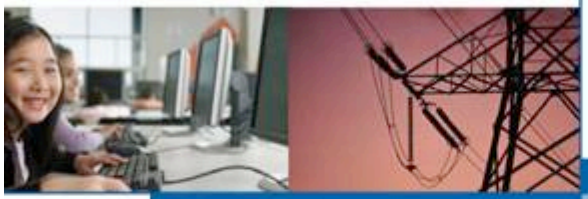


ONTARIO POWER AUTHORITY

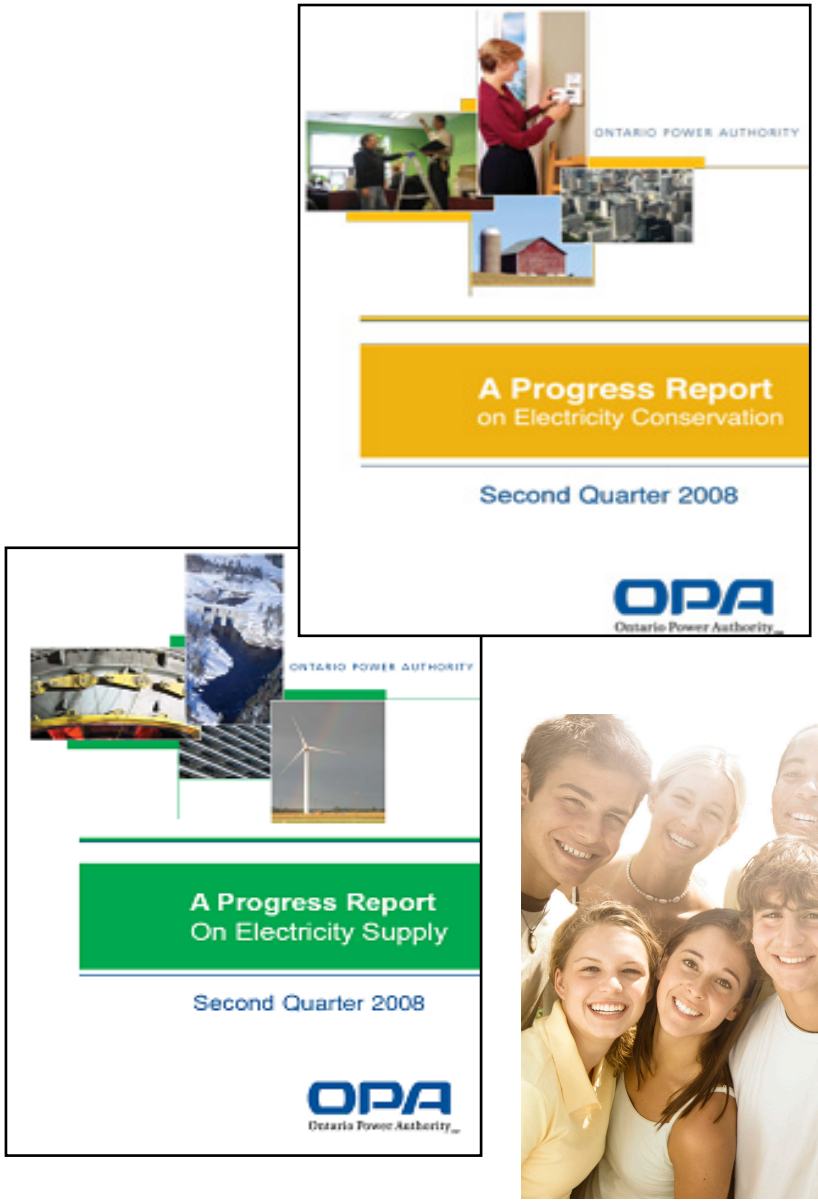
October 27, 2008

Power System Requirements & Distributed Generation within Ontario

Joe Toneguzzo, Director, Implementation & Approvals - Power System Planning

Distributed Generation and the Future of Ontario's Electricity Grid

Today's Presentation



- Ontario's Energy Context & Opportunities
- Distributed Generation Definition, Benefits & Planning Considerations
- OPA Actions for Facilitating Distributed Generation
- Conservation and Supply Accomplishments
- Conclusions

