

DECEMBER 1, 2026

Technical Panel Education and Engagement Plan: Enabling Resources Program

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Purpose and Agenda

Purpose: Provide an overview of the Enabling Resources Program and highlight the benefits it will provide to ratepayers, market participants, and the reliable operation of the bulk power system in Ontario.

Agenda:

- Program Overview
- Storage & Hybrid Integration
- Distributed Energy Resource Aggregations
- Market Rules & Manuals
- Testing Update

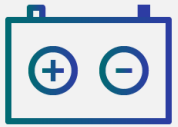
Enabling Resources Program Overview

The Enabling Resources Program (ERP) is a set of integrated projects that will further enhance the renewed market.

ERP's proposed changes will unlock new opportunities for storage, hybrid, and distributed energy resources to compete in the wholesale market, helping to meet system needs in a reliable and cost-effective manner.

ERP will benefit the sector by supporting grid reliability, increasing economic efficiency, and encouraging resource innovation.

Resource Types



Electricity Storage ("**Storage**")



Hybrid Generation-Storage Pairings ("**Hybrids**")



Distributed Energy Resources (**DERs**)

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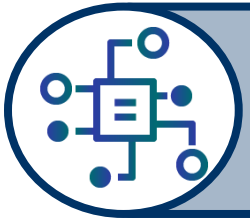
The Rationale for ERP



With electricity demand in Ontario growing, we must support emerging technologies and empower stakeholders to play an active role in meeting the province's needs.



Will improve market efficiency and ancillary service effectiveness by introducing a new single resource participation model for storage resources.



Support resource adequacy, support reliability through enhanced coordination and data sharing.

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Storage and Hybrid Integration

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Storage and Hybrid Integration Project

Drivers for change:



~3,000MW of contracted storage resources are scheduled to be in service by 2028.



Limitations of the current two resource model is creating **operational challenges** and reducing market efficiency for storage resources.

The project will improve market efficiency, reduce manual control room intervention, unlock their ability to provide additional grid services, and improve real-time visibility into available energy from storage.

Phase 1

- ✓ Introduce a single resource model for battery storage
- ✓ State of Charge management

Phase 2

- ✓ Frequency regulation from storage resources
- ✓ Uplift exemptions
- ✓ Additional features and improvements

Storage & Hybrid Integration Phase 1

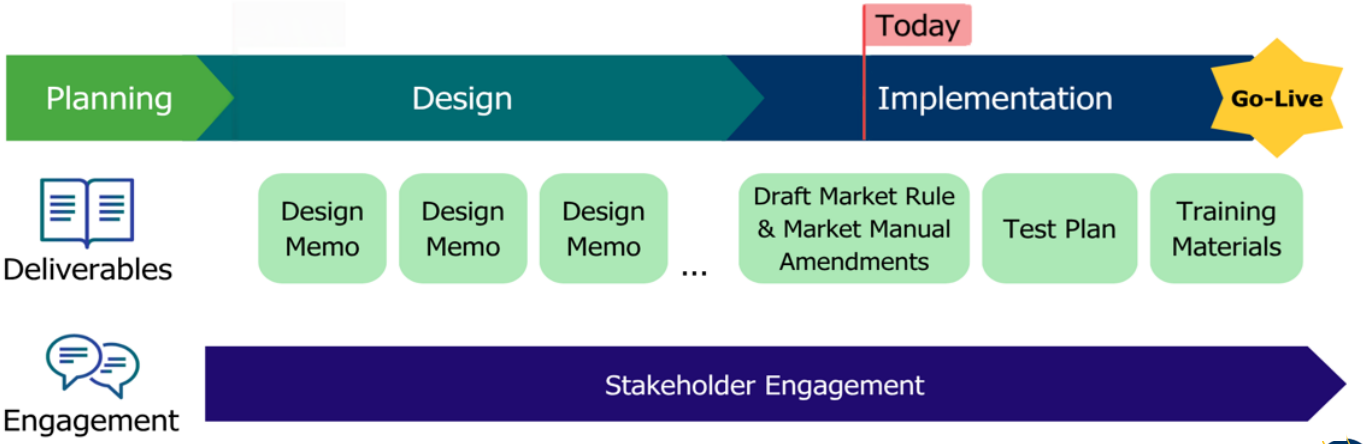
Phase 1 of the Storage & Hybrid Integration Project will implement real-time visibility into available energy from battery storage resources.

