

# Review of Ontario's Interties

Presentation to Stakeholder Advisory Committee  
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# Ontario's Interties

- Ontario is net exporter of energy, but was a net importer throughout the early 2000's
- 85 per cent of all electricity imports come from Quebec and Manitoba
- Imports provide significant economic and reliability benefits, including day-to-day flexibility and support during emergency events
- Ontario's overall import and export capability varies depending on internal constraints in the Ontario and neighbouring transmission systems



# Opportunities for Additional Intertie Benefits

- More frequent scheduling on the interties
  - Neighbouring jurisdictions scheduling interties every 15 minutes
  - General stakeholder support
- Expanding provision of ancillary services
  - Scheduling operating reserve on the interties
  - Testing with Hydro Quebec to schedule 10-min non-sync and 30 min reserve

# Opportunities for New Arrangements: Energy or Capacity

- Energy is already bought and sold over the interties through the market every hour of every day, but this does not contribute to Ontario's long-term adequacy requirements
- Interties could be used to obtain capacity resources, which would be available to meet Ontario's resource adequacy requirements
- Interties could also be used to allow the export of excess domestic capacity resources should they not be required or contracted to meet Ontario's resource adequacy requirements
- Any potential arrangement should be designed to maximize value to ratepayers and system operations through competitive and transparent processes

# Commercial Considerations

- The benchmark comparison for new generation in Ontario would be a newly built simple cycle gas facility:
- All-in price would be about 70 to 90 \$/MWh, assuming intermediate to baseload production levels
- Purchasing capacity over the interties could be achieved either through a capacity auction mechanism or a provincial contract
- The ability of suppliers to sell power at higher prices to markets other than Ontario will be a factor
- Pricing would also have to take into consideration additional cost for transmission in Ontario

# Technical Considerations

- Transmission capability is an important consideration when examining the options to ensure the import could be delivered to the load centre
  - interties are located at a considerable distance from major load centres, in particular the Greater Toronto/Hamilton Area which accounts for about 40 per cent of provincial demand
- Insufficient capability along the existing transmission lines could create congestion and restrict the availability of other domestic resources particularly when the power is needed most and all available resources are already producing
  - i.e. import supply from outside the province would at times only serve to replace another source within the province, providing little net benefit to the system, instead adding considerable costs
- The report examines a number of scenarios intended to demonstrate the potential technical enhancements required to receive capacity from neighbouring jurisdictions

# Quebec

- Quebec has a winter peaking system, and is currently capacity limited in the winter - but has spare capacity in the summer.
  - Quebec recently issued an RFP for 500 MW of capacity for the winter months from 2014 to 2018
- Real time transactions with Quebec have reached up to ~1800 MW either way under certain conditions over the last few years, but is typically less due to the need to maintain operational flexibility
  - The interties between Quebec and Ontario have a combined capacity of 2775 MW, but flows are regularly limited by Ontario transmission constraints
- The following scenarios identify transmission upgrades that could be needed to accommodate firm long-term arrangements with Quebec
  - The scenarios do not assess any potential upgrades to the Quebec transmission system or new generation that may be needed to support larger exports to Ontario

# Quebec Scenario 1: Up to 500 MW / Status Quo

- Firm import capability from Quebec are quite restricted due to transmission issues in the Ottawa area
- Ontario is able to accommodate only ~500 MW of firm capability on a fairly regular basis; but even this could be limited during some extreme local conditions
- By 2020 it is expected that no firm imports can be counted on to meet Ontario peak load without significant transmission investments in that area
  - 2013 LTEP identifies 2019/20 as the first years when Ontario may experience capacity shortfalls
- This does not include any potential transmission limits on the exporting jurisdictions

# Quebec Scenario 2: Imports up to 1,000 MW

- By 2020, the Ottawa area is expecting to be fully utilizing local transmission capability, leaving little capacity if any to allow for a firm import during peak periods
- A transmission upgrade in Ottawa is expected to be required in the future to meet local reliability needs
- Adding facilities to improve the Ottawa Area flows will also allow firm imports of up to 1,000 MW on the high voltage direct connection
- The estimated cost of these transmission upgrades would be up to \$325 million in addition to the cost of the capacity/energy, and up to 3-5 years years to complete