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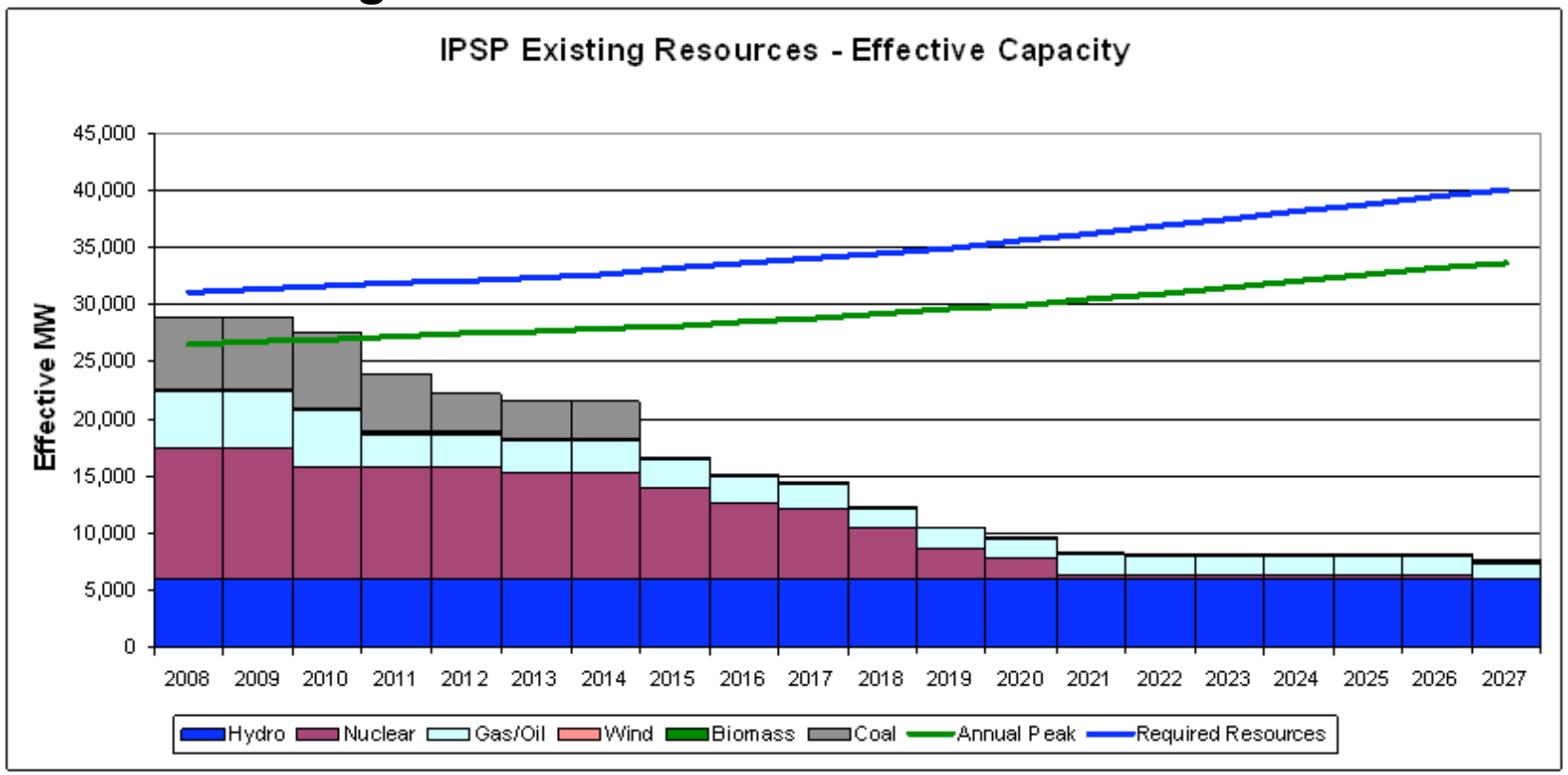
Ontario Energy Context

- About 80% of Ontario's electricity infrastructure requires rehabilitation/replacement in the next 20 years
- An opportunity exists to incorporate conservation and distributed generation to the fullest extent



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Distributed Generation Definition Industry Literature Search:

Currently, there is no industry consensus on how Distributed Generation should be exactly defined.

- Some countries define distributed generation on the basis of the **voltage level**, whereas others start from the principle that distributed generation is connected to **circuits from which consumer loads are supplied directly**.

- Other countries define distributed generation as having some basic characteristic (for example, using **renewable, cogeneration, being non-dispatchable**, etc.).

- The DG Working Group of CIGRE (International Council on Large Electric Systems) defines distributed generation as “all generation units with a **maximum capacity of 50MW to 100MW**, that are **usually connected to the distribution network and that are neither centrally planned nor dispatched**”.

- The IEEE, defines distributed generation as “the generation of electricity by facilities that are **sufficiently smaller than central generating plants so as to allow interconnection at nearly any point in a power system**”.