Benefits:

- Enhances operational decision-making by incorporating variable energy capabilities into Day Ahead, Pre-Dispatch and Real-Time market engines.
- Enables greater quantities of flexible, cost-effective operating reserve (OR) options.
- Greater value from storage through better optimization of energy and OR.

Phase 1 Storage Project – Timelines and Process

- The IESO completed Phase 1 design work in Q3 2026
- Currently testing solutions that have been developed for the implementation of Phase 1, including changes to the Dispatching and Scheduling Optimization (DSO) system. Testing is expected to be completed in Q1 2028.
- Proposed Market Rule and Manual amendments are currently being drafted to incorporate Phase 1 design.



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State of Charge Management

State of Charge (SoC) management is the process of keeping a battery's energy level within an optimal range so it can provide required services and follow dispatch instructions.

SoC management ensures the battery:

- Is ready to discharge when the grid needs energy 
- Can absorb excess energy when the grid has surplus 

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Operating Without SoC Visibility



The IESO currently has no visibility into state of charge for battery storage resources participating in the market.

Challenges:

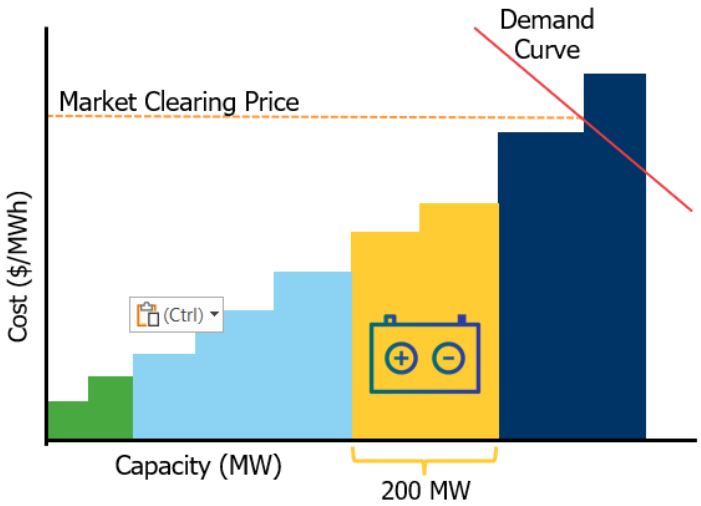
- Control room operators must rely solely on market participant (MP) bids/offers, assuming they accurately reflect the battery's capability.
- MPs must self-manage SoC through their bids/offers, which may result in less energy being offered than the resource could otherwise provide.



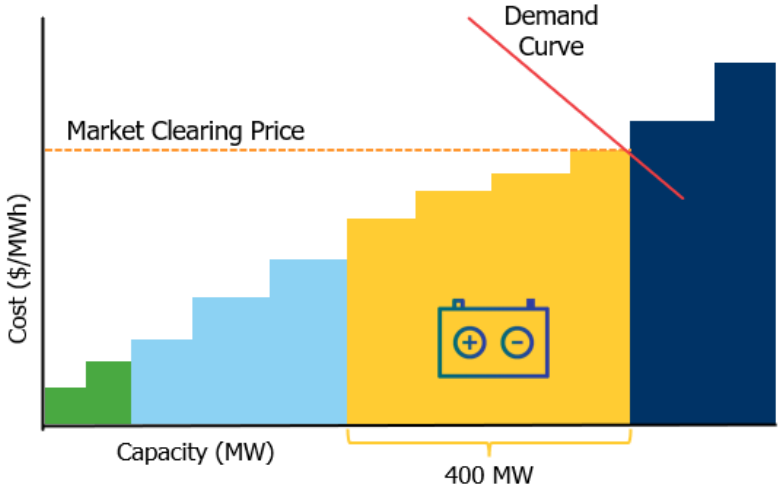
- Creates additional workload for all parties, leads to inaccurate situational awareness, and requires IESO operators to manually intervene to maintain system reliability.

