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IESO DER Roadmap Update

Progress to-date on initiatives and next steps

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Purpose and Agenda

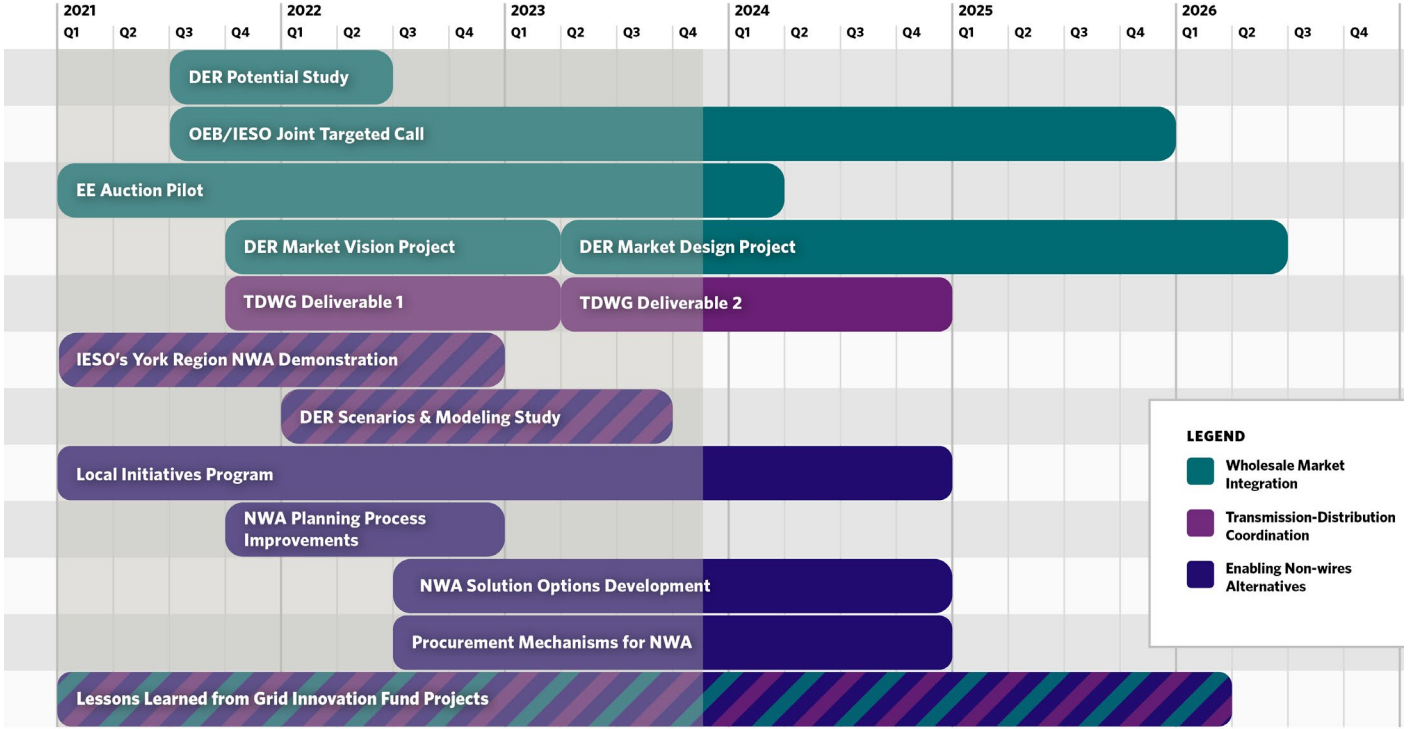
- The purpose of this presentation is to provide an update on the IESO's recent Distributed Energy Resources (DER) activities as identified in the IESO's DER Roadmap (published in December 2021)

- This presentation will first provide an overview of the DER Roadmap followed by one slide for each of the DER Roadmap initiatives, highlighting current status, key learnings, and next steps

IESO's DER Roadmap: Overview

- IESO's goal for DER integration is to maximize the value that DERs can provide to Ontario's electricity system by addressing challenges and opportunities within the IESO's mandate
- The DER Roadmap was **published in December 2021** and was developed with input from organizations from across the electricity sector and beyond
- The roadmap sets out the IESO's objectives, initiatives and timing for DER integration and identifies three key focus areas for DER integration activities:
    (1) Wholesale Market Integration
    (2) Transmission-Distribution (T-D) Coordination
    (3) Enabling Non-Wires Alternatives (NWAs)
- The DER Roadmap is updated periodically – e.g., in May 2023 roadmap updates were presented in an OEB/IESO Joint Engagement webinar and the roadmap website was updated

