



APRIL 22ND, 2022

Hybrid Integration Project: Enhanced Participation Models, EPRI Participation Model Study & Hybrid Siting Overview

**Innovation, Research & Development (IRD)
Electric Power Research Institute (EPRI)**

Overview of Presentations

1. Hybrid Design Vision & Enhanced Hybrid Participation Models
2. Details of the EPRI Participation Model Study (presented by EPRI)
3. Siting of Hybrid Resources (presented by EPRI)

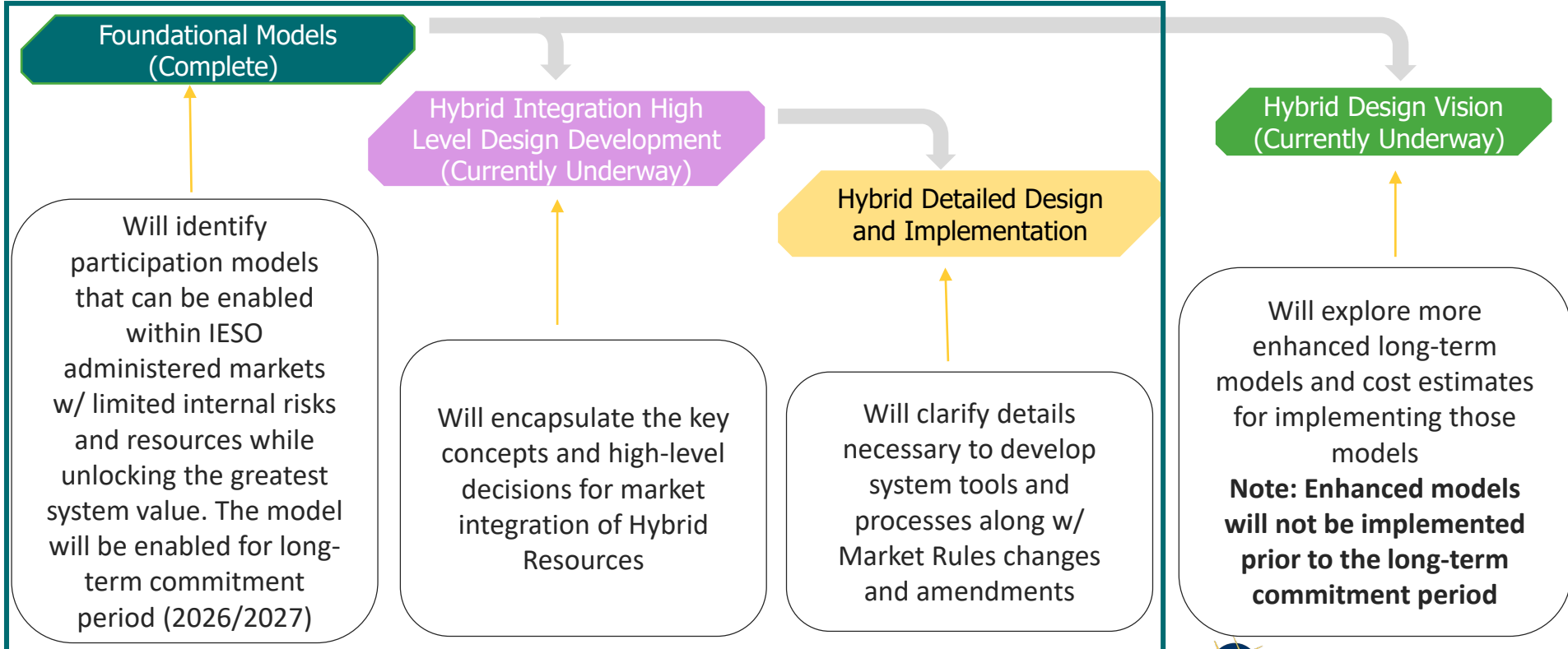


Hybrid Design Vision & Enhanced Participation Models

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IESO Hybrid Integration Project – Committed Work Stages

