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Distributed Energy Resources Roadmap

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Agenda

1. Introduction to the Distributed Energy Resource (DER) Roadmap
2. OEB/IESO Joint Engagement on DER Integration
3. OEB/IESO Joint Targeted Call

1. Introduction to the DER Roadmap

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Introduction

- The IESO is developing a DER Roadmap to provide clarity on IESO objectives, initiatives, and timing for DER integration
- The DER Roadmap will integrate stakeholder perspectives and IESO's objectives to increase competition and unlock options to meet the province's reliability needs
- The IESO will work towards developing a draft DER Roadmap for fall 2021 and a final DER Roadmap by the end of the year
 - The Roadmap will be updated periodically to reflect progress
- The purpose of today's discussion is to introduce the IESO's goals, focus areas and near-term initiatives for DER integration

Background – DER Definition

- To date, the IESO has defined DERs as*:
A resource that is directly connected to the distribution system, or indirectly connected to the distribution system behind a customer's meter; and generates energy, stores energy, or controls load
- While energy efficiency (EE) is not captured in the definition, the IESO intends to include EE initiatives in the Roadmap that directly relate to the focus areas
- The IESO will continue to work with others in the sector (e.g. the Ontario Energy Board) to develop consistent definitions of DERs in Ontario

* [Exploring Expanded DER Participation in the IESO-Administered Markets - Part 1](#)

Background – DERs in Ontario

- DERs can provide benefits to customers and to the electricity system
- By enabling DERs to provide wholesale services, system costs can be reduced and opportunities for customers and investors can be increased
- At least 5000 MW* of DERs have already been deployed in Ontario and there is potential for substantial growth, driven by:
 - Decreasing cost and increasing capability of DERs
 - Electrification/decarbonisation goals and federal funding
 - Business environmental, social, and governance (ESG) goals
 - Municipalities' community energy planning and customers' preferences

* Per DERs that IESO has visibility to as a result of markets, procurements, programs, the Industrial Conservation Initiative

Background – Enabling Resources Context

- The IESO forecasts growing needs through the 2020s for capacity, energy, and specific operability attributes, which may require securing new resources
- The IESO's [Enabling Resources Program](#) (ERP) will produce a 5-10 year plan to enable resources to provide services they currently cannot or cannot fully provide; ERP will support competition to meet emerging system needs
- ERP has identified storage, hybrids, and DERs as high-priority opportunities
- IESO is reviewing stakeholder feedback on the ERP from the April 21st stakeholder meeting and plans to present a draft work plan in Q3
- DER timelines established in the ERP work plan will be reflected in the DER Roadmap

IESO Goal for DER Integration

- To maximize the value DERs can provide to Ontario's electricity system by addressing challenges and opportunities related to DER integration within the IESO's mandate

IESO Focus Areas for DER Integration

- As part of its mandate, the IESO has an important role to play in integrating DERs in Ontario. The IESO's focus is on the following areas:
 1. Non-Wires Alternatives (NWA) – The IESO will implement the recommendations identified in the Regional Planning Process Review to support consideration of feasible NWA solutions to meet regional needs
 2. Wholesale Market Integration – The IESO will seek to expand competition and options for meeting reliability needs by enhancing opportunities for DERs to compete to provide wholesale services
 3. Transmission-Distribution (T-D) Coordination – The IESO will work with others in the sector to ensure there is appropriate T-D coordination to deliver a reliable and efficient supply of energy to Ontarians

Near-Term Activities

- These initiatives are commencing in 2021 and lay the groundwork for DER integration over the coming years:
 - DER Potential Study
 - OEB/IESO Joint Targeted Call
 - DER Market Vision Project
 - Regional Planning and NWA Barriers
 - York Region NWA Demonstration – Year 2
 - Local Initiatives Program within the 2021-2024 Conservation & Demand Management Framework
 - Energy Efficiency Auction Pilot

DER Potential Study

- A key early initiative is to determine the system value of various types of DERs, and the timing of their emergence under different scenarios
- IESO is undertaking a DER Potential Study in 2021 to be completed in 2022
 - Will look out over a 10-year time horizon
 - Will consider a broad range of DERs (e.g. demand response, storage, electric vehicle charging, distributed generation)
 - Use cases in the Ontario context will be explored to determine economic and achievable potential, and to provide recommendations
- The study will inform market design and integration efforts
- A consultant to conduct the study is expected to be in place in July and the project is expected to be introduced to stakeholders in August