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Distributed Generation within the IPSP:

- Non-Renewable Generation connected to the Transmission System near a Load Centre
- Renewable Generation distant from load centres and / or the Transmission Grid
- Small scale distribution connected generation or generation behind the customer meter

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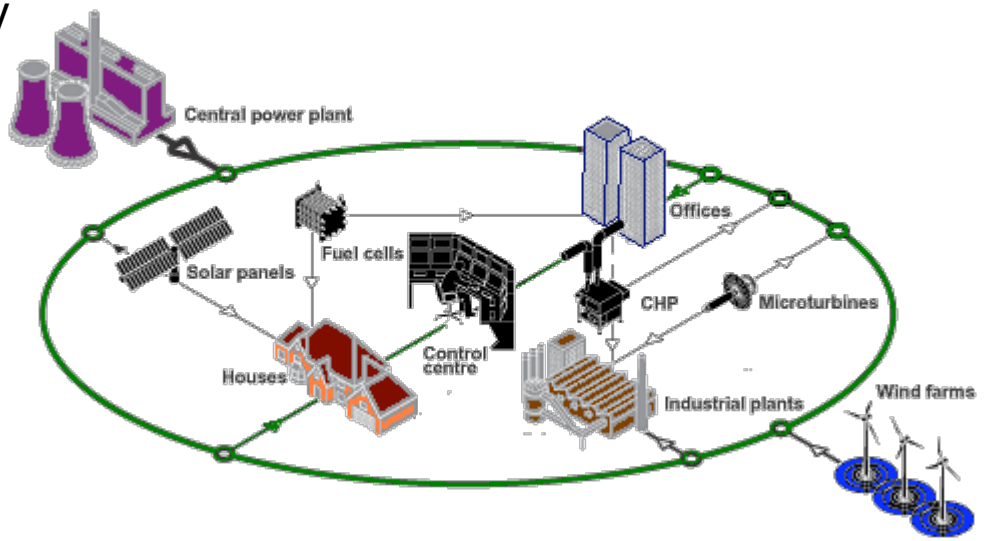
DG has Benefits if Implemented Near Load

- **For customers:**
  - Provides economic opportunity
  - Provides conservation opportunity
  - Can increase local reliability
  - Improve fuel sourcing flexibility



- **For the power system:**
  - Can reduce system losses
  - Can reduce need for new supply infrastructure
  - Can diversify Ontario's supply sources (Technology and Ownership)
  - Can reduce reserve margin requirements
  - Avoided transmission/distribution costs

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DG - Planning Considerations

General Commercial Considerations:

- Cost
- Environmental Benefits
- Timing of Technology
- Effectiveness of Incentives to Install
- Administrative Challenges – Approvals, Operational Control, Connection Queues, Lost Revenue for T&D, Stand-by Charges

