



Niagara On-The-Lake HYDRO

Introduction and Executive Summary

Niagara-on-the-Lake Hydro (NOTL Hydro) is pleased to provide its submission to the Electrification and Energy Transition Panel (EETP). The submission contains high-level reviews of the Panel Mandate, electricity generation and storage and three high level recommendations that result from this analysis. The recommendations relate to market design, the regulatory environment and the role of the electricity distributor (LDC).

The review of the Panel mandate is important. Though it is called the Electrification and Energy Transition Panel, NOTL Hydro interprets the mandate as helping Ontario's economy to prepare for the impact of combating climate change. Electrification and Energy Transition are the, not unreasonable, expected paths to decarbonize to combat climate change. Ontario needs to be kept competitive during this process and it is advice on this that the Provincial Government is seeking.

The market design in Ontario has morphed so that it no longer meets its original objectives and serves little coherent purpose. NOTL Hydro has been told by outsiders, not positively, that Ontario is the only jurisdiction with anything like the Global Adjustment. NOTL Hydro recommends a full overhaul so that there is a market that sends the right price signals, that encourages investments, that is technology agnostic and that is not dominated by any single entity. NOTL Hydro considers this one of the most important challenges facing the electricity sector in Ontario today.

The regulatory environment in Ontario also needs to be substantially improved. To be clear NOTL Hydro is not referring to the regulation of electricity distributors. Rather, NOTL Hydro is referring to the regulatory obstacles to installing new generation and new loads. This is primarily the Independent Electricity System Operator (IESO), then Hydro One as the dominant transmitter and then the various LDCs to varying degrees. All these bodies have regulatory responsibilities and NOTL Hydro is not advocating changing or relaxing those. But the decision-making timetables need to be dramatically hastened and these responsibilities should not be used as an opportunity to impose unnecessary costs.

Finally, the role of LDCs in Ontario has been highly restricted, especially in comparison to similar entities in other jurisdictions. Loosening some of these restrictions, particularly with regards to the roles of LDCs in sourcing and contracting for generation and storage and for making changes to their systems to accommodate this generation and storage will be necessary. LDCs have the capabilities and capacity to take on this role and to free the IESO to focus on the large generation initiatives and the related transmission challenges.



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Panel Mandate

“The Electrification and Energy Transition Panel was established as a short-term advisory body to help Ontario’s economy prepare for electrification and the energy transition.”

The website for the Electrification and Energy Transition Panel (EETP) starts with this phrase and that is a good starting point for this report. The EETP is to assume that electrification and energy transition will happen. However, electrification and energy transition are not the ultimate objectives. The ultimate objective is to limit the extent of climate change. That will require decarbonization and that is expected to result in electrification and energy transition.

This distinction is important. For instance, there are some organizations advocating for an immediate elimination of all the remaining carbon-based electricity generation in Ontario. NOTL Hydro agrees with the Independent Electricity System Operator (IESO) that this is not the best course of action. Doing so would drive up the cost of electricity considerably which, in turn, would constrain the electrification of transportation and heating. The actual result may be less decarbonization; not more.

There may also be non-electric, or at least non-electric grid, solutions that provide an alternative to carbon-based energy. The use of green hydrogen to power transportation would be one example of this.

The direction to the panel recognizes that electrification is a transition. The expectation is that Ontario consumers will not accept a reduction in their energy usage but can be encouraged to transition to non-carbon sources of energy over time. There is still an important role for the oil and gas industry in Ontario and in Canada. It is therefore not hypocritical to support this supply industry in Ontario and Canada while at the same supporting initiatives to reduce the demand for oil and gas. While the demand for oil and gas still exists, it is better for it to be supplied, cost competitively, from Canada.

The statement also recognizes that electrification and energy transition will be a global phenomenon. This will both help and hinder the decision-making. As many jurisdictions will be going through the same transition as Ontario, Ontario can learn from them and apply the best practices that fit with Ontario’s particulars. However, this will also mean that Ontario will be competing for similar investments, supplies and labour skills which will have an impact on both cost and availability.

