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Enabling Resources Program

Update

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Agenda

1. Introduction & Background
2. Developments To Date
3. Update to ERP Project Plan
4. Next Steps and Stakeholder Questions

Summary

- Significant progress has been made on the Enabling Resources Program (ERP) to date, including the completion of foundational and enhanced design visions
- While the IESO initially committed to implementing foundational models for storage, hybrids and Distributed Energy Resources (DERs), factors impacting resource needs since the program was initiated have evolved (i.e. significant amount of storage procured; increased demand for clean energy; certainty regarding DER potential; availability of federal funding for system upgrades)
- Accordingly, the IESO is now revising the scope of ERP to expedite implementation of the enhanced models for storage and hybrids and elements of the enhanced model for DERs

Enabling Resources Program Background

Introduction and Background

- In December 2021, the IESO published the Enabling Resources Program work plan for enabling priority emerging technologies in the wholesale market. These technologies include energy storage, hybrids and distributed energy resources
- Since then, IESO has completed various work at the individual project stream level through project-specific engagements such as the Hybrid Integration Project and DER Market Vision and Design Project, adding to the previous work done by the Storage Design Project
- The purpose of this presentation is to provide a recap of what has been accomplished to date and to provide an update to the ERP Project Plan

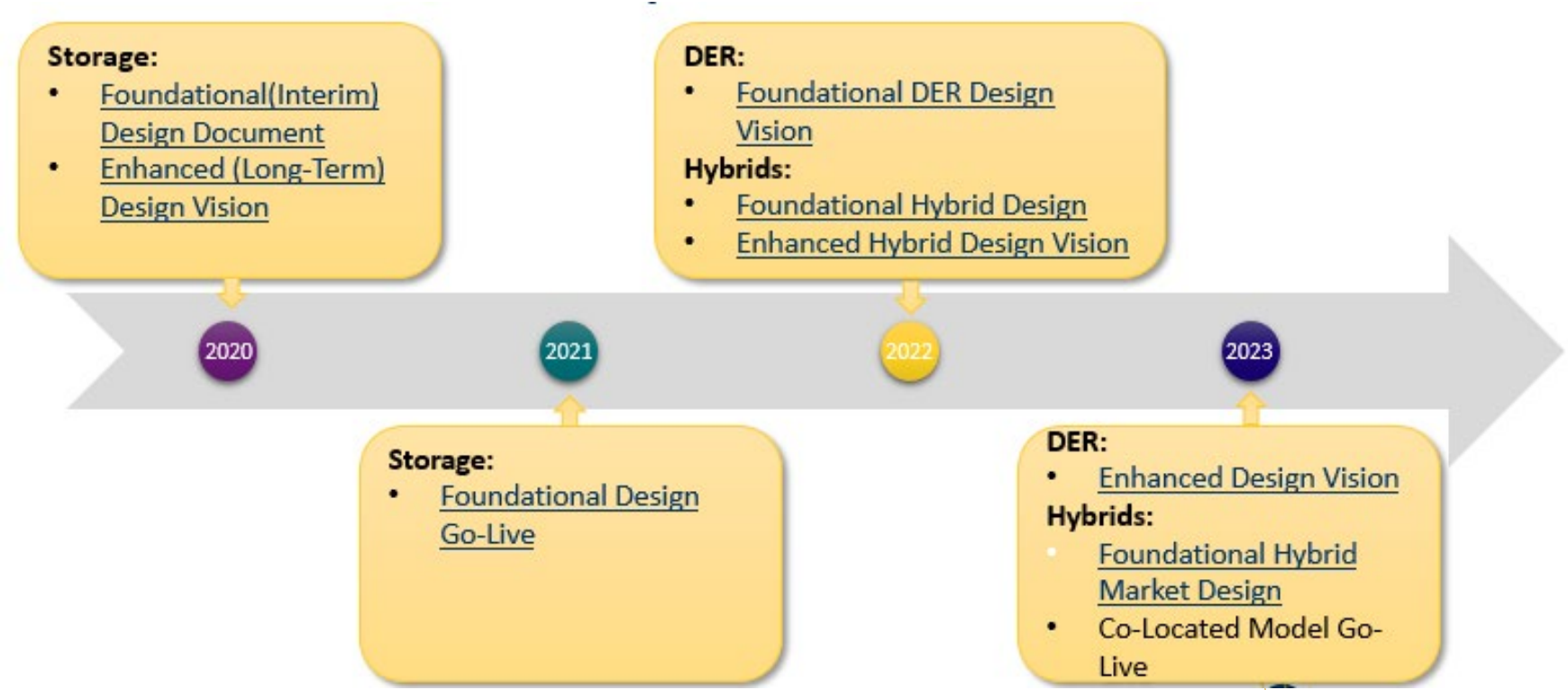
Recap: IESO's Enabling Resources Program (ERP)

- ERP is a five-year program to enable emerging resources to provide electricity services in the post-Market Renewable Program (MRP) electricity markets that they cannot fully provide in the current electricity market design; ERP will provide more options for Resource Adequacy
- A cost effective and orderly energy transition will require an "all hands on deck" approach; enabling emerging resources helps to ensure Ontario can leverage all of the supply options at its disposal in order to maintain the reliability and affordability of Ontario's electricity system to support Ontario's energy transition