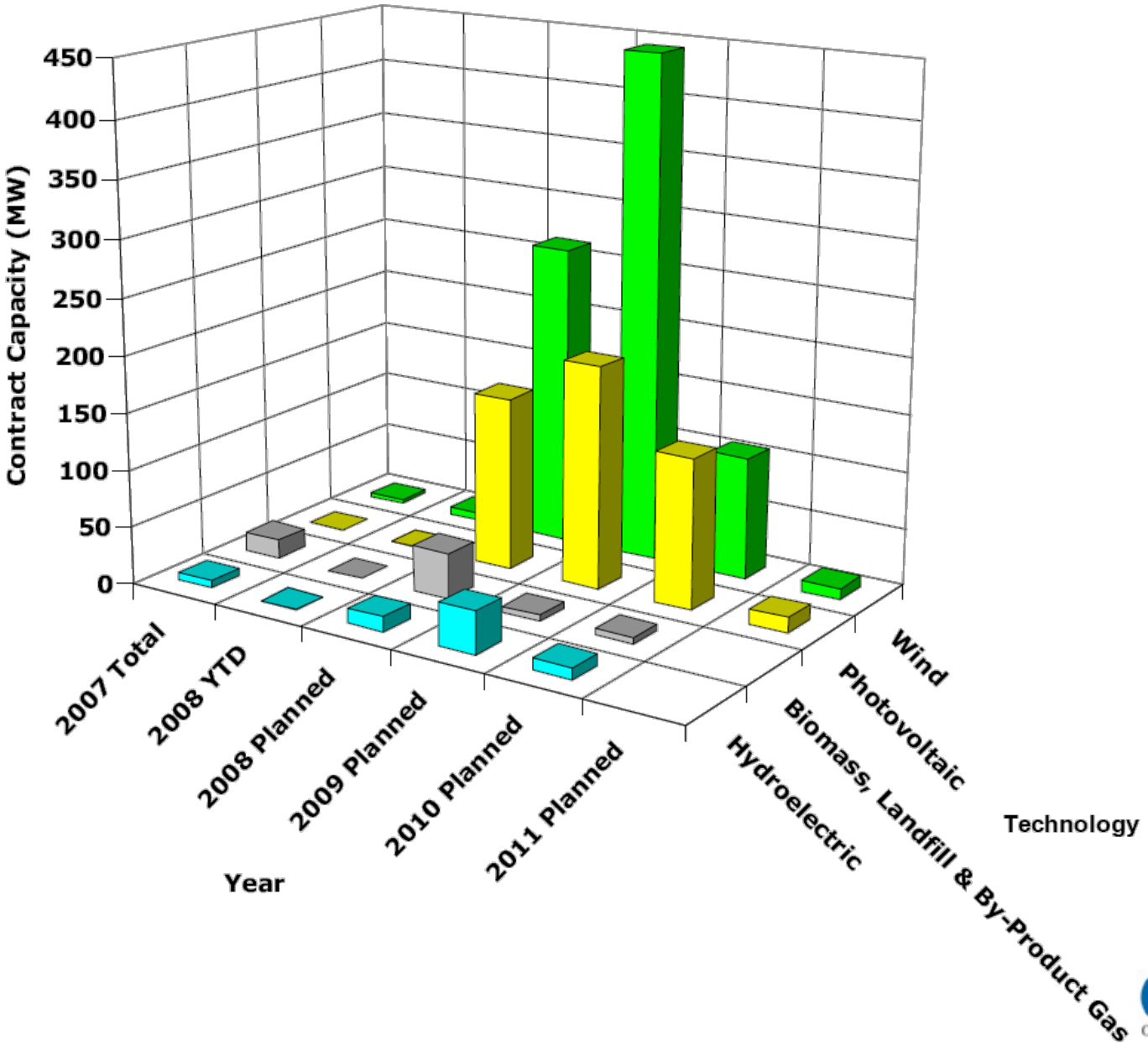
Technical Considerations

- Voltage Control
- Short Circuit Level Impacts
- Protection System Impacts
- Operability
- Dynamic Stability Studies at lower voltage levels

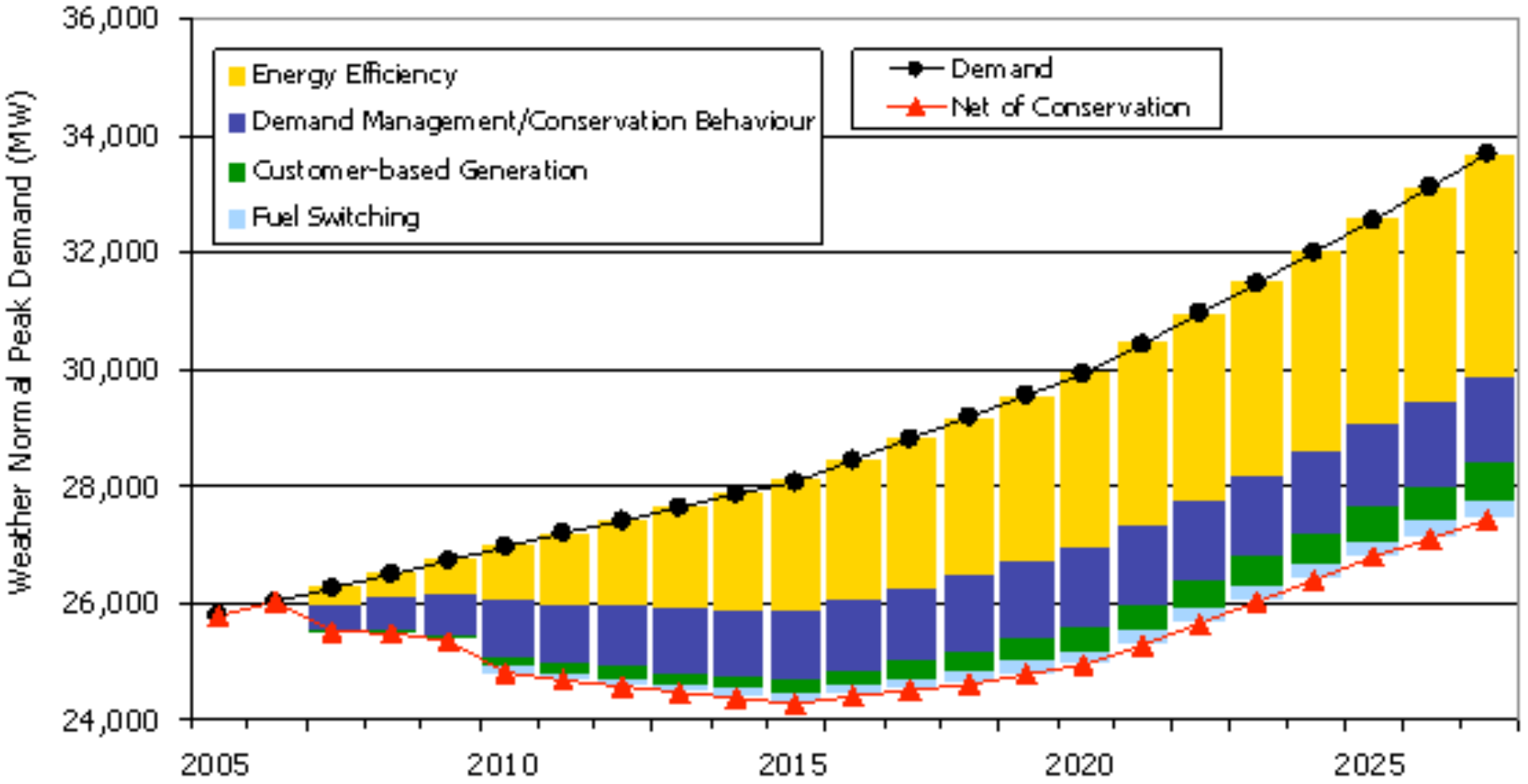
What is the OPA Doing to Facilitate DG?