Finally, the mandate is about how Ontario’s economy can prepare for the transition. For an economy to prepare, electricity must remain at a fair and low cost. Ontario must remain competitive with the rest of the world for its economy to grow. Subsidizing electricity is not the best course of action as that simply transfers the cost from rates to the tax base. The net result is



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the same. Decisions must be made based on critical examinations of both their costs and benefits. And the benefits must be based on reality, not a political wish. Hopefully, the lessons of the Green Energy Act, and the billions of subsidies now required to pay for it, will be learned.



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Generation

Depending on who you talk to or what you read the need for electricity generation is expected to double or triple over the next 25-30 years. The panel is not seeking (wisely) and NOTL Hydro is not offering advice on specific technologies. Rather, the following are some thoughts on adjustments that may be required to accommodate the needed growth in generation.

Distributed vs Centralized

The current electricity grid is still largely the historical highly centralized one with most generation being large facilities connected to the transmission grid which brings the power to the local distribution grid. There are now a large number of small renewable energy generators connected to local electricity distributors but their overall generation is relatively small. It was not long ago that pundits were forecasting a future in which buildings had solar generation, battery storage, maybe some back-up gas generation and a computer system to manage it all and the grid had become much more decentralized. While this is still feasible and possible it is now realized that this scenario may no longer become mainstream. The reality is nobody knows how centralized or decentralized the electricity grid will be after the next few decades. There are arguments in either favour.

Arguments for a more decentralized grid include:

- The technologies described above now exist and are readily available so roof top systems and battery storage could be installed with any building.
- Expanding and upgrading the transmission grid will likely be one of the most difficult challenges. A more decentralized grid reduces this need.
- The development of small and mini modular reactors means baseload generation can also be distributed.
- The software required for local distributors to manage a local grid has improved significantly so this is now very feasible.

Arguments for a continued more centralized grid include:

- While decentralized generation and storage systems are available, they are not economically viable. Large generation installations (multiple MWs) are still the most economically viable so will still be preferable. This includes solar installations.
- The current grid is highly centralized so less modification of the existing processes is needed.
- The lowest cost generation in Ontario remains hydropower. These are only available in specific locations. A centralized grid helps spread the benefit of this across the entire province.
- The safety demands of nuclear reactors limit the number of locations in which it makes sense to have them.



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The reality is that some sort of in-between solution will likely be required that allows the capture of the benefits of both centralized and decentralized generation. This will require changes to the current processes possibly including:

- Allowing the local electricity distributors some sort of system operator capabilities in their territories in order to simplify the ability to integrate local generation. This would include contracting directly with local generation.
- Changing the market design to encourage more market-based generation.
- Faster regulatory approval processes.

Storage

The lack of storage has always been one of the biggest challenges in creating an electricity system. It has meant that sufficient generation must always be available at the times of highest demand. While great strides have been made in developing new forms of storage it is still very expensive. Storage cannot be relied upon to be a significant part of the solution at present but there are steps that can be taken to facilitate the development of storage in an economical manner that will work in Ontario.

- The creation of market pricing signals that will reward storage opportunities. This includes the elimination of the Global Adjustment mechanism. This is described in more detail in the Market Design section below.
- Encouraging the pumped storage opportunities that exist in Ontario. These can be economical and long-lasting like the pumped storage in Niagara. The recent plans in Meaford and Marmora may be good opportunities in this regard.
- While the funding of storage trials and developments and the latest IESO storage auction are worthwhile, care should be taken not to be locked into requiring a specific type of storage. This was one of the mistakes of the Green Energy Act in purchasing specific generation such as solar and wind. The focus should be on the result, peak shaving or shifting, and not the mechanism.

Storage is not generation so is not a substitute for generation but can reduce the need for generation by reducing peak demands, shifting either demand or supply and supporting intermittent generation.

