

PJM ENERGY STORAGE RESOURCE MODEL ENHANCEMENTS

Issue Source

PJM staff is bringing this issue forward for consideration, in alignment with FERC Order 841

Issue Content

While PJM's Electric Storage Resource (ESR) model went into production in 2019 in compliance with FERC Order 841, the current model may not lead to the most optimal use of this limited-duration resource. For example, it currently does not account for the state of charge in the dispatch. Rather, it requires market participants to manage their state of charge and can result in PJM providing an infeasible dispatch to the resource. PJM has a compliance requirement with FERC to update the model in 2026 to "account for state-of-charge." While updating the model to "account for state-of-charge" will address infeasible dispatch, it will still fall short of recognizing the opportunity cost associated with the limited duration and energy storage resources. Other ISOs, with higher penetration of storage assets participating in their markets, have recognized the importance of managing state-of-charge of these resources and reflecting the opportunity cost for dispatch decisions.

With storage integration expected to increase in PJM's footprint, there is an opportunity to revisit how PJM accounts for state-of-charge and more broadly review the existing ESR model and business rule design with a view toward allowing storage to effectively participate in PJM's market at higher penetration levels.

Key Work Activities and Scope

1. Provide Education on the existing PJM FERC Order 841 ESR Model and nGEM ESR model
2. Review the pertinent market design and business rules of other ISO/RTOs with greater experience with battery storage
3. Discuss potential reforms to state-of-charge management and cost representation, including intertemporal opportunity cost (e.g. cost to dispatch now vs. later given factors such as changes in prices, supply, load, emergency conditions), for storage resources
4. Discuss additional enhancements to ESR market participation rules to charge and discharge that may be needed (such as, but not limited to, energy must offer rules for committed Capacity Storage Resource, intraday offer rules, cost-based energy offers, uplift eligibility and calculation, LOC rules for storage resources providing both energy and ancillary services, and resource parameters)
5. Determine if any proposed reforms from KWA 1-4 should be extended to Hybrid or pumped storage hydro resources

6. Discuss the need and scope of a potential Phase 2 effort, to either further enhance the ESR model and/or tackle out-of-scope items, if needed.

Out of Scope:

- Changes to the resource adequacy, PAI, and ELCC model for Storage
- Market rules for resources going through Surplus Interconnection Service
- Storage As a Transmission Asset (SATA)
- Pumped-hydro optimizer
- Storage providing peak shaving adjustments

Expected Deliverables

- 1 | Education and gap analysis of PJM's ESR Model
- 2 | Proposed solution(s) to address potential reforms as appropriate.

Corresponding revisions to the PJM Tariff or other governing document provisions consistent with the solution proposed will be brought to the MRC and MC for review and endorsement. Proposed revisions to PJM Manuals conforming to the FERC approved solution will be brought to the appropriate Standing Committees for review and endorsement.

Decision-Making Method

Tier 1, consensus

Stakeholder Group Assignment

Market Implementation Committee (Special sessions, if needed)

Expected Duration of Work Timeline

Estimated length of time expected to resolve the issue: 6-9 months

Start Date	Priority Level	Timing	Meeting Frequency
Jul 2026	<input type="checkbox"/> High <input checked="" type="checkbox"/> Medium <input type="checkbox"/> Low	<input type="checkbox"/> Immediate <input checked="" type="checkbox"/> Near Term <input type="checkbox"/> Far Term	<input type="checkbox"/> Weekly <input checked="" type="checkbox"/> Monthly <input type="checkbox"/> Quarterly

Charter

(check one box)

<input type="checkbox"/>	This document will serve as the Charter for a new group created by its approval.
<input checked="" type="checkbox"/>	This work will be handled in an existing group with its own Charter (and applicable amendments).

More detail available in M34; Section 6