- Planning for the doubling of renewable resources
- Planning for “smart-gas” strategy
- A variety of procurement initiatives and programs are available to meet consumer needs
    - Resource Procurements
    - Renewable Energy Standard Offer Program (RESOP)
    - Clean Energy Standard Offer Program (CESOP)
    - Demand Response (ability to dispatch on-site generation)
- Technology Development Fund
- Joint OPA / Toronto Hydro study to investigate and review degree of feasibility of DG technologies that could be implemented in central and downtown Toronto

Installed and Future Capacity of OPA RESOP Contracts



Conservation: The Priority Option 5000 MW, $10B



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Generation Supply:
Natural Gas Projects Under Development

For illustrative purposes only.

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Planned Renewable Resources : 8,000 MW, $15 Billion

Note:
The wind generation capacity shown will provide twice the the amount of wind resources necessary to meet the renewable target required by the plan in 2025. As discussed in Exhibit D-5-1, not all of the potential sites are expected to be developed.

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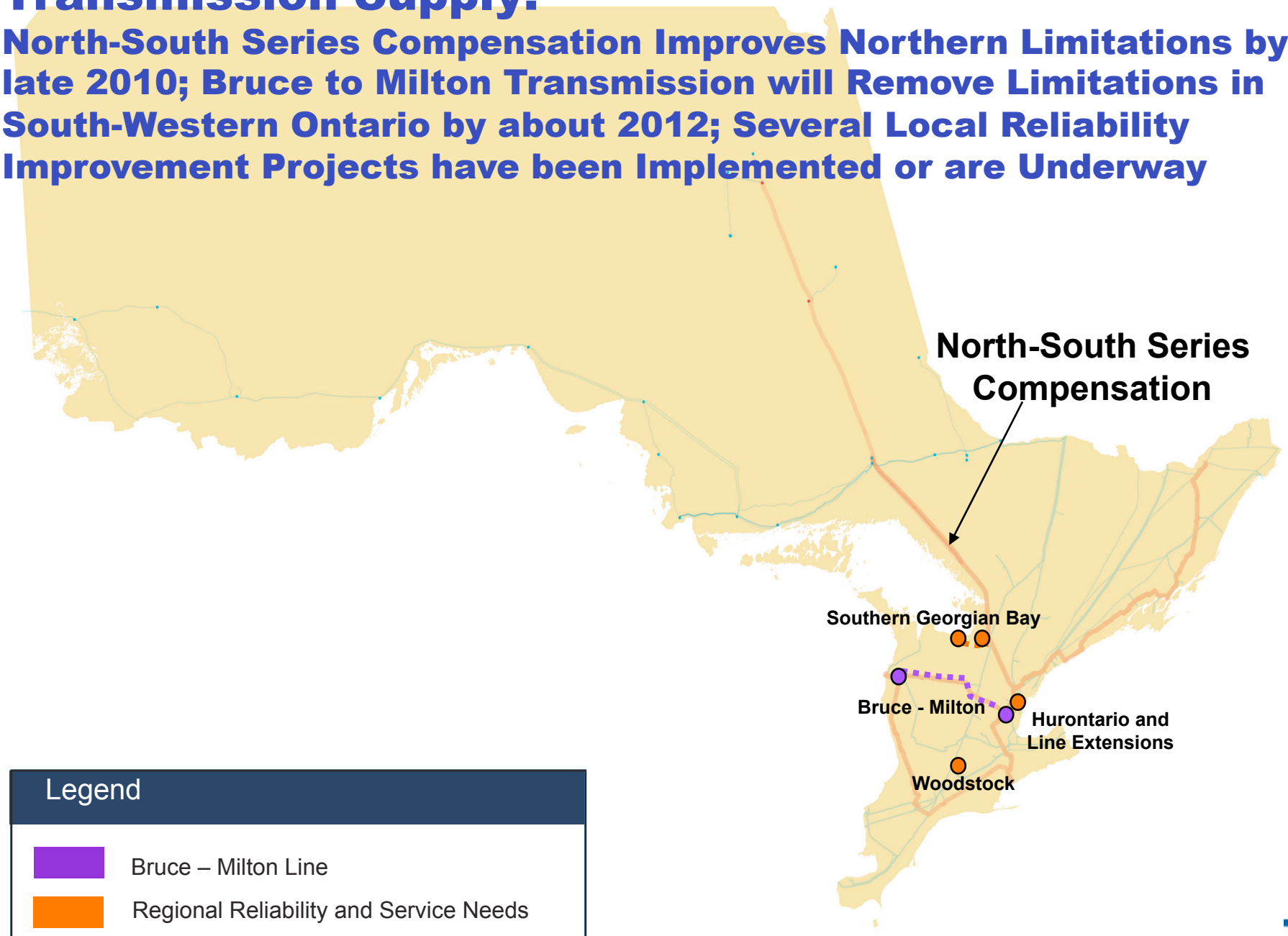
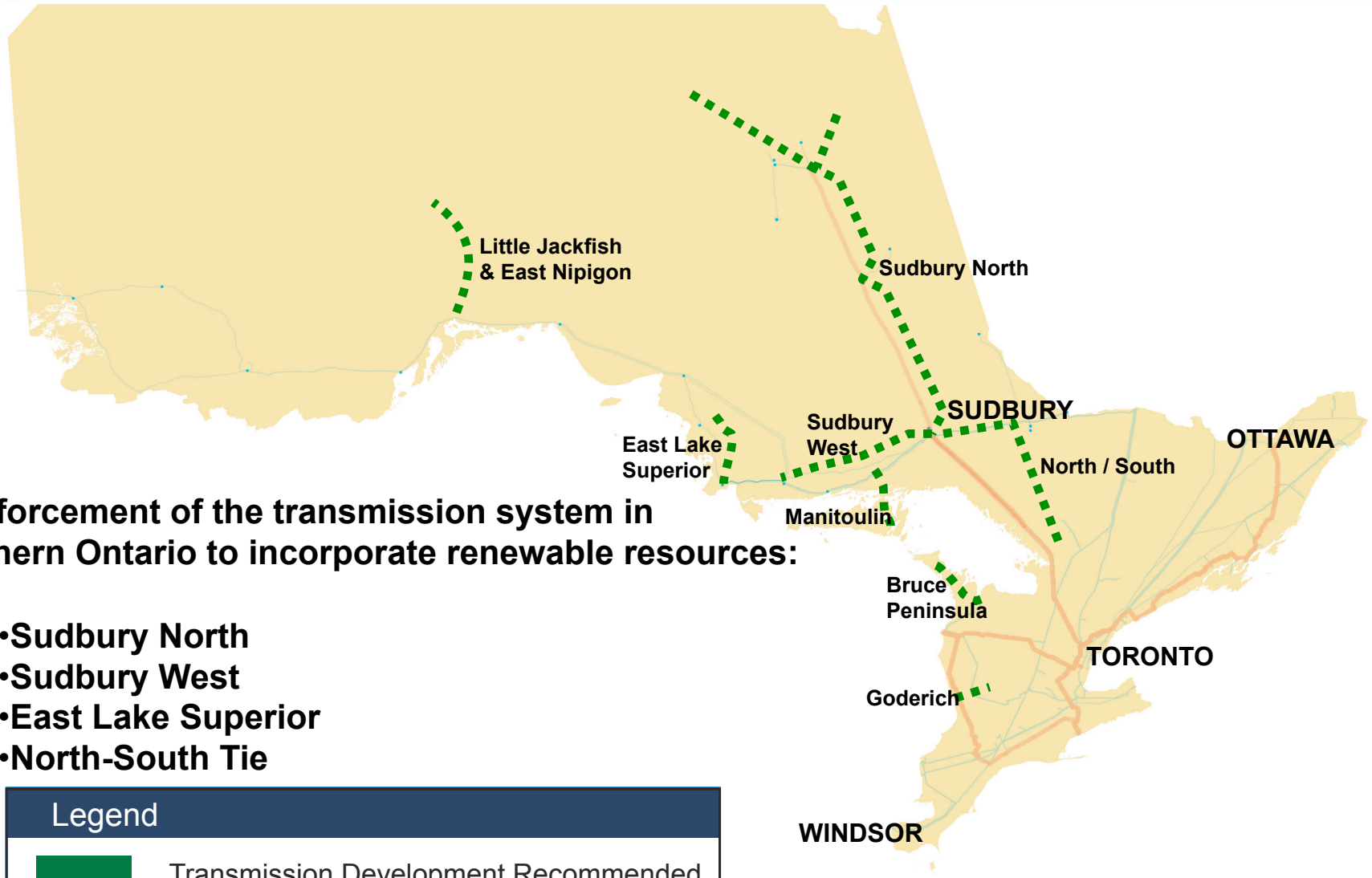
Transmission Supply:

North-South Series Compensation Improves Northern Limitations by late 2010; Bruce to Milton Transmission will Remove Limitations in South-Western Ontario by about 2012; Several Local Reliability Improvement Projects have been Implemented or are Underway



Connecting Renewables



Reinforcement of the transmission system in Northern Ontario to incorporate renewable resources:

- **Sudbury North**
- **Sudbury West**
- **East Lake Superior**
- **North-South Tie**

Legend

Transmission Development Recommended

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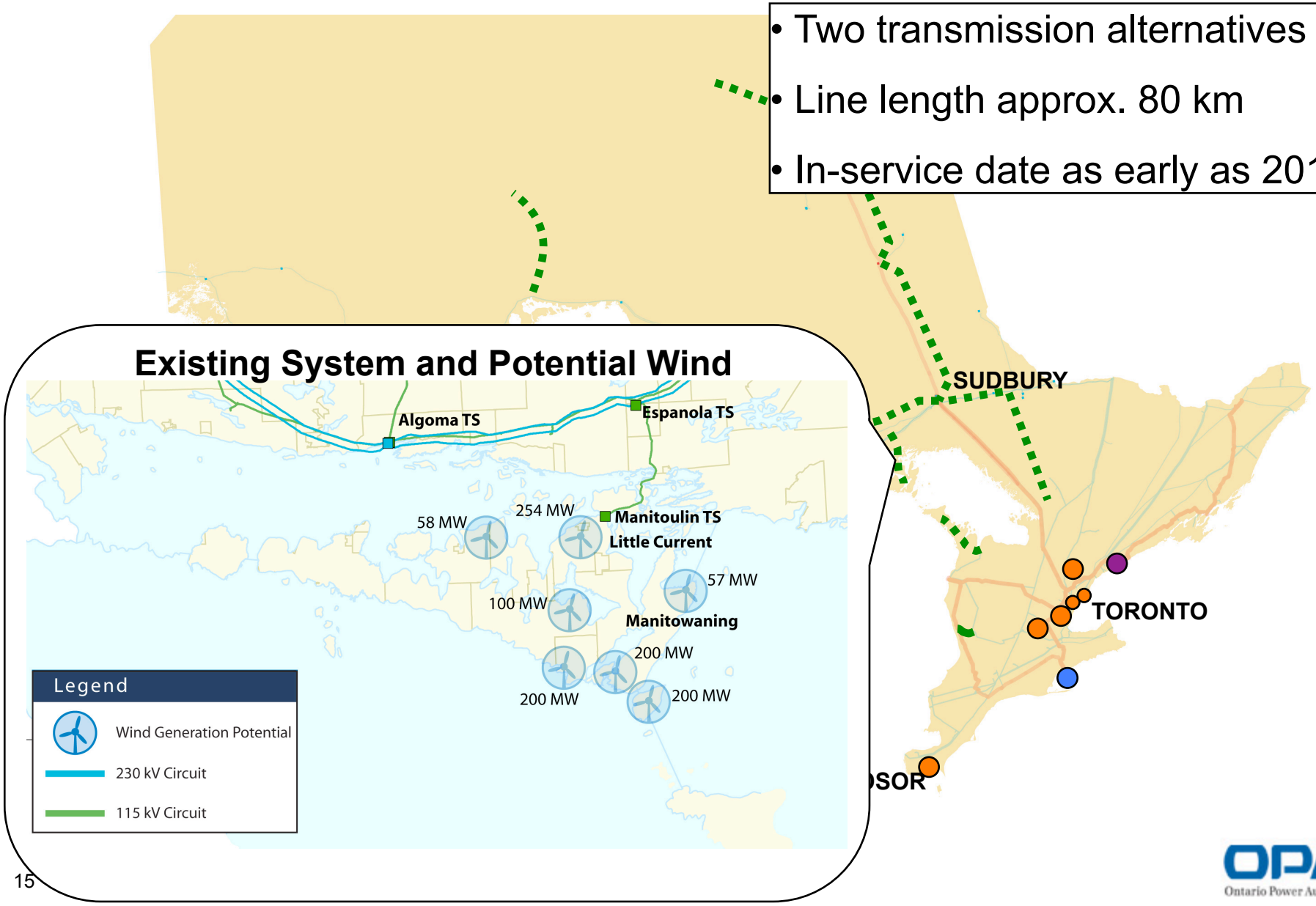
Manitoulin Island Enabler Line

- Two transmission alternatives
- Line length approx. 80 km
- In-service date as early as 2015