NOTL Hydro's recommendations stemming from the above analysis can be categorized in three main areas: market design, the regulatory process and the role of the LDC. These are provided in more detail below.



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Market Design

The current electricity market design in Ontario has, over time, evolved in a manner inconsistent with the goal of a market. Ongoing government tinkering has morphed the market from the original hourly market-based system to one dominated by contracts and standard pricing. This leaves little or no room for market-based participants. In fact, the current design discourages market-based solutions. To meet the expected generation needs the market will need to be redesigned. The EETP recommendations offer an excellent opportunity to begin this process.

The key to market design is to create an environment that encourages investments and creativity. At its most effectiveness, this means:

- The decision making is agnostic as to the underlying technologies.
- The price signals fairly represent the cost of generation at each point in time.
- Pricing is transparent and market participants have confidence in the pricing.
- No one party or group of parties dominate the market.
- Decisions based on market signals reflect the needs of the market.

The following are some thoughts of NOTL Hydro on changes to the current market design:

- The Global Adjustment (GA) mechanism needs to be removed. NOTL Hydro is not referring to the revenue the GA raises as that will still be required. Rather, the hourly price should capture the full cost of generation (less the current subsidy paid for by the Provincial Government). Currently, the hourly price over a full month may only capture 20% of the cost of generation with the remainder being GA. There are some important benefits from taking this step:
 - Generators without contracts will be paid the full value of their generation. Currently they only receive the very low hourly price. This would encourage more generation.
 - The price difference between the lowest price at night and the highest price at peak times is very low. The GA is applied at the same rate no matter the time of day or level of demand. This removes opportunities for peak shaving using storage or timing of demand. This is a significant impediment to managing the levels of demand in a cost efficient manner.
- The Provincial Government has required the offering of a new Ultra Low Overnight (ULO) rate option that has very low rates at night but offset by much higher rates at certain peak times. This is being offered in anticipation of more electric vehicles (EV) and their charging requirements. NOTL Hydro supports this initiative but notes that its



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effectiveness will be limited due to the existence of tiered rates which are also offered at the requirement of the Provincial Government. Tiered rates charge the same rate irrespective of time of use so EV owners get a similar benefit and can charge their EVs at any time; even at peak periods. NOTL Hydro recommends that tiered rates be phased out.

- Generation in Ontario is still dominated by Ontario Power Generation (OPG). NOTL Hydro understands the preference to keep nuclear power largely in the government owned entity for safety and development purposes. NOTL Hydro also understands the public desire to keep public ownership of much of the hydro generation. NOTL Hydro never understood why OPG was allowed to purchase all the additional gas generation. However, there is no need for them to be in the same company. NOTL Hydro recommends splitting OPG into three different hydro, nuclear and gas companies so that each has much less market dominance.

The IESO has spent close to 20 years working on the Ontario electricity markets and is continually working to develop them further. NOTL Hydro recommends building on these efforts to make a market that can truly serve Ontarians and help meet the decarbonization challenge.

These recommendations are not intended to preclude the auctions, centralized purchasing and contracts administered by the IESO nor the OEB regulated pricing of OPG. These will still be required for much, though not all, of the generation. However, the costs of these should be fully reflected in the market pricing.



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Regulatory Improvements

Many bodies have expressed their concerns with the regulatory gridlock in Ontario and Canada. A recent example was the June 12, 2023 full-page ad in the Globe and Mail entitled Future Unbuilt sponsored by all the provincial Chambers of Commerce and some unions.

NOTL Hydro has had its own small experience recently getting approval for a load over 10 MW for a customer and can sympathize with these concerns.

In Ontario, the regulatory bodies that have the biggest impact on electrification and energy transition are the IESO, Hydro One and the LDCs. The Ontario Energy Board (OEB), while being the ultimate regulator, is primarily responsible for setting rates and monitoring the actions of the various participants in the industry. Their role in the actual electrification and energy transition process is limited.