OEB/IESO Joint Targeted Call

- A joint targeted call of the OEB's Innovation Sandbox and the IESO's Grid Innovation Fund
- Specifically will seek pilots and research aimed at demonstrating and evaluating the capabilities of DER and solutions to DER integration challenges to support DER participation at the distribution and wholesale levels
- Discussed in more detail as the final agenda item in today's DER Roadmap presentation

DER Market Vision Project

- A market design vision for DER in the IESO-Administered Markets will be developed to form the basis of future market design/integration efforts
 - DER Potential Study and OEB/IESO Targeted Call will inform the vision
- The design vision will consider a range of DER types (generation, storage, controllable loads) and make recommendations in foundational areas:
 - Participation and aggregation models
 - Services eligible to DER/DER aggregations
 - IESO-LDC coordination requirements
 - Metering and telemetry requirements

DER Market Vision Project (continued)

- DER Market Vision Project is a key near-term focus of IESO's DER integration activities and is what much of the near-term DER Roadmap efforts build towards
- The project will be initiated in September/October and will be supported by a robust stakeholder engagement effort
- In the longer term, the DER Market Vision Project is expected to inform the High-Level Design, Detailed Design and implementation for DER integration in the IESO-Administered Markets

Regional Planning and NWA Barriers

- The IESO released its [Regional Planning Process Review](#) (RPPR) report in early 2021, identifying barriers to NWA across the electricity sector in interlinked processes managed by multiple entities, including the IESO
- The IESO process improvements, beginning in fall 2021, will focus on refining the approach to identify opportunities for DER and energy efficiency to cost-effectively meet needs, deferring or negating transmission solutions
 - Formalized sub-process: Establish consistent approach to studying NWA
 - Screening mechanism: Efficiently identify where NWA are suitable
 - NWA characterization: Methods/tools to define and communicate need

Regional Planning and NWA Barriers (continued)

- In the longer term, the IESO will continue to evolve options development and procurement mechanisms for NWA as the OEB's Framework for Energy Innovation (FEI) progresses

York Region NWA Demonstration - Year 2

- \$10M York Region NWA Demonstration is co-funded by Natural Resources Canada and has Alectra Utilities as the delivery partner
- November 2020 Local Capacity Auction achieved 10 MW target (34 MW registered) and DER are participating in Local Energy Auctions (LEA) throughout May-October 2021 to support both local and system needs
- Project explores and demonstrates the coordination of DER providing distribution and transmission services, and will help inform T-D coordination component of the DER Market Vision Project
 - As part of the York Region project, a DER Scenarios & Modeling Study is expected by end of 2022, investigating reliable T-D coordination protocols in detail

Local Initiatives Program

- As part of the [2021-2024 CDM Framework](#), the [Local Initiatives Program](#) (LIP) is being developed to demonstrate the use of targeted CDM as a cost effective resource to help address known regional and/or local system needs
- Four areas with local/regional needs identified for the first cycle of the LIP: Richview South (Toronto), Ottawa, York, and Belle River (Windsor-Essex)
- Open and competitive procurements will be used for the program and are expected to be in the range of 500 kW to 10 MW for each target area
- The IESO is working with LDCs in the four target areas to encourage their partnership and explore the opportunity to expand the procurements to also target distribution system needs through the use of the [OEB's CDM Guidelines](#)

Local Initiatives Program (continued)

- The Local Initiatives Program supports the ‘non-wires alternative’ focus area of the DER Roadmap in particular, and may help inform the ‘wholesale market integration’ and ‘T-D coordination’ focus areas as well
- In the longer term, the IESO will seek to continue to provide opportunities to access local, regional and bulk value by working with partners on pilots or programs, including through the Local Initiatives Program

Energy Efficiency (EE) Auction Pilot

- \$5M Energy Efficiency Auction Pilot tests an auction-based mechanism for procuring EE to inform future potential for EE to compete alongside other supply resources to meet system needs
- Demand reduction procured from EE and non-dispatchable load-shifting projects during specific hours of winter 2022/23 and summer 2023 obligation periods
- Auction was held in March 2021 and secured 7.4 MW for winter 2022/2023 and 6.6 MW for summer 2023, enough to power more than 3,000 homes
- Successful participants include Mohawk College, Unity Health Toronto, City of London, and several aggregators participating on behalf of smaller consumers

Timelines – Near-Term Activities

York Region NWA Demonstration – Year 2 engagement (July)

OEB/IESO Joint Targeted Call and DER Potential Study engagement (August)

DER Market Vision Project engagement and Regional planning process update (Sept./Oct.)

