IESO Presentation: DSO Capabilities Consultation

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Today's Agenda

The purpose of today's presentation is to provide an overview the IESO's approach to further integrating distributed energy resources (DERs) into the electricity system and perspectives on the adoption of Distribution System Operator (DSO) capabilities in Ontario.

About the IESO

- The IESO plans for future needs, manages the reliability of the electricity system in real-time, and oversee Ontario's electricity markets to drive competition and maintain affordability
- Ontario has a strong history of procuring DERs with over 3,600 MW* of distribution connected contracted capacity
- The IESO's activities related to DER integration and the IESO's perspective on DSO capabilities are rooted in our focus on **reliability** and **cost effectiveness**

* Source- Progress Report on Contracted Electricity Supply

IESO DER Integration Activities

Mandate

- Maximize DER value to the IESO-controlled grid (ICG) through planning, procuring, and operating cost-effective DERs for bulk and regional reliability needs.
- [NEW] Evolve mechanisms for LDC-procured DERs to also provide and be compensated for service to the ICG.

DER Integration Activities

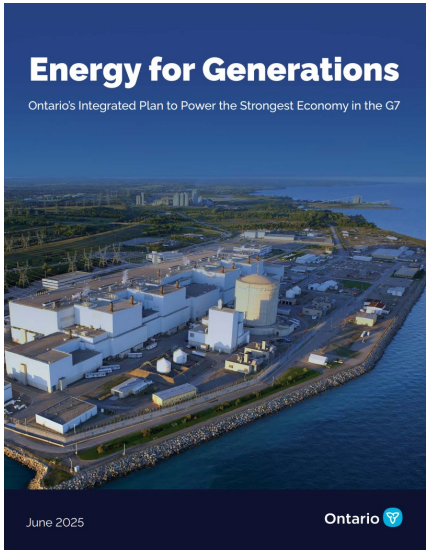
Planning: Consider DERs as a solution for meeting resource adequacy needs (e.g., those specified in the Annual Planning Outlook and Reliability Outlook) and as transmission non-wires solutions (as specified in bulk and regional transmission plans).

Procurement and Markets: Procure DERs, through both market and programmatic mechanisms, as part of the Resource Adequacy Framework (e.g. Long-term/Medium-term RFPs, Capacity Auction, and Local Generation Program), and Electricity Demand Side Management (eDSM) Framework. Further enable access to the IESO-administered markets for DERs and DER aggregations (e.g. Enabling Resources Program).

[NEW] Operational Coordination with LDCs: Work with LDCs/DSOs to enhance bi-directional operational and planning data and coordination processes for all DERs/aggregations that are activated/dispatched by the IESO or by LDCs/DSO.

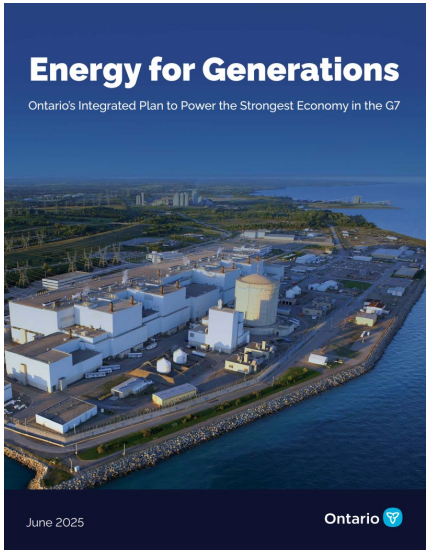
Research and Demonstration: Support continuous innovation in the DER space by testing the feasibility and cost-effectiveness of promising new technologies, practices, and services (e.g. Grid Innovation Fund).

Integrated Energy Plan (IEP) DER Strategy (1/2)



- In addition to ongoing activities, the IEP directs the IESO to:
  - Enable broader DER eligibility in IESO procurements and programs undertaken to meet system reliability needs
  - Review bulk system planning (and support the OEB's review of local and regional planning) to ensure planning processes consider cost-effective DER deployment including identifying areas that would benefit from targeted DER deployment
  - Work with the government to explore opportunities to examine barriers to DER adoption through the Grid Innovation Fund

Integrated Energy Plan (IEP) DER Strategy (2/2)



- The IEP further directs the IESO to support the OEB in:
  - A review of DER valuation that will identify recommendations for the overall regulatory and compensation frameworks to appropriately reflect the value DER provides to the system
  - Identifying responsible parties to implement the review's recommendations and exploring opportunities for LDC-led DER procurements
  - Enhancing data sharing practices between IESO, LDCs, and DER providers