State of Charge Management (Energy)

Today (No SoC Management)



Future (With SoC Management)



Adding SOC management allows additional MW of storage to be offered, shifting the market supply curve to the right which may result in a lower market clearing price.

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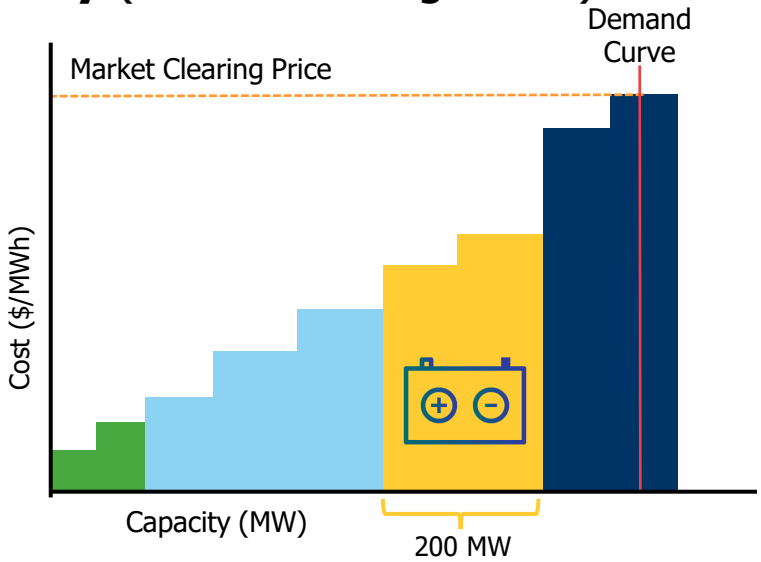
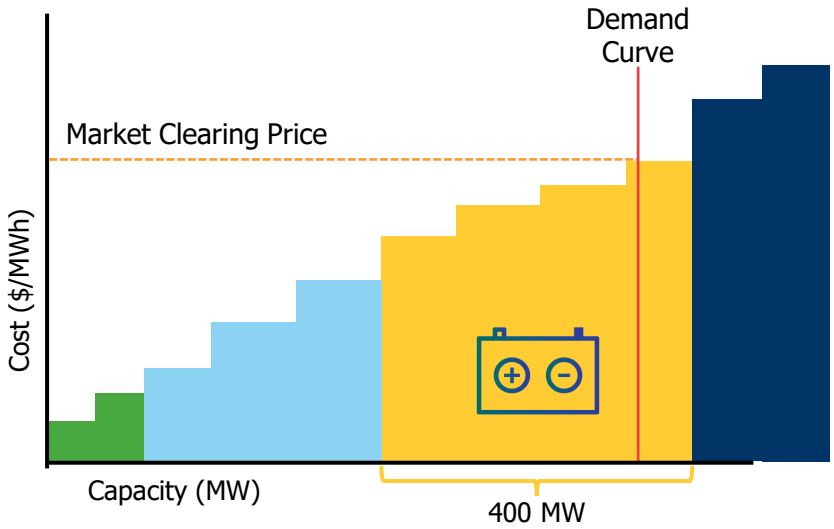
State of Charge Management (Operating Reserve)

Today (No SoC Management)



Future (With SoC Management)



Adding SOC management allows more MW of storage to be offered, shifting the market supply curve to the right which may result in a lower market clearing price

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Storage & Hybrid Integration Phase 2

