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Distributed Energy Resources - Market Vision and Design Project

Presentation to TDWG

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Agenda

1. Introduction
2. DER Market Vision and Design Project
3. Phase I Questions
4. Next Steps and Stakeholder Feedback



Introduction

Purpose

The purpose of today's session is to introduce the Distributed Energy Resource (DER) Market Vision and Design Project, part of the IESO's broader Enabling Resources Program (ERP), which includes outlining:

- Background Information - Definitions, DER Roadmap and Enabling Resources Program
- Market Vision and Design Project - Problem Statement, Context, Project Goals, Structure, Scope & Inputs
- Market Vision and Design Project – Phase I Questions
- Next Steps

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 the IESO will continue to work with stakeholders and others in the sector (e.g., the Ontario Energy Board) to develop consistent definitions of DERs in Ontario, the definition above provides appropriate direction on the resources within scope of this project

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

Background - Enabling Resources Program

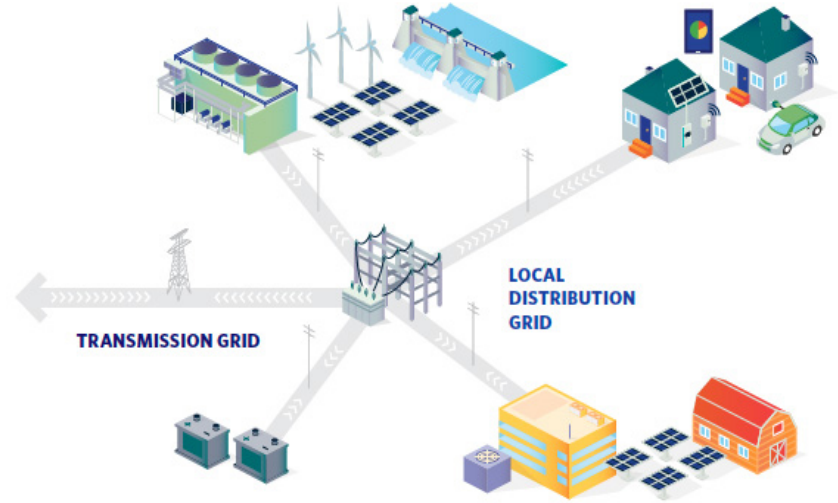
- The IESO forecasts growing needs through the 2020s for capacity, energy, and specific operability attributes, which will require securing new resources
- The IESO's Enabling Resources Program (ERP) will produce a 5–10-year plan to enable resources to provide services they currently cannot or cannot fully provide; ERP will support competition to meet emerging system needs
- ERP has identified storage, hybrids, and DERs as high-priority opportunities
- A complete ERP work plan was published in December 2021
- Timing for this project and other DER Roadmap objectives and initiatives were finalized in parallel with the ERP work plan



DER Market Vision & Design Project

Problem Statement

How can the IESO cost-effectively enhance the value DERs can provide to Ontario's electricity system by expanding participation in the wholesale markets?



Context – DER Landscape in Ontario

- At least 5000 MW* of DERs have already been deployed in Ontario and there is potential for substantial growth
- Additional DERs are being deployed to support customer and policy-driven electrification and decarbonization goals
- Ontario communities are increasingly expressing preferences for the source of their energy; DERs provide them with an opportunity to express and realize those preferences
- The IESO has forecast significant reliability needs over the next decade; DERs can increase options to meet these needs

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

Context – What is Enabled Today

Through existing market rules, the IESO has enabled the participation of DERs if:

- They are a single generation, storage or load resource rated greater than 1 MW
- They are a part of an aggregation of Demand Response (DR) resources, including physical hourly demand response (HDR), virtual HDR – residential, virtual HDR – commercial and industrial (C&I) and dispatchable loads (DLs)

Context – What Can Be Enhanced

- Through the Innovation and Sector Evolution White Paper Series on [Exploring Expanded DER Participation in the IESO-Administered Markets](#) the IESO and stakeholders have identified barriers to DER participation in Ontario's wholesale markets as well as opportunities to address those barriers
- At the same time, in response to FERC [Order 2222](#), jurisdictions across the US are developing and implementing enhanced wholesale participation models for DERs

Context – What Can Be Enhanced (cont'd)

- The efforts above will inform potential enhancements in Ontario, including:
 - Opportunities to enable new and more diverse DER aggregations (DERAs) to better reflect existing and emerging DER potential in the province
 - Potential to enable greater flexibility of aggregated demand-side resources
 - Addressing barriers to participation for small resources (e.g., metering/telemetry processes and requirements)

Context – Role of Markets in Incentivizing DERs

- Stakeholders have identified, and the IESO agrees, that wholesale market participation is one of several options to incentivize efficient investment in and operation of DERs; different approaches may be appropriate in different situations
- Net metering or electricity rate structures are examples of other approaches that can unlock DER potential
- This project is focused on ensuring the IESO is addressing opportunities for DERs that fall within its mandate (i.e., introducing robust wholesale market participation options)

DER Market Vision and Design Project Structure

- This project is a key focus area of IESO's DER integration activities and is what much of the near-term DER Roadmap efforts build towards
- The DER Market Vision and Design Project will be separated into two phases:
- **Phase I:** 2021-(Q1)2023 *DER Market Vision Project (MVP)*
 - Identify "foundational" wholesale participation models for design and implementation in Phase II and "enhanced" participation models to be implemented at a future date
- **Phase II:** 2023-2026 *DER Market Design Project (MDP)*
 - Design in detail and implement "foundational" wholesale participation models (includes market rule/manual amendments and process/tool updates based on recommendations identified in Phase I)