Draft DER Roadmap posted (Fall)

Final DER Roadmap posted (EOY 2021)

Stakeholder Feedback – DER Roadmap

The IESO is seeking written feedback on the following:

- Has the IESO identified the right focus areas to deliver on its goal for DER integration?
- Will the near-term initiatives enable the IESO to make timely progress on its goal and focus areas?
- Are stakeholders supportive of the approach detailed in the draft DER Roadmap Engagement Plan?

Please use the feedback form found under the June 22 entry on the [Distributed Energy Resources Roadmap webpage](#) to provide feedback and send to engagement@ieso.ca by July 14, 2021

Stakeholder Feedback – DER Roadmap (continued)

The IESO is also seeking stakeholders who wish to present their views on the DERs that are most likely to emerge in Ontario and how they should be incorporated into wholesale markets:

- Interested stakeholders are asked to identify themselves via written feedback and briefly identify their views
- IESO will seek to identify a number of stakeholders to present their views at the September engagement days and will work with stakeholders to coordinate content
- Presentations and subsequent stakeholder discussions will provide insight for the DER Market Vision Project

2. OEB/IESO Joint Engagement on DER Integration

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OEB/IESO Joint Engagement - Context

- A common theme in stakeholder feedback to both the IESO and OEB has been the need for greater and more public coordination between the two organizations in relation to DER integration
- Stakeholders have indicated that there are a number of “cross-cutting” issues that impact the work of both the IESO and OEB and it is unclear who is responsible and how the IESO and OEB are coordinating on these topics
- In response to this feedback, the OEB and IESO are proposing to initiate joint engagement meetings to enhance coordination on DER integration

OEB/IESO Joint Engagement - Process

- Leverage existing stakeholder venue(s), i.e. IESO's DER Roadmap engagement sessions and OEB's Framework for Energy Innovation (FEI) consultation
- Meetings will be jointly hosted by OEB and IESO and will be open to all stakeholders
- Initial meeting will be held in the fall of 2021 and subsequent meetings will be held approximately every 6 months
- IESO and OEB will alternate hosting of these meetings

OEB/IESO Joint Engagement - Objectives

- Provide clarity to stakeholders on what topics and issues are being addressed by each organization and in what forums
- Identify key cross-cutting issues and demonstrate to stakeholders how and when they will be addressed
- Ensure IESO and OEB efforts are appropriately coordinated in order to make timely progress on each organization's efforts and DER integration as a whole

Stakeholder Feedback – OEB/IESO Joint Engagement

Stakeholder feedback is being sought on the following:

- Do the proposed OEB/IESO joint engagement objectives meet stakeholder needs?
- Will the proposed process for OEB/IESO joint engagement enable us to deliver on the proposed objectives?
- What are the cross-cutting issues relevant to the OEB/IESO joint engagement that there should be focus on/awareness of and why do they matter?

Please use the feedback form found under the June 22 entry on the [Distributed Energy Resources Roadmap webpage](#) to provide feedback and send to engagement@ieso.ca by July 14, 2021

3. OEB Innovation Sandbox and IESO Grid Innovation Fund Joint Targeted Call on Enabling Resources

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Agenda

- DER Challenges/Problem Statement
- The Opportunity
- Rationale for the Targeted Call
- The Grid Innovation Fund (GIF) and Innovation Sandbox
- Examples of Solutions Being Sought
- Timelines
- Stakeholder Feedback

DER Challenges for Ontario

1. 1000 MW* of expiring DER contracts are expected over the next decade
2. DERs are being installed by residential, commercial and industrial customers independently of distribution or bulk system needs
3. Uncertainty around the value that DERs can provide at both the wholesale market level and distribution level and the tools required to unlock that value
4. The technical and operational requirements to fully integrate DERs across the wholesale market level and distribution level are not fully known

*Section 2.3 Exploring Expanded DER Participation in the IESO-Administered Markets - Part 2

Problem Statement

- How do we maximize the system-wide and ratepayer value that DERs can provide to Ontario's electricity sector and its customers by reliably integrating these resources across both wholesale and distribution system levels?

IESO's DER White Paper Series Recommendation

IESO developed the [white paper series](#) in 2019 with feedback from stakeholders incorporated throughout.

