Barrie to Sudbury Transmission Proposal Response

Aug 14, 2025

To: Environmental Registry of Ontario and IESO

Environmental Registry of Ontario | Via Web comment attachment

ERO number 025-0656 https://ero.ontario.ca/index.php/notice/025-0656?utm_source=chatgpt.com

Notice type Policy **Act** Ontario Energy Board Act, 1998
Posted by Ministry of Energy and Mines
Notice stage Proposal **Proposal posted** June 16, 2025
Comment period June 16, 2025 - August 15, 2025 (60 days) Open
Consultation closes at 11:59 p.m. on: **August 15, 2025**

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We understand that proposal ERO number 025-0656, references the new Environmental Protection Act but is now referencing the Impact Assessment Act which allows economic factors to bypass previous environmental acts. We also understand that Bill-5 and C5 can be used to fast rack projects eliminating the environmental concerns. We also understand that Canada now has very good reason to expand its electrical and transmission grid for the future of all Canadians and that we need to carefully fast track projects that are both beneficial to Canadians and the environment. This would include the planning for an East-West Transmission corridor unifying the country with all provinces to share this vision. The Transmission line from Barrie to Sudbury could be initiating this process. We would like to suggest 3 alternative solutions that would support this vision eliminating the need for the two 500KV lines that would be added to the existing corridor. We realize the IESO is aware of all these technical issues but would like to summarize them for others. Our proposal suggestions are not only centered around the Barrie to Sudbury corridor. The Barrie to Sudbury corridor is our immediate concern but it may be the beginning of a nation-wide plan to link all of our provinces.

In our proposal to the Environmental Registry and IESO and all parties involved, we see many technical, financial and economic benefits to our suggestions. The proposed date for completion outlined in ERO 025-0656 is 2032, far too late for many of the economic gains Canada needs so critically. All three of our proposals shorten the construction time considerably, reduce cost and minimize environmental impact in comparison to ERO 025-0656.

Please consider our suggestions in whole or in part.

The heart of all three of our proposals eliminate the need for clearing the path of trees and delays associated with property owners. This would reduce the time for construction, environmental approvals, property rights procedures and construction materials as well as cost reductions overall. Our suggestions also set a path to unify Canada’s East-West Grid for sharing power in the event of blackouts or trade alternatives.

Part of the proposal focuses with **HVDC** (High Voltage Direct Current) vs. **HVAC** (High Voltage Alternating Current) transmission lines. Most of the provinces with significant electrical power production have introduced HVDC into their grids except for Ontario.

Brief history of Canada’s Power Grid using HVDC(High Voltage Direct Current):

Manitoba Hydro

Manitoba (1300km) which has deployed HVDC for many years successfully can also connect to other regions in Northern Ontario if a HVDC line were deployed. Large HVDC links (e.g. Manitoba’s Bipole III) transfers thousands of megawatts over long distances—HVDC is recognized worldwide for its reliability and scalability. https://en.wikipedia.org/wiki/Nelson_River_DC_Transmission_System

Hydro-Québec operates one of the most advanced high-voltage direct current (HVDC) transmission networks in North America, playing a pivotal role in exporting clean hydropower to neighboring provinces and the northeastern United States**.** Hydro Quebec has pioneered advancements in HVDC technology, including multi-terminal systems and dual-function de-icing solutions. Hydro Quebec which is a world leader with HVDC Technology is successfully using it for decades. Connecting Hydro Quebec with HVDC would benefit Canadians. https://www.hitachienergy.com/ca/en/news-and-events/customer-stories/quebec-new-england?utm_source=chatgpt.com

Alberta has two notable High Voltage Direct Current (HVDC) transmission line: the Eastern Alberta Transmission Line (WATL).

Maritime Provinces 170 km overhead/underground lines on Newfoundland and Nova Scotia. One in Bottom Brook, Newfoundland and one in Woodbine, Nova Scotia **170 km underwater** in the Cabot Strait using under using submarine cable. HVDC integrates renewable Labrador hydroelectric power into the Nova Scotia grid and helps Nova Scotia reduce its reliance on coal. This also enhances grid stability and interconnection between Newfoundland and the rest of Eastern Canada.