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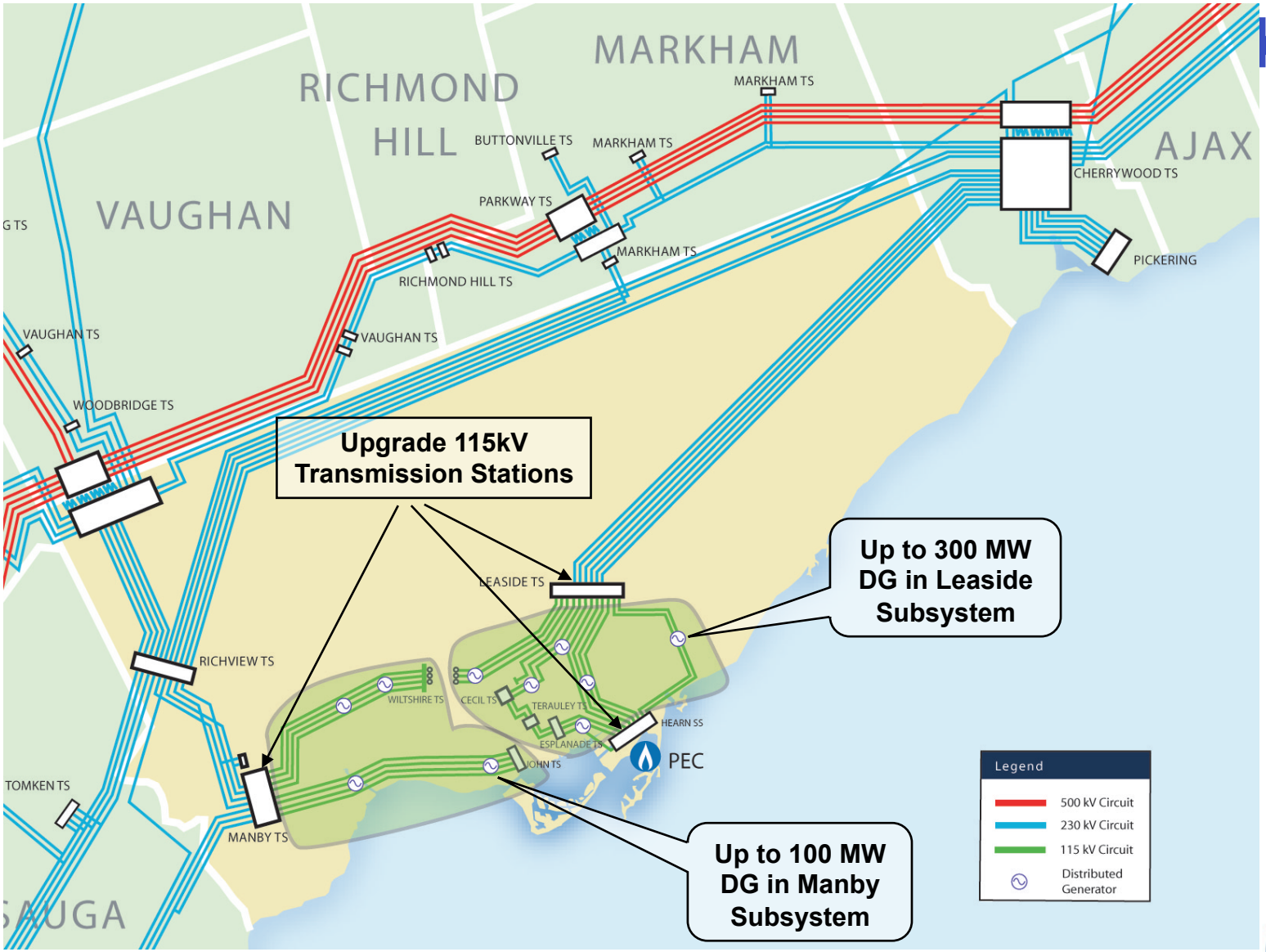
DG for Central & Downtown



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Conclusions

- Conservation, including Customer Based DG has been aggressively implemented and near-term conservation targets have been met with the support of all industry partners
- Procurement methods have been successful in attracting the necessary generation sources with successful efforts on DG resources
- The “smart-gas” strategy has been effective in delivering cost effective solutions which provide required near-term generation resources, maintain local reliability and avoid or minimize local transmission investments
- Strategic near-term Transmission System reinforcements and approvals have:
  - Enabled the implementation of Conservation in all areas of the Province
  - Provided capacity for the incorporation of high value DG solutions in the near-term
  - Maintained local reliability
  - Prepared a good foundation for further reinforcements to enable DG in mid-term
- All industry participants are proactively developing solutions for the timely incorporation of cost effective DG Technologies

Questions ?