Included recommendation to conduct pilot projects that address current challenges to DER integration, some of which include:

- Aggregation Compositions and impacts on Real-Time Operations
- Types of telemetry
- Measurement and Settlement

OEB Recommendations from ICF Report

ICF developed recommendations for OEB related to DERs. Recommendations related to pilot projects that address current challenges to DER integration include:

- Reporting requirements and best practices for DER data collection and IESO/OEB data-sharing
- Requirements for coordination of DER participation in distribution-level markets and IESO-Administered Markets (IAMs) as they relate to prioritization of services and allocation of roles and responsibilities
- Effectiveness of monitoring and controlling investments

The Opportunity

- DERs are considered a flexible asset that can provide services at both the wholesale market level and distribution system level
- Leveraging the expertise and financial support that the Grid Innovation Fund and OEB Innovation Sandbox can provide, the IESO and OEB are collaborating to discover how to derive value from DERs while maintaining or improving reliability

The Opportunity (continued)

This value can be derived through:

- Developing opportunities for DERs to expand the range of services they can provide to consumers, distribution systems and the IESO-controlled grid
- Refining our understanding of cost effectiveness and dependability of DERs
- Testing and demonstrating effectiveness of technologies that can improve visibility of DERs at both levels (e.g. reliable dispatching, coordination and measurement and verification of DERs)

The Grid Innovation Fund

Enables IESO to evaluate potential of novel and innovative solutions to increase electricity reliability, affordability and customer choice.

- \$9.5M/year for projects
- Open to utilities, for-profit, non-profit and institutional entities
- 230 projects funded since 2005; \$180M invested (\$74M from IESO)
- Investment in projects no more than three years in length, and funds up to a specified percentage of project costs, depending on project type

The Grid Innovation Fund (continued)

Fund creates value for Ontario ratepayers in several ways:

- Enhancing competition in electricity markets
- Producing Ontario-specific data to inform policy, regulatory and electricity market changes/investments by businesses/customers
- Provides objective means of evaluating new solutions while containing ratepayer risk (IESO funds 25-50% of project costs)

The Innovation Sandbox

A fast, accessible way for the OEB to support innovators testing new ideas, services, and business models.

- Open to natural gas and electricity distributors as well as other energy sector entities
- The Innovation Sandbox is designed to support companies interested in innovative projects that show clear potential for benefit to consumers

The Innovation Sandbox (continued)

The Innovation Sandbox offers different types of support:

- An informal Information Service where innovators can speak to OEB staff about questions related to innovative ideas
- Customized regulatory guidance from OEB staff in relation to an innovative pilot project
- The ability for innovators to ask for temporary relief from a regulatory requirement
- Liaison for further assistance

Previous GIF/Sandbox Collaboration

- OEB Sandbox and IESO GIF have experience collaborating to support innovative projects. Collaboration has included GIF funding and Innovation Sandbox guidance on permissible activities for utility proponents, and assessment of regulatory considerations.
- For example: [AlectraDrive @Home electric vehicle charging pilot](#)
 - Purpose of pilot is to assess the effectiveness of time-varying access fees as a means of incenting off-peak use of charging equipment. GIF provided funding and Innovation Sandbox staff provided regulatory guidance regarding Alectra's activities.

Examples of Solutions We Are Seeking

- Technologies that can support dispatching, aggregation, visibility and control of DERs at the IESO-controlled grid as well as at the distribution level to inform OEB's regulatory framework
- Better understanding of coordination and other issues when parties are providing services to each of these levels
- Innovation and research into valuation, measurement, verification and settlements and any regulatory considerations associated with these kinds of functions

The Results

- For the IESO, the results from the successful projects will be used as an input into the DER Market Vision Project lead by the IESO
- For the OEB, results will be an input into the Framework for Energy Innovation policy consultation and related policy development efforts

Timelines – Next Steps

IESO Summit-Lite (June)

Stakeholder Engagement (August)

Release Application Guideline (October)

Project Intake Window Opens (November)

IESO-OEB Review and Select Projects (January – April 2022)

Stakeholder Feedback

The IESO is seeking written feedback on the following:

- Given the problem statement, recommendations, and opportunity presented today, what barriers to DER integration are best suited to be addressed through the joint call?
- Which kinds of projects designed to address these barriers would be expected to benefit from regulatory support available through the OEB Innovation Sandbox?

Please use the feedback form found under the June 22 entry on the [Distributed Energy Resources Roadmap webpage](#) to provide feedback and send to engagement@ieso.ca by July 14, 2021

Thank You

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