Ontario has the largest span (1800km from Windsor to the Manitoba border) and is centrally located yet has no viable HVDC corridors linking the Eastern and Western Provinces.

Why HVDC Matters

Efficiency: HVDC reduces line losses over long distances and supports transmission across asynchronous grids. It also requires fewer conductors and offers better control of power flow. The cost/distance, being one of the financial disadvantages. If one just compares the conversion from AC/DC to DC/AC used for HVDC instead of High Voltage transformer technology, HVAC is cheaper to deploy. The control logic, with HVDC, being more complicated as well. However, this modern control logic also helps with more advantages to unify, stabilize and control the grid, especially for renewable intermittent sources. The savings earned by reducing the amount of material for wires, towers, cement for the bases and transformers are much more favorable now. The cost for Aluminum Wire has escalated recently leaving 3-Phase HVAC more costly. The distance of the proposed transmission lines connecting the 290km Barrie-Sudbury corridor is now very close to the cost break even point comparing HVAC with HVDC. This management plan would also reduce the requirement for battery and pumped storage for balancing the grid during intermittent renewable usage, which would take years to approve and construct as well. These storage ventures become financially risky as market conditions change over the lengthy completion dates. They are also environmentally hazardous. One can only guess what electricity rates will be once the automotive nighttime charge demand changes and people are charging their cars at night. The cost structure on the grid is bound to equalize closer to daytime rates making pumped storage a 30% loss. This could become an 8-billion-dollar loss. We need to consider the financial and environmental risk that may occur in 12 years when the estimated time for pumped storage is completed. We also need to understand the environmental risks for Georgian Bay. https://www.savegeorgianbay.ca/

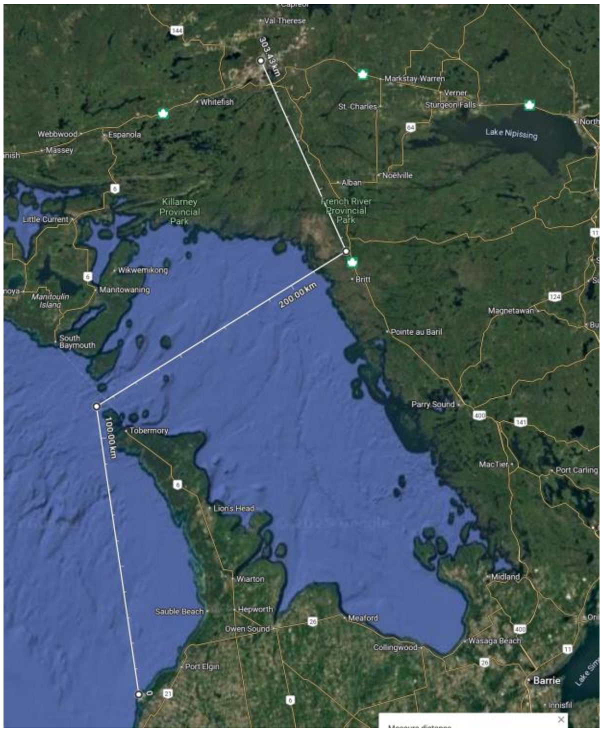
Ontario currently lacks both a North-South and East to West HVDC corridor, yet it has the longest span of any province. It lacks a HVDC line over the greatest distance linking the countries grid. This is costly to Canadians. Both solution # 1 and #2 begin to address the heart of Ontario's current electricity grid. Balancing our grid with renewable energy has been a requirement for storage solutions that should have been foreseen hence the requirement for battery storage plants and pumped storage emerged to compensate for intermittent power. Since battery storage has quick response times, they are suitable for transitioning and stabilizing the grid during fluctuations that utilize HVAC, however the requirement to store energy for all renewables becomes challenging, expensive and environmentally risky with current battery storage technology. The capacity vs, cost and environmental damage to extract the resources is too lengthy to summarize in this proposal. However, if we manage our generation and transmission effectively using HVDC storage, other than transitional balancing, may not be required. Basically, we can regulate the amount of electrical capacity on our grid with HVDC and the flow of water and proper transmission eliminating or minimizing the need for high-capacity inefficient storage.