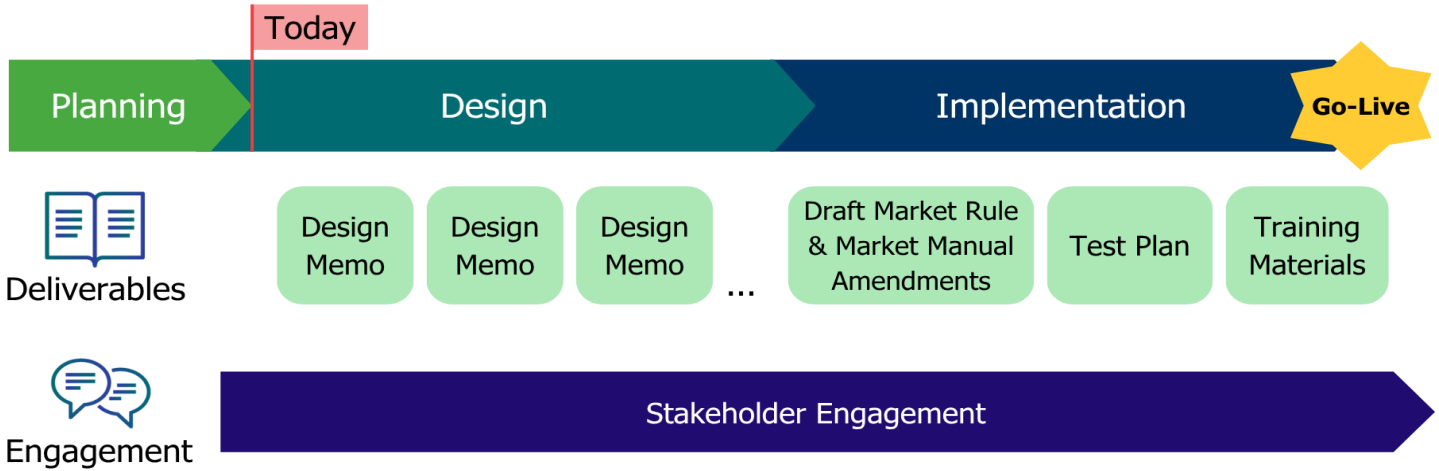
Will enable expanded BESS market participation, including helping to close the gap in regulation capability highlighted in the Annual Planning Outlook.

Benefits:

- Allow Dispatchable BESS resources to provide regulation services to the grid. Batteries can provide much faster and more accurate balancing services than conventional generators, which improves frequency control and overall grid reliability.
- Remove uplifts from storage charging load to encourage efficient operation of BESS resources. Removing uplifts will lower charging costs which will increase arbitrage opportunity, ultimately lowering costs for ratepayers.

Phase 2 Storage Project – Timelines and Process

- The IESO is targeting to complete Phase 2 implementation by Q4 2028
- Design Memos will be shared with stakeholders to inform feedback throughout the engagement on design, and will also inform draft amendments to IESO market rules and manuals
- The planning and design phase is expected to be complete by Q4 2027



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DER Integration

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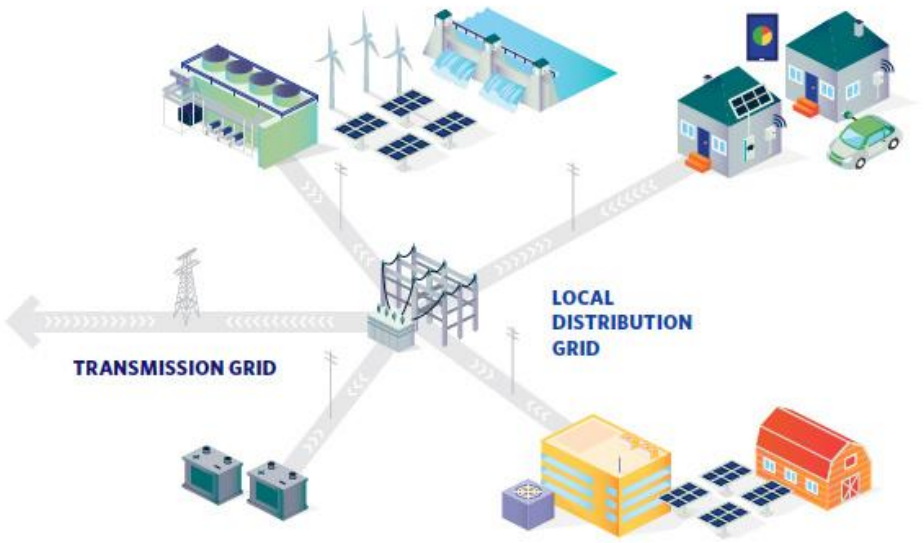
What is a Distributed Energy Resource?

Distributed Energy Resource (DER): An individual resource directly connected to the distribution system or indirectly connected behind a customer's meter.

DER Aggregation (DERA): A group of individual DERs that are coordinated to act as a single, larger resource.

DER/As: Inclusive category of DERs and DERAs.



