommodate our desires. In addition, a new line between St Lawrence and Merivale would further support our vision and desires.

The IESO should be looking at projects that increase transfer capability into this region, e.g., new transmission lines such as the St. Lawrence to Merivale project. Approving a plan without such a local upgrade to the network would be an opportunity lost. Instead of promulgating the Gatineau Corridor, it is time to construct transmission in the Ottawa area like St Lawrence to Merivale or Chat Falls to

Merivale to Hawthorne. These projects will increase the transfer capability into the Ottawa region, allow for local generation development, and restore all or a part of the Algonquin Park back to its pristine form.

With the Gatineau Corridor refurbished and possibly upgraded to a higher rating, will this provide an opportunity for additional generating capacity to be incorporated into the system?

IESO Response: The Gatineau Corridor EOL Study proposes a plan that addresses the demand forecast for Ottawa for the next 15 years, results in the lowest cost to rate payers, and forms the foundation for additional transmission reinforcements (i.e. St. Lawrence to Merivale transmission line) to be constructed in the future to accommodate additional growth beyond 15 years, or to accommodate higher growth (i.e. higher penetration of electrification). Decommissioning T22C and T33E and building the St. Lawrence to Merivale transmission line today, will limit our ability to increase the Ottawa LMC beyond 2050 MW in the future. Resource alternatives were examined as part of the assessment, while a resource within Ottawa can certainly address the supply capacity requirements, the assessment results indicate that this would result in a significantly higher cost to the rate payer.

As noted prior, the transmission lines that run through Algonquin Park are part of the Des Joachims to Minden corridor, and are not within the scope of the Gatineau Corridor End-of-Life Study.

Feedback Provider: City of Ottawa

Feedback: With the ongoing discussion of imports from Quebec, is there any need to take this into consideration in this project? Would one of the lines ever be more useful as a HVDC line or as a line running on Quebec frequency / series compensation up to some point west of Ottawa?

IESO Response: The IESO's "Ontario-Quebec Interconnection Capability - A Technical Review" report presented the capability of Ontario's transmission system to import from Quebec using the existing interties with Quebec. The maximum capability that would be available ranges from 500 MW to about 2,050 MW depending on the transmission improvements made in the Ottawa and Cornwall sub-systems. Beyond this level, a new intertie between Ontario and Quebec would be required.

The report described three illustrative options for a new intertie and expansion of Ontario's transmission system required to import an additional 2,000 MW from Quebec. One of the options considered is a new Ontario-Quebec intertie near Chats Falls Transformer Station (TS). The intertie would comprise of a HVDC ("High Voltage Direct Current") transmission line from Chats Falls TS to the GTA East. The new transmission line would require rebuilding and repurposing one of the existing Gatineau Corridor transmission lines.

The IESO would like to emphasize this is one of three illustrative options, refurbishing the T22C from Clarington TS to Chats Falls TS does not preclude building new interconnections between Ontario and Quebec in the future.

Also to note, Quebec's electricity demand is projected to grow over the next decade, decreasing its surplus. The IESO will continue to examine the role of Quebec imports in Ontario's reliability needs, including in its upcoming Pathways to Decarbonization study.

Maintaining a safe and reliable supply of electricity to Ottawa requires a planning decision to be made today on these EOL transmission lines originally built over 90 years ago.

Theme 3- Future Engagements

Feedback Provider: PNE Canada, Haudenosaunee Development Institute, Grid Reliability Consulting

Feedback: The IESO should continue to engage through proactive reoccurring meetings presenting observations, results, and strategy adaptations. Engagements should include Indigenous communities, generators, regulators, consumers alike. This should also include open discussions of how power generators and consumers can work towards a cost efficient, resilient, and clean energy market design with increasingly liberal market structures.

IESO Response: Thank you for the feedback. We are continuously striving to enhance our engagement practices to increase transparency and opportunities for stakeholder input. The IESO is committed to helping to ensure that interested parties are kept informed and are provided with opportunities for purposeful engagement to contribute to electricity planning initiatives such as the development of this Gatineau Corridor EOL planning study.

Regular communication with communities, stakeholders and interested parties take place through emails, IESO Electricity Network updates, IESO weekly Bulletin, public webinars, and targeted outreach meeting. Visit the IESO website to [subscribe](#) to received updates on engagement activities.

Feedback Provider: City of Ottawa

Feedback: The City of Ottawa Ottawa's Energy Evolution modelling can help with enhancements to future bulk and regional planning work, specifically in the area of electrification.

IESO Response: Thank you for this insight. As part of regional and bulk planning processes, the IESO collects data from local distribution companies, municipalities, Indigenous communities, businesses, and other interested parties to help inform the development of the IESO models. We will continue to collect this information as part of the upcoming processes. The next cycle of regional planning in the Greater Ottawa area is expected to begin in Q4 2022.