Foundational Models

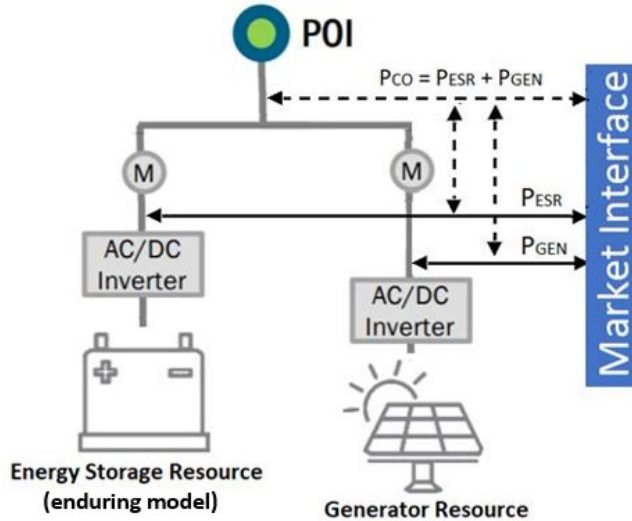


Hybrid Design Vision - Timelines

- Development of reference study case (**complete**)
- Benchmarking of reference case with system sanity checks (**complete**)
- Development of preliminary study scenarios (**complete**)
- Development of bid-offer curve strategies and modelling for hybrid models (in-progress)
- Obtain cost estimates to implement new resource types into IESO tools (in-progress)
- Simulation and analysis (April - July)
- Finalized study results and conclusions (July)
- Hybrid Design Vision initial draft (September)
- Hybrid Design Vision final draft (November)

Model 1: Enduring Storage + Generator Resource (Co-located Model)

Enhanced Co-located Model Concept

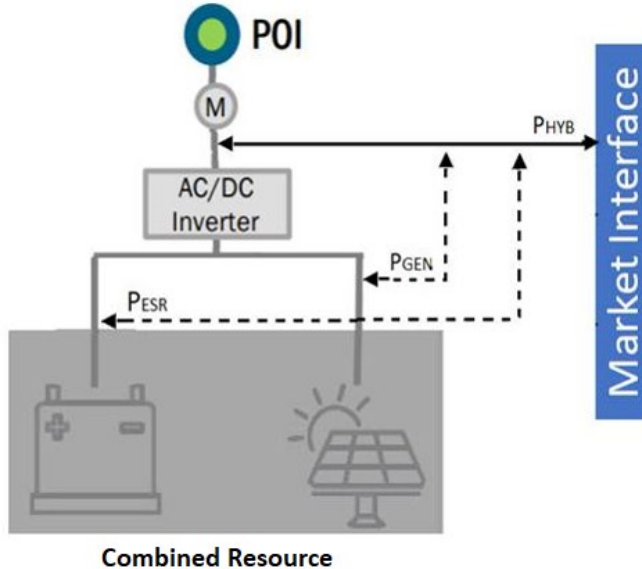


POI = Point of Interconnection to IESO-Controlled Grid
M = Revenue Metering

- Each hybrid facility would be registered in the markets as two separate resources:
 1. A dispatchable generator (one resource)
 2. An energy storage resource (one resource) - using our enduring storage design with a continuous bid-offer curve and state of charge (SoC) management
- The two resources would bid/offer into the market separately and be settled separately
- Ability to model constraints between the two resources (eg. interconnection limitation)

Model 2: Single Resource Integrated Model

Single Resource Integrated Model Concept



POI = Point of Interconnection to IESO-Controlled Grid
M = Revenue Metering

- Generator resource registered together with storage resource and represented as one larger resource that can generate, consume and store energy at a single connection point with a single bid/offer curve into the market
- Market participant continues to be responsible for managing all aspects of their bids, offers and forecasting
- Dispatchable load at the site used to allow charging from the grid is no longer required as the new resource itself can be modelled to consume energy

Foundational vs Enhanced Models Changes

Model	Foundational	Enhanced
Co-located	<ul style="list-style-type: none">• Storage modelled with Interim Storage Model (2 resources)• Separate bid and offer required from the load and generator resources of the storage model• Market participant (MP) manages SoC through their bids + offers	<ul style="list-style-type: none">• Storage modelled with Enduring Storage Model (1 resource)• Single resource used to model energy storage with continuous bid-offer curve• SoC-Lite management• Ability to model constraints between the generator and storage resource
Integrated	<ul style="list-style-type: none">• Dispatchable load used to facilitate grid charging• Separate bid and offer required from the load and generator resources	<ul style="list-style-type: none">• Model can sink and source so no separate load component is required to facilitate charging from the grid• Single resource with continuous bid-offer curve

Questions for Stakeholders

1. Are there any additional data sources the IESO should consider when developing enhanced hybrid participation model?
2. What additional scenarios and sensitivities should be considered through the EPRI study?