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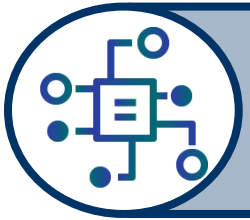
Drivers for ERP DER Integration Project



Support provincial resource adequacy needs, while enabling DERs for distribution-level use



Maintain reliability as expanded DER deployment creates transmission and distribution reliability impacts



Move at the pace of change with flexible, accessible solutions for all LDCs while the regulatory framework evolves

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DER Integration Project Outcomes

Wholesale Market Access for DERs

- Enables IESO procurement of DERs
- Enables wholesale revenue opportunities for dispatchable DERs
- Enables DERs to **simultaneously participate** in IESO markets & LDC programs

Market Operational Coordination (Tx-Dx)

- Strengthen how LDCs and IESO coordinate in the **operational timeframe** for dispatchable DERs that participate in the IAM
- E.g. IESO-contracted BESS facilities
- Supports bulk and local system reliability

IESO-LDC Operational Visibility

- IESO to provide visibility into bulk-system activations e.g. Peak Perks, Peak Performance, Capacity Auction
- LDCs to provide visibility into Dx-level activations
- Provides **situational awareness** for both parties

Tx-Dx refers to "*transmission – distribution*"

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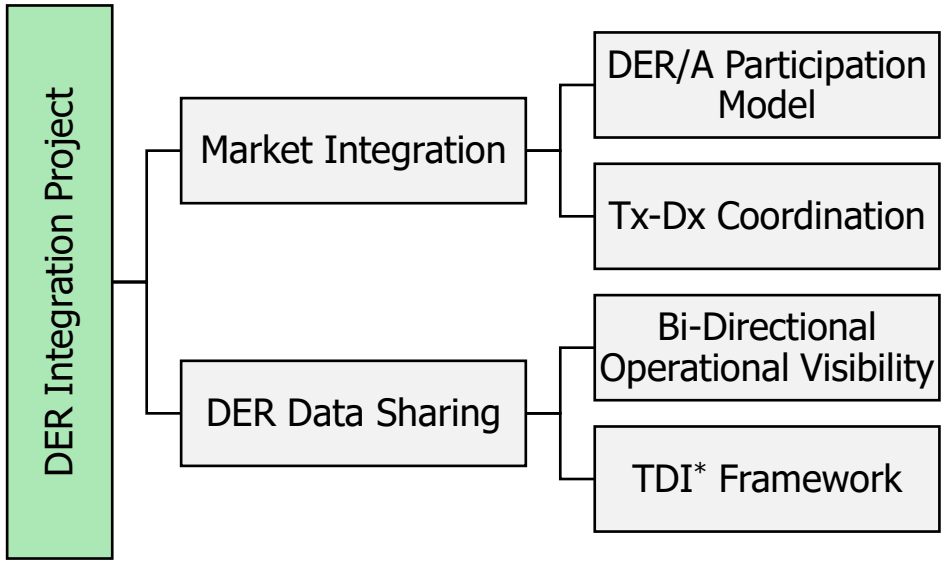
DER Integration Project Design Streams

1. **Market Integration**: New participation models and coordination approaches will enable DER/As with dispatchable capabilities to participate in the wholesale electricity markets
2. **DER Data Sharing**: Enhanced mechanisms for near-term data sharing & situational awareness of DER activity will support reliability for IESO and LDCs



*Transmission-Distribution Interface

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DER/A Participation Models

Front of Meter (FTM)

- Today, standalone DERs are able to participate in the IESO's wholesale markets
- ERP will enable aggregations of dispatchable FTM DERs to access the wholesale markets, operating as technology-agnostic virtual power plants, which can participate in a future IESO procurement

Behind the Meter (BTM)

- Today, BTM resources can participate through the Capacity Auction, eDSM and as dispatchable loads
- ERP will develop a new Capacity Auction product for fast-moving, flexible DERs installed behind the meter (e.g. BTM storage)

BTM to FTM Switching

- Develop a guidance document on how a BTM dispatchable resource (i.e. storage or generator) may be able to switch between BTM and FTM configurations through installing additional parallel wholesale revenue-grade metering equipment

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DER Integration Project Will **Not**