DERs: Not New But Diverse

- The IESO has a long history of procuring and operating DERs, but they are not a single "type" of resource
- DERs are a heterogeneous mix of resources that differ in technology type, size, dispatchability, metering, and purpose
- They can be loosely placed on a spectrum:

Load-modifying DERs that primarily provide other services to an end-user (e.g. transportation, cooling, backup power, etc.) but may incidentally provide services to the grid

Utility-oriented DERs whose primary business is providing grid services

Multi-pronged DER Integration Approach

There is no one-size fits all solution – by deploying a variety of DER procurement and incentives, the IESO enables customer choice while ensuring DERs are integrated cost-effectively:

Programs

(e.g. Demand Side Management, Local Generation Program)

Market Mechanisms

(e.g. Capacity Auction, RFPs)

Rates

(e.g. Time-of-Use Pricing, Net Metering, Industrial Conservation Initiative)

IESO's Enabling Resources Program will start with implementing simple no-regret functionality to enable aggregated DERs and, potentially, smaller standalone DERs to participate in wholesale electricity markets. This work will also include improving DER information sharing between LDCs and the IESO for enhanced visibility and, in the future, coordination.

Evolving Role for LDCs in Advancing DER Integration

Historically:

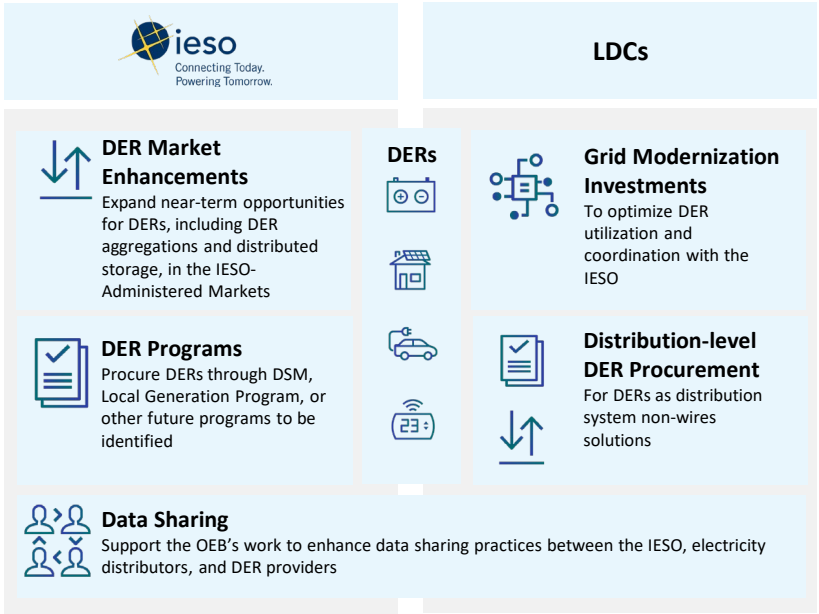
- The IESO was the sole buyer of electricity services from DERs through the Demand Response Auction (DRA) and programs like the Feed-in-Tariff programs (FIT)
- LDCs were "non-dispatchable load" market participants and their business activities were largely limited to distributing electricity – i.e., delivering electricity to retail consumers at the appropriate voltage for their needs

More Recently:

- Through the OEB's Framework for Energy Innovation, Non-wires Solutions (NWS) Guidelines, and Benefit-Cost Analysis Framework, LDCs are enabled to procure and operate DERs as distribution non-wires solutions funded through distribution rates
- LDCs can elect to calculate and seek compensation for broader energy system benefits of DER NWS through initiatives funded by the IESO
- Some LDCs are modernizing their grids to enable management of a more dynamic distribution-network