DER Roadmap Project Timelines



Projected timelines as of November, 2023

1. DER Potential Study

Overview: the IESO commissioned consulting firm Dunsky to conduct a DER Potential Study

Current Status: Complete - DER Potential Study was published in September 2022

Key Learnings:

- 1,300-4,300 MW DER of potential available to meet peak summer demand by 2032 under three scenarios with different market, policy, and technology pathways
- Recommends pursuing high-value DER measures in near-term (e.g. demand response), while enabling emerging potential from solar, storage, and electric vehicles over longer-term
- Recommends accounting for DERs' additional values (T&D deferral, etc.), and leveraging more diverse approaches to deploying cost-effective DERs (e.g. programs, procurements, markets)

Next Steps: Inform IESO Roadmap initiatives and future DER-related efforts; The DER Potential Study was referenced in the government's Powering Ontario's Growth report and the significant potential of DER was recognized

2. IESO GIF/OEB Sandbox - Joint Targeted Call

Overview: In 2021 the IESO's Grid Innovation Fund (GIF) and OEB Innovation Sandbox launched a Joint Targeted Call (JTC)

- In 2022, the JTC funded seven projects that focused on demonstrating the potential for DERs and aggregators to provide services to end-customers, distribution systems, and the IESO-Controlled Grid (ICG)

Current Status: Proponents are advancing their projects and reporting to the IESO and OEB as milestones are achieved; an interim report on the JTC and status of the projects was recently published to the OEB's and IESO's websites

Key Learnings: IESO's key areas of interest include: (1) DER and aggregation performance; (2) transmission-distribution coordination and; (3) metering, monitoring and control solutions

Next Steps: Project activities are advancing and proponents will be speaking to their projects during a moderated discussion at today's IESO/OEB Joint Engagement Session

3. Energy Efficiency (EE) Auction Pilot

Overview: To complement existing incentive-based programs, the IESO has piloted an auction-based mechanism for procuring energy efficiency to support system reliability

Current Status: Piloting is completed, and pilot results are currently being compiled

- Auction was held in March 2021 and awarded 7.4 MW winter and 6.6 MW summer capacity
- Nine proponents cleared 17 EE resources with diverse technologies, participants, and facilities
- The pilot's two obligation periods took place in 2022/2023

Key Learnings: Pilot seeks to assess the interest and ability of different sectors to compete to provide EE capacity through an auction-mechanism

- Uncertainties revealed in participation/performance, with only two providers completing pilot

Next Steps: The results of the pilot are expected to be available in Q4 2023

4. ERP: Market Vision and Design Project [1/2]

Overview: As committed-to in the IESO's Enabling Resources Program (ERP), the DER Market Vision and Design Project will enable dispatchable DER aggregations in the wholesale market

- Allows DER participation in energy, capacity, operating reserve and IESO procurements broadly
- Implemented in a staged approached - Foundational and Enhanced Models

Current Status: Recent developments have substantiated the need to revise the scope of ERP to expedite implementation of enhanced models, including those for DERs

4. ERP: Market Vision and Design Project [2/2]

Key Learnings: Identified "foundational" wholesale participation models for manageable implementation and implementation and "enhanced" participation models for more sophisticated operation

- Foundational model proposes to enable aggregations at a single node, heterogenous aggregations (mix of certain different DER technologies)
- Enhanced model proposes to enable multi nodal aggregations, alternative metering and a reduction in minimum size threshold

Next Steps: IESO is targeting Q1 2024 to share the revised Project Plan with interested stakeholders

5. T-D Coordination Working Group (TDWG)

Overview: Established in Jan 2022, the TDWG is a forum for the IESO, LDCs, and DER participants and aggregators to work together to develop transmission-distribution (T-D) coordination protocols for the reliable operation of DER

- The T-D protocols will detail the type and timing of data to be shared to ensure reliability as DERs participate in the wholesale market, and in emerging local distribution-level services

Current Status: The working group is currently investigating topics related to implementation of the protocols, including the functions of LDCs, communication pathways, IT platforms, etc.