- ✕ Control distribution system assets – *the IESO will continue to dispatch wholesale market resources and activate IESO-procured (e.g. LT1, eDSM, etc.) resources*
- ✕ Control distribution system operations
- ✕ Seek LDC information that is not material to the IESO and does not impact bulk system reliability
- ✕ Seek visibility deep into the distribution system
- ✕ Procure DERs
- ✕ Seek for the IESO to become a Distribution System Operator

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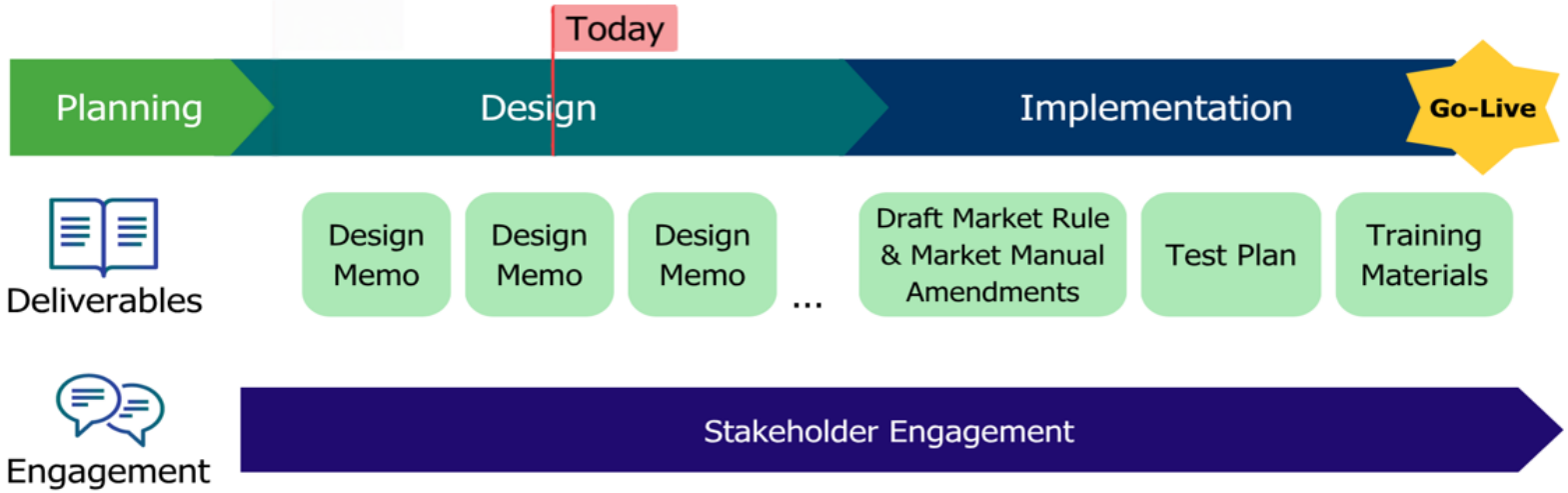
DER Integration Project – Timelines and Process

- The IESO is targeting to complete DER implementation by Q2 2029
- Design Memos will be shared with stakeholders to inform feedback throughout the engagement on design, and will also inform draft amendments to IESO market rules and manuals
- The planning and design phase is expected to be complete by Q4 2027



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Stakeholder Engagement and Technical Panel Plan for Storage & Hybrid Integration Phase 1 - Market Rules and Market Manuals

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Sector Engagement To Date: Storage Phase 1

Stakeholder Engagement Summary

- Conducted nine design-focused engagements throughout 2025 & 2026
- Published design memos covering Optimization, Connection and Registration, Dispatch data and other inputs, Market Power Mitigation, and Settlements
- Conducted numerous 1:1 outreach with storage owner/operators and industry associations.

Sector Feedback

- Support for the IESO's proposals to enable additional services and improve operational and market certainty.
- Design enhancements made in response to stakeholder feedback
- Further clarification on some operational aspects and market changes are on-going with the sector.