The IESO and Hydro One

The IESO and Hydro One do have very important roles to play in regulating the electricity grid in Ontario. The importance of the reliability, resiliency and cost effectiveness of the grid cannot be overstated. These bodies must act to protect that and ensure the required growth can be properly managed.

However, there is significant room for improvement in the process by which this is managed. The process is too slow and too expensive. Too many hurdles are created which are administrative in nature rather than germane to the risk management of the grid.

NOTL Hydro's own experience demonstrated these issues:

- It took 9 months for the IESO to deliver a final decision even though they largely indicated what the decision would be early in the process.
- The length of the process added significantly to the cost as our customer was charged by the hour.
- The length of the process was frustrating to our customer who at times considered moving to other jurisdictions given the delays. This will be a significant risk during electrification.
- NOTL Hydro has no complaints with the actual decision even though our customer did not get all they were seeking and significant conditions, with related costs, were imposed.
- Hydro One has also required an excessive up front payment just to provide an estimate of the cost of implementing the IESO decision. This payment seems to include services and analysis which could be done later in the process. All investment projects have risks and uncertainties; the bigger the upfront costs the more likely the project will not proceed.



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NOTL Hydro recommends the approval process within the IESO and Hydro One be reviewed with a view to what changes can be made to speed up the decision making process and reduce the costs of this process.

LDCs

LDCs also have an important role to play in facilitating electrification and energy transition. As there are over 50 LDCs, the ease in implementing investment projects will vary by LDC. NOTL Hydro deals with multiple contractors and customers who also deal with other LDCs. They are very articulate as to which LDCs have operations which assist customer investments and which are difficult and costly to deal with. NOTL Hydro is not aware of any review of the OEB which has looked at this aspect of LDC performance.

One of the challenges LDCs face is their own restrictions on how much generation can be connected to their feeders. The guidelines vary by LDC but all are designed to protect against short circuit risk. The base guideline in this is IEEE 1547. Ontario has a particular challenge in this regard with high electricity demand in the winter and summer but low demand in the spring and fall; the times when solar generation is at its highest. This results in a much lower level of allowed generation connection per feeder. These restrictions may also have been developed for technologies that have a greater short circuit risk than solar and wind power. This has been an issue at NOTL Hydro and at other LDCs with high levels of distributed generation. NOTL Hydro recommends an industry review be undertaken to see if different standards can be created that are more generation technology specific and may allow more generation to be connected. It would also be useful to see if there are any cost effect solutions that could be undertaken at the transmission stations.



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The Role of the LDC

Contracting for Generation

The role of an LDC is very restricted in Ontario by regulation; much so than is normally seen in other jurisdictions. In particular, LDCs cannot contract for generation. All generation must be purchased from the grid or from locally connected distributed which has a provincial contract. The only generation an LDC can currently contract is net metering which is not really generation but rather an exchange of electricity over different time periods.

LDCs also have the greatest visibility into the generation opportunities in their service territories. Different technologies (solar, wind, hydro, landfill gas, biomass, industrial byproducts, etc.) will be better suited to different regions. These opportunities may also be small in size though on an aggregated basis they could be significant. NOTL Hydro recommends that providing this ability to LDCs be considered. NOTL Hydro recognizes that there are risks with this and these risks will have to be taken into account in both the structure of allowing this contracting and the resulting regulatory review of the LDC performance.

Energy Transition Preparation

The preparedness of LDCs for the energy transition will vary based on both the demand in their service territories and their historical infrastructure. Some areas have high electric vehicle and/or high distributed generation penetration and others do not. Some areas have more recent or larger sized infrastructure (transformers, wiring) and others do not.

Each LDC will therefore have their own timetable for adapting their infrastructure for the energy transition and their own particular investment needs. However, these investments will most likely be needed and there will be a cost for this. The OEB, as the regulator of LDCs, will need to recognize the need for these investments while monitoring that they are being implemented in a manner that meets the needs of the customers in that territory and matches the particular requirements of that territory.