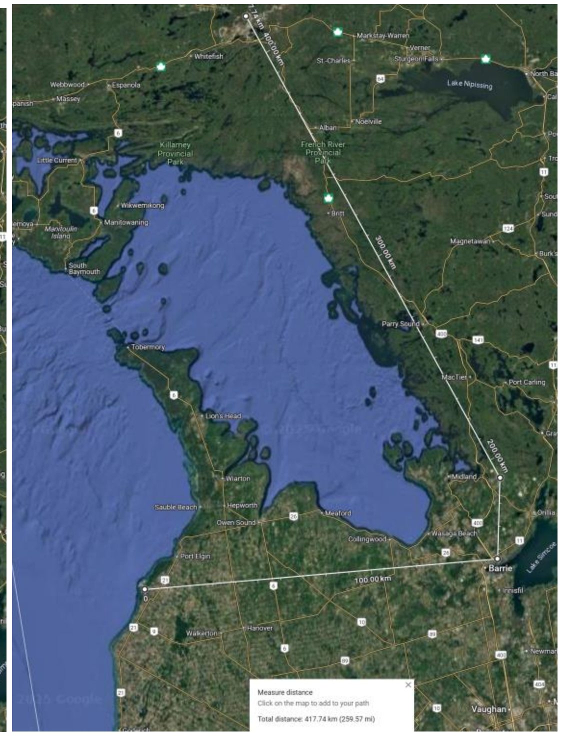
Solution #1

The Barrie to Sudbury corridor can have a HVDC transmission line added to the existing corridor replacing the old out of date center line running at 230kV. There is just enough space currently to allow for this. Trees will not need to be removed as well as land infringement is no longer a concern. This would greatly speed up the completion of the project from the 2032 estimation date. This HVDC line, unlike the HVAC-line, can also allow bi-directional flow of electricity sharing (on the same line) from Barrie to Sudbury or back from Sudbury to Barrie, something currently not possible with the 500KVAC lines . The connection to 6 other proposed lines as mentioned by the IESO “Bulk Transmission Plans” becomes more feasible with the combined length if these projects also consider HVDC. They would include the 2 additional proposed lines from Bruce Nuclear to Barrie, Barrie and Orangeville Bruce -c to London, one double circuit line to from Darlington to Markham (SMR project). And Barrie to Kleinberg. Whether they utilize HVDC technology or not, these lines may remain HVAC if not feasible.

Proposed solution #2

As an alternative to the Barrie to Sudbury route and the Bruce -to-Barrie Route a HVDC underwater cable near the shores of Georgian Bay should be considered. It is feasible with HVDC, A HVDC cable 224km long would weigh approximately 2000 metric tones. It could take under 2-years to deploy from Bruce NGS to the Henvey Inlet Transmission corridor bypassing the expensive time-consuming Barrie to Sudbury route over land except for 75km above ground from Henvey to Sudbury. This route would also eliminate the need to cross over land with towers from Bruce to Barrie(150km). This would reduce the overall land route (160km + 290km = 450km) from Bruce to Sudbury to only 75 km(Henvey to Sudbury), once again with no line losses and minimal completion dates. These use multilayer insulation, shielding, and are safe when properly installed and monitored. These systems are very safe, with decades of operational experience and strict regulation. They have already been successfully deployed elsewhere in Canada.