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Stakeholder Engagement – Review of Market Rules and Manuals

Stakeholder Engagement:

- Proposed market rule amendments and draft market manual content will be presented at the ERP stakeholder engagement – stakeholders will have the opportunity to review and provide written feedback on all materials:
  - Stakeholder Engagement Session 1: Introduction and Overview – Overview of the proposed market rule amendments and draft market manual content, including a request for stakeholder review and written comments; any incremental design updates
  - Stakeholder Engagement Session 2: Placeholder Session (if required) – to discuss significant stakeholder feedback, material design updates, or changes to proposed market rule amendments or market manual content that warrant additional stakeholder engagement

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Technical Panel – Review of Market Rules (and Manuals)

Technical Panel:

- TP engagement will include two sessions for each batch:
  - Session 1: Design Education: Overview of ERP design objectives, concepts, key design elements associated with the batch
  - Session 2: Market Rules Review: Review of proposed market rule amendments and discussion of TP member feedback, including questions, comments, and suggested revisions

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Technical Panel – Review of Market Rules (and Manuals)

Technical Panel:

- A TP vote to post and vote to recommend will occur only on the Final Alignment batch (the final consolidated suite of ERP amendments)
- Review of amendment packages in batches is intended to make TP member review more manageable leading up to the review of the consolidated set of amendments via the Final Alignment batch

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Batches of Market Rules and Manuals for Storage Phase 1

Market Rules and Manuals for Storage phase 1 will proceed in 4 batches

Batch	Content of Batch
1. Registration, Connection & Market Power Mitigation (MPM)	Market Rules (MR): Ch 2, 7, Appendix 4.2 & 4.24 Market Manuals (MM): 5.4, 1.5, 7.3, 14.1, 14.2
2. Settlements	MR: Ch 9, Appendix 9.2 & 9.4, Ch 7 Appendix 7.8 MM: 5.5
3. Grid and Market Operations Integration (GMOI) & Optimization	MR: Ch 7, Appendix 7.5, 7.5A, & 7.6 MM: 4.1, 4.2, 4.3, 7.1, 7.2, 7.3
4. Final Alignment	Consists of the entire, consolidated suite of ERP market rule amendments. Net new content is TBD but anticipated to include transition plan & conforming changes throughout the rest of the Market Rules & Manuals

Batches of Market Rules and Manuals for ERP Phase 1

Planned Engagement schedule for the 4 ERP Phase 1 batches

	Registration, Connection & MPM	Settlements	GMOI & Optimization	Final Alignment
MR & MM Publication Date (approximate)	January 13	February 17	March 17	July 1
Stakeholder Engagement Session 1	January	March	April	TBD
TP Session 1: Design Education	February 2	March 11	April 6	July 6
Stakeholder Engagement Session 2 (if required)	April	May	June	TBD
TP Session 2: Market Rules Review	May 11	June 8	July 6	
Vote to Post	N/A	N/A	N/A	September 8
Vote to Recommend	N/A	N/A	N/A	November 9