DSO Capabilities

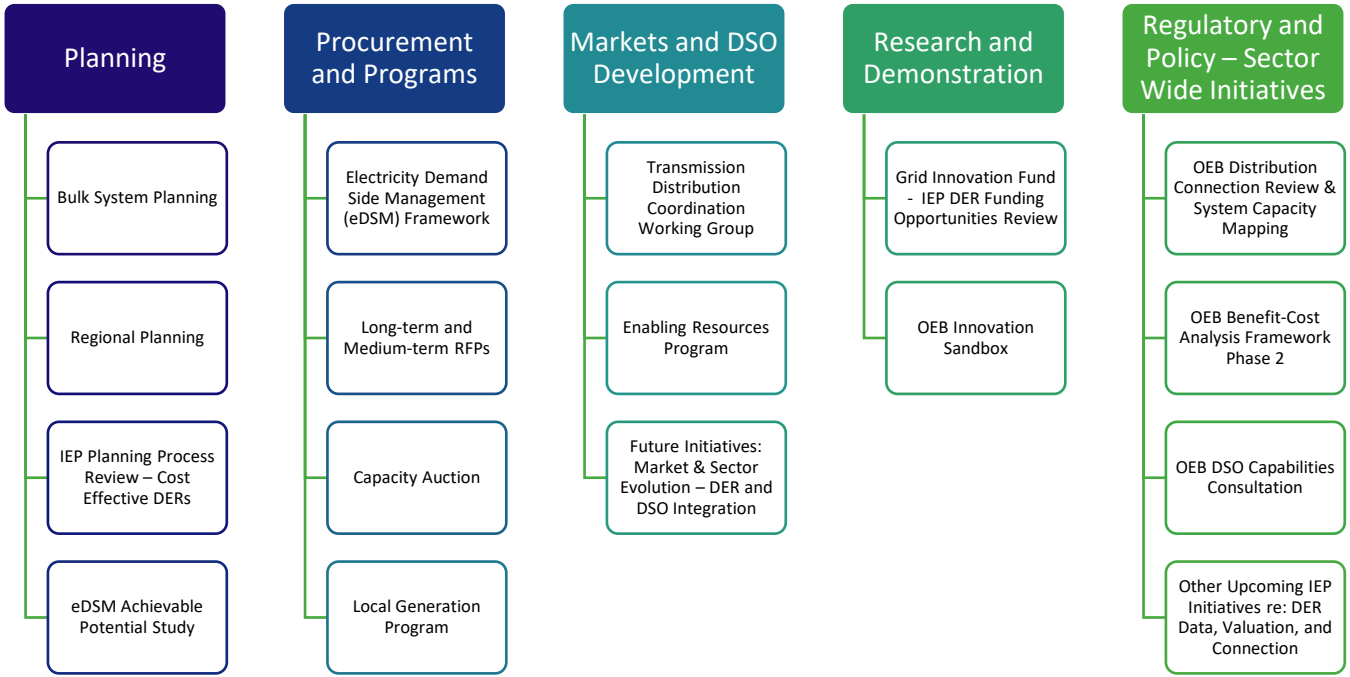
- The IESO is supportive of the development of DSO capabilities and associated grid modernization investments required to enhance the planning, procurement, and operation of DERs for distribution system services (i.e., DERs as distribution non-wires solutions)
- The IESO is committed to collaborating with DSOs to enable pathways for these DERs to also provide and be compensated for additional services to the bulk system (e.g. energy, capacity, transmission deferral, etc.) where appropriate



Graduated Approach to Adopting DSO Capabilities

- The IESO supports the OEB's proposal for a graduated approach to facilitating the adoption of DSO capabilities in Ontario, beginning with a simplified model that reflect the existing regulatory framework
- The distribution-level procurement mechanism and the administrative costs should be commensurate with the value of service provided
- There is room for continuous innovation; functions associated with more complex DSO models can be implemented as DER penetration grows, DSOs mature, and as the value propositions of more complex capabilities are validated

Ongoing and Upcoming DER Integration Activities



Summary

- The IESO is undertaking a variety of planning, procurement, and operational initiatives to advance DER integration. This includes a multi-pronged approach, enabling customer choice while helping to ensure DERs are added to the system efficiently and cost-effectively.
- The Integrated Energy Plan directs the IESO to build upon this work, enabling broader DER eligibility, enhancing planning processes, increasing data sharing between IESO and LDCs, funding pilots, and supporting the OEB in their initiatives.
- The IESO is supportive of an increased role for LDCs in managing DERs and the OEB's proposal for a graduated approach to facilitating the adoption of DSO capabilities and is committed to collaborating with DSOs to integrate DERs for both distribution and bulks system needs.

Thank You

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Appendix

IESO Definition of DER

- There is no universally accepted definition for DER; the IESO defines a DER as:

  A resource that is directly connected to the distribution system or indirectly connected behind a customer's meter and that does one or more of the following:
  - *Generates electricity (e.g., rooftop solar, small solar/wind/biogas/hydroelectric facilities)*
  - *Stores electricity (e.g., batteries, vehicle to building/grid)*
  - *Controls load (e.g., smart EV charger, smart thermostat, other demand response)*

- While DER definitions can include energy efficiency, the IESO has focused on resources that are controllable and/or inject energy

- A DER can operate as standalone resource or as part of an aggregation