# Quebec Scenario 3: Imports up to 1,800 MW

- Assuming the upgrades identified in Scenario 2 are completed, Ontario would require further transmission enhancements to accept up to 1,800 MW in firm imports from Quebec
- A preliminary estimate of the enhancements includes:
  - A new 230 kV double circuit line between Cornwall and Ottawa to replace the existing single circuit 115 kV line along the right of way
  - A new 230 kV circuit, approximately 8 km in length to connect existing circuits in the west of Ottawa (Kanata)
  - Additional voltage control equipment in the Ottawa area
- The estimated cost of these transmission upgrades would be up to \$500 million in addition for a total of about \$825 million to the cost of the capacity/energy, and 5-7 years to complete on committed

# Quebec Scenario 4: Imports up to 3,300 MW

- In addition to the enhancements noted in Scenario 1, 2, and 3 a new interconnection with Quebec would be required
- A preliminary estimate of the enhancements includes:
  - A new double-circuit 230 kV interconnection
  - A new back to back DC facility at the Quebec-Ontario border and replacement of existing phase-angle regulating transformers at New York at Cornwall
  - A new 46 km 500kV double-circuit line between Bowmanville and the Cherrywood transformer station.
- The estimated cost of these transmission upgrades would be up to \$1.4 billion for a total of over \$2.2 billion in addition to the cost of the capacity/energy, and 7-10 years to complete

# Manitoba

- The existing northern Ontario electrical system cannot accommodate any firm import to the GTA and would require significant upgrades to the Ontario transmission system
  - At a minimum, a 500 kV direct current line, complete with new switching stations and upgrades to existing stations would be needed linking Manitoba all the way to Toronto.
  - The cost of this new infrastructure is estimated to be up to \$3 billion
- An import of about 200 MW from Manitoba could be accommodated when regional load grows sufficiently to absorb the power directly in the northwest

# United States: Michigan, New York, Minnesota

- **Michigan:**

- Roughly 400 MW of additional capacity could be accommodated through the existing transmission infrastructure in the 2020-2030 time-period
- Transmission enhancements in the London, Chatham and Sarnia areas would be required to increase this capability beyond 400 MW. There is no current cost estimate for this option.

- **New York:**

- Ontario's transmission system is connected to New York at Niagara Falls and Cornwall. There is no available capacity to deliver additional imports through the Niagara area. The import capability from Niagara could be increased by 800 MW if the remaining four kilometres of double-circuit 230 kV line between Allanburg and Middleport was completed, at a cost of \$5 million.

- **Minnesota:**

- Ontario has a small intertie connection with Minnesota of 100-150 MW, depending on the season. Imports from Minnesota would encounter the same overall constraint as imports from Manitoba.

# Calculating the All-in Cost

- The all-in cost for delivery of Ontario generation ranges from \$70/MWh to \$90/MWh
- Any arrangement needs to consider the cost of the commodity at the Ontario border and the costs to deliver the power to the load centre
  - **Transmission costs:** The cost for incremental transmission could add about \$20-\$30/MWh to upwards of \$100/MWh depending on the nature of the arrangements
  - **Commodity Cost:** Recent discussion suggest that neighbouring jurisdictions would charge from the mid \$70/MWh for small amounts to over \$100/MWh for larger amounts
- The electricity price paid at the border needs to be on average lower than \$50 to \$60/MWh when considering the all in cost of even modest transmission investments
- Estimates do not include costs of environmental assessments, regulatory approvals, or the job creation and economic development opportunities that made in Ontario alternatives provide

# Recommended Course of Action:

1. *The OPA and the IESO should work with Hydro-Quebec and Manitoba Hydro to explore opportunities for clean imports when such imports would have system benefits and are cost effective for Ontario ratepayers.*
2. *The OPA should continue to evaluate and regularly update the Minister of Energy on the specific parameters for clean-energy import arrangements that would best meet Ontario's needs and circumstances.*
3. *The IESO should allow for capacity imports and exports in developing the design for a potential capacity market for Ontario.*
4. *In providing for capacity imports and exports, the current ability of the interconnections to support reliability and operating flexibility should be maintained. This will mean that only a portion of intertie capacity could be allocated for capacity imports.*
5. *Opportunities to enhance the benefits of the interties should be pursued by the IESO, including more frequent intertie scheduling, and expanded provision of ancillary services through intertie transactions.*