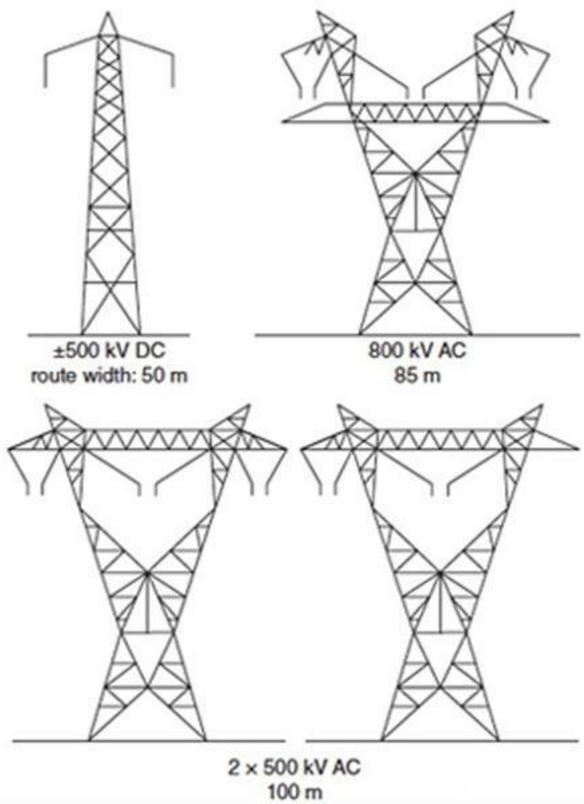
https://en.wikipedia.org/wiki/Saint_Lawrence_River_HVDC_Powerline_Crossing

Proposed solution #3

With the increased hydroelectric generation in Sudbury coming on-line in 2026, increasing 2.5 Megawatts to 6 Megawatts additional electrical power may not be required at all, or minimized. Therefore, increasing the north to south corridor for the sole purpose of these mining projects are negated entirely. Perhaps other hydroelectric generation closer to the demand centers would be more cost effective than long distance transmission lines. Building local capacity may require less time to deploy as well.

Advantages of the HVDC line vs. the HVAC line.

1. The number of conductors is reduced to 2 wires (3cm diameter) + Ground vs. 12 wires(currently) for 3-phase AC transmission.
2. The tower is therefore smaller and most likely can fit in between the two existing 500HVAC towers. The current separation distance with the two existing 500HVAC towers. being 65 meters. The existing 230VAC tower is the smallest, lowest capacity and oldest and eventually needs to be replaced anyway. HVDC Towers offer simpler, more compact steel lattice, smaller footprint and visual impact, Also only 1 or 2 conductors (monopole/bipole)



3. The conductor diameter is smaller for DC (direct Current transmission). Again, a reduction in precious metals is saved. There is no Skin effect with DC transmission allowing a smaller diameter for the equivalent current carrying capacity with no line loss. DC avoids skin effect, inductive/capacitive losses, and minimizes corona effects. Maximizing conductor use and reducing energy wastage is especially important for long distances and the future expansion.

4. The towers for HVDC use approximately half of the steel compared to HVAC, saving costly steel production and carbon emissions during production. We can use this steel for the nation-wide corridor instead.
5. Grid Integration: Enables linkages between Ontario, Quebec, Manitoba and cross-border markets, facilitating clean energy transfers and balancing variable renewables (From IESO).
6. Reduction in Carbon during production of cement bases and other metals has environmental benefits. The foundation bases are already there if they can be reused and re-enforced from the old 230kV AC lines
7. The elimination for High Voltage transformers will increase reliability due to lightning, surges, grid instability and solar flare disturbances the latter of which brought down the entire eastern seaboard in past years.
8.

   Environmental benefits are many but the removal of millions of trees is most concerning. Refer to Fig # 1 for the existing corridor and imagine doubling that width to accommodate two additional 500HVAC lines as proposed in ERO number 025-0656. During a time where Canada is losing its forests from pine beetles, forest fires and increased logging one may ask why we are eliminating more trees? We need to use these trees to sequester the carbon the fires are creating.