Inputs to the Market Vision & Design Project

The Market Vision & Design Project will draw upon past IESO efforts, ongoing initiatives within the [DER Roadmap](#), and experience in other jurisdictions, including:

- **Incorporating outcomes and suggestion from T-D Coordination Working Group**
- Learning from past studies, whitepapers, and grid previous innovation fund projects
- Jurisdictional scans from ISOs/RTOs implementing FERC Order 2222
- Working with industry leaders in the DER space such as the Electric Power Research Institute (EPRI)
- Incorporating outcomes of the DER potential study and this year's targeted Grid Innovation Fund call

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Phase I Questions

Key Focus Areas

- The DER Market Vision and Design Project will consider a range of DER types (generation, storage, controllable loads) and make recommendations in the following key focus areas:
 - Participation and Aggregation
 - Eligible Services
 - IESO-Distributor Coordination
 - Metering and Settlement
- These areas are broadly consistent with, and build on approaches from FERC jurisdictions subject to [Order 2222](#) which outlines mandatory requirements for DER wholesale integration

Phase I Questions – Participation & Aggregation

Key Focus Area	Phase I Questions	Explanation of the Issue	Additional Considerations
Participation & Aggregation	1. What participation and aggregation models will be established for DER resources? And why?	This topic will identify the options DER participants will have when connecting and registering DERs/DERAs.	<ul style="list-style-type: none"> • Types of aggregations • Single-nodal or multi-nodal • Dispatch capabilities • Behind-the-Meter participation
	2. Which entity/entities represents the IESO market participant?	As individual DERs may be a part of a larger aggregation, this topic will identify the entity/entities responsible for meeting wholesale market participation requirements.	<ul style="list-style-type: none"> • Evolution of the aggregator role • Distributor role and responsibilities
	3. Are maximum and minimum size thresholds needed for individual DERs or DERAs?	FERC Order 2222 stipulates a minimum size requirement of 100 kW. Currently in Ontario the threshold is 1 MW. This topic will explore appropriate thresholds for Ontario.	<ul style="list-style-type: none"> • Minimum size threshold • Maximum size threshold (if applicable) • Size thresholds for DERA contributors (if applicable)

Phase I Questions – Eligible Services

Key Focus Area	Phase I Questions	Explanation of the Issue	Additional Considerations
Eligible Services	4. What products and services can DERs/DERAs provide?	One DER (or DERA) can have very different characteristics from another. This topic will identify which DERs/DERAs will be eligible to provide which products and services.	<ul style="list-style-type: none"> • Capacity • 5-min energy • Operating Reserve • Regulation
	5. In what timeframes will DERs/DERAs be eligible to participate?	Upon completion of the Market Renewal Project the IESO will have a day-ahead market, an enhanced real-time unit commitment process and a single schedule real-time market. This topic will explore DER/DERA eligibility for these structures.	<ul style="list-style-type: none"> • DER/DERA unit commitments (if applicable)
	6. What are appropriate visibility requirements for DERs/DERAs (i.e., telemetry)?	Today, the IESO has prescriptive telemetry requirements outlined in the Market Rules. This topic will identify what information will be needed (and at what level) to enable DER/DERA participation while maintaining reliable operations.	<ul style="list-style-type: none"> • Device-level telemetry • Inverter- based telemetry • Distributor collected operational data

Phase I Questions – IESO-Distributor Coordination

Key Focus Area	Phase I Questions	Explanation of the Issue	Additional Considerations
IESO-Distributor Coordination	7. What coordination protocol(s) will be used amongst the IESO-Distributors-Aggregators to enable reliable wholesale market participation?	Understanding distributor/IESO operations and reliability needs will help the IESO, distributors, aggregators and asset owners create protocols that are beneficial to all parties and do not unduly hinder one party's operations over another. This topic seeks to identify what components of a coordination protocol will be required.	<ul style="list-style-type: none">• Managing dual participation in wholesale markets and distribution services• Managing resource unavailability due to system conditions

Phase I Questions – Metering & Settlement

Key Focus Area	Phase I Questions	Explanation of the Issue	Additional Considerations
Metering and Settlement	8. What revenue metering arrangements are appropriate for DERs/DERAs?	Existing metering requirements set forth through market rules, standards, and policies, may provide barriers to DER participation. This seeks to determine if different approaches are possible and appropriate for DERs/DERAs.	<ul style="list-style-type: none"> • Alternative forms of metering for measurement and verification purposes • Accuracy requirements for small scale resources
	9. Will additional settlement arrangements need to be established for DERs/DERAs?	There are technical characteristics of various DERs/DERAs relevant to settlement can differ (e.g., access to demand response data vs. generation data). As such, this topic will determine if existing settlement processes and timelines are appropriate for DERs/DERAs	<ul style="list-style-type: none"> • DERs/DERAs spanning several locational marginal prices (LMP) zones • Data composition and timing



Next Steps and Stakeholder Feedback

Timeline and Deliverables

Date	Deliverables
January 2022	<ul style="list-style-type: none">• EPRI Presentation on FERC Order 2222• MVP timelines and deliverables for the remainder of 2022
Q2 2022	<ul style="list-style-type: none">• Criteria used to determine foundational vs. enhanced models• Initial set of options of Phase I questions
Q3 2022	<ul style="list-style-type: none">• Recommendations for Phase I questions for foundational models with associated rationale
Q4 2022	<ul style="list-style-type: none">• Options and draft recommendations for enhanced models with associated rationale and criteria to trigger implementation
Q1 2023	<ul style="list-style-type: none">• Contingency and finalization of participation models

Thank You

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