Recap: Foundational versus Enhanced Models

- The general approach to resource enablement under the ERP includes identifying and implementing participation models in two stages:
    - **Foundational Models:** Pragmatic models with manageable implementation cost and complexity; developed to avoid impacting MRP timelines and due to uncertainty about how many new storage, hybrid or DER resources would be developed in Ontario
    - **Enhanced Models:** More sophisticated models that build on foundational models; enhanced models require greater resource/tool upgrades and could be implemented post-MRP to unlock additional capability from ERP resources

ERP Deliverables Completed To-Date



Implementing Enhanced Models

- In 2021 the IESO determined a need to proceed with "foundational" participation models in order to: minimize impacts on IESO tools and MRP, limits costs, and seek further clarity on when new resource types would emerge
- The IESO committed to developing design visions for enhanced participation models that could be implemented in the future
- To help address when enhanced models could be implemented, the IESO identified criteria for proceeding with enhanced participation models

Criteria for Enhanced Model Implementation

Criterion	Storage/Hybrid	DER
Completion of IESO Market Renewal Program	✓	✓
Implementation of the IESO Foundational Model	✓	✓
Availability of external sources of funding	✓	✓
Commitment to implement enhanced models as part of other ERP initiatives (enduring storage model, enhanced hybrid models)	✓	✓

Revising the Scope of ERP – Rationale

Recent developments in Ontario's energy landscape have substantiated the need to revise the scope of ERP to expedite implementation of enhanced models for storage and hybrid resources and elements of enhanced DER models, including:

- Progress on MRP implementation has clarified timing/availability of resources for ERP
- Significant growth in the number of storage resources expected online in Ontario in the near-term as a result of recent procurements (see Appendix A)
- Greater understanding of volume of DER potential to support system needs (per Achievable Potential Study completed by the IESO in 2022)
- Commitment of funding from Natural Resources *Smart Renewables and Electrification Pathways* funding to support ERP

Revising the Scope of ERP – Work Plan

- IESO will revise the scope of ERP to proceed with the implementation of the enhanced models for storage and hybrids
- The IESO will continue to implement the foundational DER model as committed with some additional functionality of the enhanced model and a commitment to implement the full enhanced model by end of program
- The IESO is currently working on developing a detailed work plan to determine the timing for implementation of the work
- Work plan will leverage expertise made available as MRP aspects complete and consider that ERP will be built on market platform established by MRP

Recap: Foundational & Enhanced Models (Storage)

Feature	Foundational Model	Enhanced Model
Resource Modelling	• Two resource model (i.e., a storage injection resource and a separate storage withdrawing resource) • Separate bid and offer required from the injection resource and the withdrawing resource	• Storage will be modeled in the tools as a single bi-directional resource that can inject (bid) or withdraw (offer) fluidly and seamlessly
State of Charge	• Market participant manages state of charge through their bids + offers (not modelled in IESO tools)	• State of charge modelled in IESO tools to support efficient/reliable use of storage (will ensure tools have view to state of charge so only feasible dispatch instructions issued)

Recap: Foundational & Enhanced Models (Hybrids)

Model	Foundational Model	Enhanced Model
Co-located	Storage modelled with Interim Storage Model: • Two resource model with separate bid and offer required from the load and generator resources comprising the storage facility • Market participant manages state of charge through their bids + offers	Storage modelled with Enduring Storage Model: • Single bi-directional resource with single continuous bid-offer curve • State of charge modelled to help manage storage charge/discharge Ability to model constraints between the generator and storage resource
Integrated	Two resource model with separate bid and offer required from the load and generator resources comprising the hybrid facility	Single bi-directional resource used to model hybrid with a continuous bid-offer curve

Recap: Foundational & Enhanced Models (DERs)

Feature	Foundational Model	Enhanced Model
Aggregation Types	• Dispatchable aggregations enabled across relatively narrow geographies (e.g., behind a specified transformer) • Aggregations of diverse resource types enabled, but aggregations of very small consumers (e.g. residential and small commercial) not enabled	• Dispatchable Aggregations enabled across relatively broader geographies (e.g. multiple Local Distribution Company areas) • Aggregations of all resource types enabled, including aggregations of very small consumers (including residential and small commercial)
Aggregation Size	• Aggregations of 1 MW or greater enabled • Will explore the possibility of enabling smaller aggregations (subject to tool impacts and costs)	• Aggregations of 100 kW or more enabled
Metering & Settlement	• Existing IESO requirements for small resources will be used for DER aggregations	• Leverage of Smart Metering Entity to enable aggregations of very small consumers

Next Steps

- The IESO is developing a detailed Project Plan to reflect the revised program scope outlined herein
- The IESO is targeting Q1 2024 to share the revised Project Plan with interested stakeholders and communities for input
- The IESO will integrate input into the draft plan and continue to proceed with design and implementation with input sought from stakeholders and communities throughout design and implementation process as laid out in the plan

Feedback

Questions for stakeholder feedback:

- Given the updates that have been presented today for the Enabling Resources Program, what would you like the IESO to consider as it establishes timelines for both the implementation of foundational and enhanced models ?

Please use the feedback form found under the October entry on the Enabling Resources Program engagement webpage to provide feedback and send to engagement@ieso.ca by November 9, 2023.

Thank You

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Appendix A. New Storage Coming Online in Ontario

- Resource Adequacy (RA) procurements have increased certainty of ERP resources developing in Ontario :
    - 250 MW Oneida Battery - in-service 2025
    - 900 MW of targeted storage capacity from Expedited Long-Term 1 (E-LT1) procurement - in-service 2025-2026
    - 1600 MW of targeted storage capacity from Long-Term 1 (LT1) procurement - in-service 2027
- The DER Potential Study identified 1,300 MW to 4,300 MW of achievable potential by 2032