Fig#1

9. Bi-Directional transfer of energy on just 2 wires and easily be deployed simplify the direction that the electricity flows. This would allow better management of renewable energy plants when production is low or high. It would also allow other provinces to share their electricity during severe power outage events in Ontario.
10. There is far less EMI radiated with DC Transmission lines as there are for High Voltage AC lines minimizing health concerns. DC lines are generally considered to have lower potential for health effects compared to AC lines, mainly because they don't generate time-varying magnetic fields that induce currents in the body.
11. Greater power transfer efficiencies and no Line Losses due to capacitive and inductive transmission wire properties such as HVAC experiences. HVDC has significantly lower losses over long distances: about 3.5% per 1,000 km, compared to HVAC's 6–7% at similar voltages—roughly 50% less loss .
12. No 60Hz synchronization and stability issues that cause power burnouts, power quality and reliability problems that now contribute severe problems with renewable power on the grid. Simply put, there is no phase angle or shift with DC so severe outages due to inductive loads during switching ,which cannot be predicted, cannot occur with HVDC. Historically just one failure has caused a chain reaction of failures on the HVAC Canada/US corridor, where 8 billion dollars in losses were estimated.
13. Reliability and security issues are improved with HVDC. HVDC transmission may also be selected for other technical benefits. HVDC can transfer power between separate AC networks. HVDC power flow between separate HVDC systems can be automatically controlled to support either network during transient conditions, but without the risk that a major power-system collapse in one network which can trigger other networks to collapse. A HVAC network has led to a collapse in the second system then and chain reaction and then the collapse of the entire HVAC network. This would not occur with a HVDC system. DC systems are isolated from chain reactions. The controllability feature is also useful where control of energy trading is needed. https://practical.engineering/blog/2022/2/9/what-really-happened-during-the-2003-blackout?utm_source=chatgpt.com
14. Endpoint-to-endpoint long-haul bulk power transmission without intermediate taps, usually to connect a remote generating plant to the main grid (e.g. the Nelson River DC Transmission System in Canada).
15. The expansion of Northern Ontario to Manitoba would also greatly benefit for the use of HVDC lines especially over the cost break-even point for distance being about 500km. Sudbury to Manitoba is 1400km making it more

economical than HVAC. Again, it would also allow Manitoba to share its high-capacity hydroelectric power efficiently with Ontario in the event of major blackouts in Ontario or vice versa.

16. **Financial risk and benefits.** From a financial perspective it may be more beneficial to divert the funds for electrical storage projects such as pumped storage (Meaford 8 billion$) etc. Using these monies for local generation and transmission may be more beneficial. Pumped storage has losses estimated to be 30% with serious environmental impacts to Georgian Bay. Battery storage cannot reliably meet significant long-term demand capacity but remains useful for short demand load regulation and stability with the grid. We simply won't have the mineral resources ready in time for such a large-scale battery storage deployment as electrical and automotive markets compete for these same minerals. Both types of storage remain highly controversial if one compares using the money for generation and transmission. With the federal vision of a proper East West corridor there is no real financial loss to Canada that would require this type of large-scale storage. Once the East-West DC grid becomes a reality, Canada can trade within Canada and not negotiate with southern markets, sometimes selling Electricity at a loss. We need this option to be flexible.
17. **Expandability without major construction**. The capacity of the HVDC line can also be considered to exceed the current demands for long-term future requirements. For instance, a 1 Megavolt line carrying 2000 amperes (copper conductor diameter 36mm) can replace both the existing 500kv lines initially or the tower can be upgraded at a later date from 1000Amperes for example. If this type of line (2000 amperes) is initially considered, but not necessary, the existing 2 two 500KV lines can act as backup in the event of severe weather (Ice Storm) or other disruptions. Again, no trees need to be removed or land expropriated. This capacity option can also be utilized later by replacing or just adding conductor capacity on the same HVDC towers.

Summary:

Please reconsider the Barrie to Sudbury HVDC transmission line independently from many of our suggestions. Our suggestions are based on long-term national, provincial and local requirements. If any of the 3 proposed solutions initiate the provincial and national unification of our grid it would be the beginning of a new unified Canada, long overdue.

Canada was once considered the leader with Generation and Transmission. We were the envy of the world with Research in this field. Our provinces need to unite and regain this lead by thinking ahead. We cannot turn back the clock and move the HVDC lines we built going to the USA but we need to catch up in our own backyard in order to negotiate effectively.

With our current environmental concerns this project may be a beginning of the new Canada that our federal government envisions. In view of considerable national discussion around nation building projects our comments contemplate ideas beyond an Ontario only lens.

Please review our proposals and concerns and if you have any further information to share please let us know.

United we stand.

Yours truly

Andy Metelka
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BLCA Director