Testing Update

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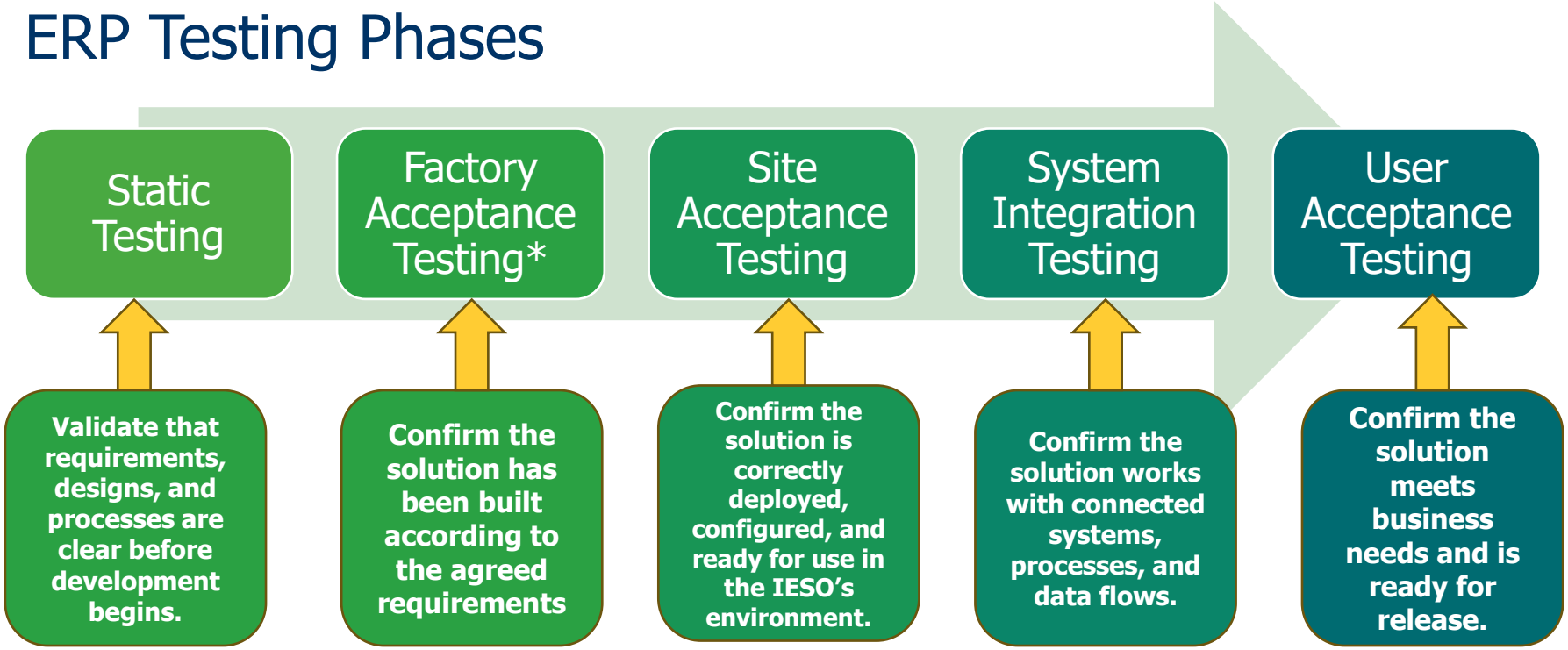
ERP Testing Phases



*Applies to vendor-developed solutions only

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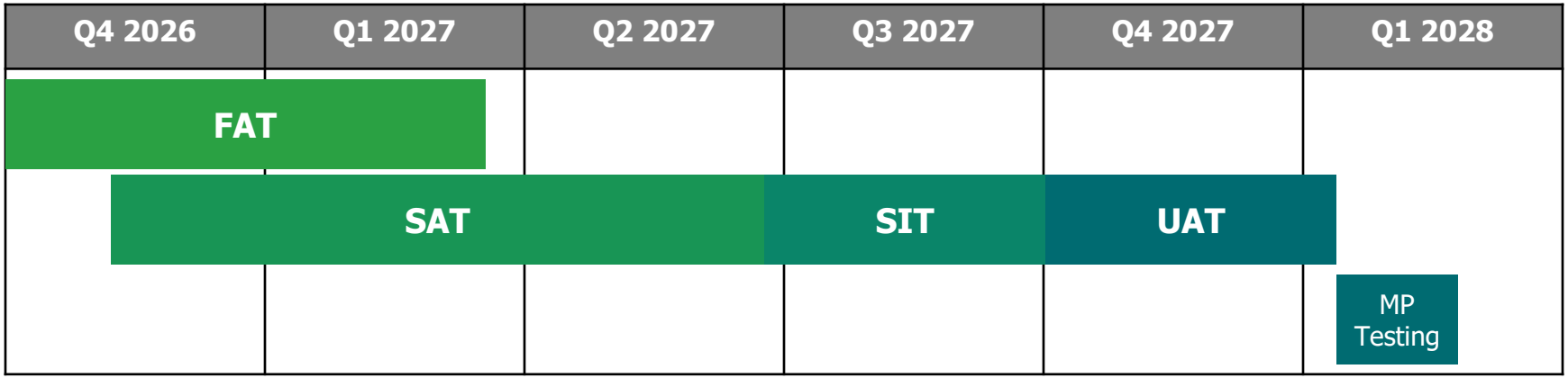
S/H Phase 1: High-Level Testing Schedule



The IESO has a robust testing schedule to ensure that the solutions that have been developed are functional prior to MPs testing the new solutions.

Dates reflect current forecast and are subject to change.

Thank You

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