Key Learnings: Conceptual coordination protocols have been developed, detailing the actions to be taken and data to be shared by the various parties under two different models ("Total Distribution System Operator" and "Dual Participation Model") for how to coordinate

Next Steps: Develop 'implementation ready' T-D protocols by end of 2024 (to ensure protocols ready to support new DER participation models being enabled in wholesale markets for 2026)

6. IESO York Region NWA Demonstration

Overview: The York Region NWA Demonstration pilots how DERs could provide distribution-level services and participate in wholesale markets

- Funded by IESO's Grid Innovation Fund (GIF) and NRCan with Alectra as delivery partner

Current Status: Piloting completed, and final reports currently being developed

Key Learnings:

- Adopted an 'independent Total DSO model' as the approach to T-D coordination (neither DSO/local market operator nor its affiliates could have DERs they own participate in market)
- 10-15 MW of DER sized 100kW - 3MW, including aggregations, provided "stacked" services and participated in local capacity and energy auction in May-Oct of 2021 and 2022
- Aggregated residential customers, supermarkets, manufacturers, and others participated

Next Steps: Stakeholder final lessons learned and provide other final reporting by Q1 2024

7. DER Scenarios & Modelling Study

Overview: Electric Power Research Institute (EPRI) commissioned to investigate coordination protocols for a "value stacking" strategy that involves providing services to both a distribution utility and the wholesale market operator

Current Status: Draft report is available; EPRI incorporating stakeholder comments

Key Learnings:

- Defines a set of grid services, a set of scenarios, and two different T-D coordination models
- Presents coordination protocols, detailing when coordination is needed, what actions are executed, and what data is exchanged among DER participants, distributors, and IESO
- Discusses simulation results on a set of Alectra feeders and standard IEEE test feeders

Next Steps: Post final study report and post three summarizing 'technical briefs' in Q4 2023; Incorporate learnings in the TDWG's efforts to develop coordination protocols for Ontario

8. CDM Local Initiatives Program (LIP)

Overview: The Local Initiatives Program uses a targeted Conservation and Demand Management (CDM) procurement strategy to cost-effectively help address local and/or regional needs

- Areas selected for local initiatives include: Richview South in Toronto, York Region, Ottawa, and the Belle River area in Essex County

Current Status:

- Business program (BizEnergySaver) is available now in Richview South and Ottawa
- Residential program (CoolSaver) launched in Toronto, Ottawa and York Region
- Retrofit regional adders (2x incentive) available in targeted areas across the province

Key Learnings: Program expected to inform using CDM as NWAs in targeted areas

Next Steps: Continue contracting efforts for business program in York Region and continue working with a vendor on a pilot program for Belle River

9. Regional Planning Review Process – NWA Items

Overview: The IESO is addressing action items identified in the 2021 Regional Planning Process Review related to 'barriers to NWA', including with respect to (1) Regional Planning process improvements, (2) NWA solution development, and (3) procurement mechanisms for NWA

Current Status: In Q2 2023, the IESO published a Guide to Assessing Non-wires Alternatives, which was developed with input from stakeholders as part of the engagement process

Key Learnings: In accordance with the guide, the IESO has implemented improvements:

- Formalizing the approach to studying NWAs in regional plans
- Adding a screening mechanism for efficient NWA analysis
- Developing methods and tools to characterize needs and develop options

Next Steps: Explore potential options for NWAs informed by the IESO-LDC CDM working group, OEB Benefit-Cost Analysis Framework, TDWG, and other efforts

10. Lessons Learned from GIF Projects

Overview: The GIF supports innovation by funding projects with the potential to achieve significant electricity bill savings for Ontario ratepayers – either by enabling greater competition in the electricity markets or by helping customers better manage their energy consumption

Current Status:

- 2021 DER projects currently or soon to be undergoing standardized test cases to assess DER or DER aggregation performance in providing various grid services

Key Learnings: The goal of GIF lessons learned reporting is to translate project results into meaningful insights to improve electricity reliability, affordability, market evolution, and policy

Next Steps: Continue disseminating project outcomes through different channels, including public reports, conference presentations, and informing ongoing IESO work including DER Roadmap initiatives on integrating DERs in the electricity system

Questions?

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