FERC Order 841 Directives
Energy Storage Participation Model

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Advanced Analytics
Intermittent Resources Subcommittee
December 9, 2019
## Energy Storage 841 Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>1. Can sell* energy, <strong>Capacity</strong>, and A/S (incl. Black Start etc.) the</td>
<td>the resource is technically capable of providing</td>
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<td>2. Dispatched and <strong>sets price</strong> as seller and buyer</td>
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<td>3. Bid parameters that account for ESR characteristics</td>
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<tr>
<td>4. Min market threshold is 100 kW</td>
<td>✔️ = already in compliance</td>
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<tr>
<td>5. Stored MWh are billed at LMP as wholesale</td>
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</tbody>
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* “Eligible to provide…”
Conceptual Timeline for Energy Storage under Order 841

Initial Proposed PJM ESR Participation Model

Go Live Dec 3

ER19-469

More Definitions & Detail in Tariff

Dec 16

ER19-469

“Account for State of Charge” enhancement in PJM ESR Participation Model

ER19-469

Sustained Output Duration
1. RPM Requirement for all resources in Tariff
2. Paper hearing on requirement for ESR

Mar 11 2020
“In this order, we accept PJM’s proposed revisions, to become effective December 3, 2019, subject to a further compliance filing, to become effective on a date to be established by PJM, as discussed below. We also institute an investigation pursuant to section 206 of the Federal Power Act (FPA) and establish paper hearing procedures regarding the justness and reasonableness of PJM’s minimum run-time rules and procedures.” - Issued October 17, 2019

New filing by December 16, 2019 in existing docket ER19-469:
1. Add additional definitions and items into the Tariff.
2. Add to the Model to account for additional parameters.
   – FERC allowing PJM to propose a later effective date in order to achieve full compliance with the Final Rule.

New filing by December 12, 2019 in new docket EL19-100 (including paper hearing):
3. Add provisions reflecting “minimum run-time” rules and procedures applicable to all resources into the Tariff.
4. Brief in paper hearing on “minimum run-time” rules as applied to Capacity Storage Resources (10 hour rule).

*“Minimum run-time” in Order 841 refers to the sustained output capability requirement in the Capacity market. This usage is not related to the PJM Tariff Term “Minimum Run Time.”*
Directive 1: Items to add to the Tariff

A. Add Minimum and Maximum Charge Limit; Minimum and Maximum Discharge Limit; and Charge and Discharge Ramp Rate bidding parameters into Tariff language.

B. Add descriptions of three modes (continuous, charge, discharge) into Tariff language.

C. Add which services constitute “dispatched to provide a service” in Dispatched Charging Energy definition into Tariff language.

D. Add a general description and references for metering and accounting practices into Tariff language.

E. Describe how PJM will ensure the separation and proper accounting of wholesale and retail uses.

F. Add statement that PJM will not charge a distribution-connected Energy Storage Resource for charging energy if the distribution utility is unwilling or unable to net out any energy purchases associated with the Energy Storage Resource’s wholesale charging activities from the host customer’s retail bill into Tariff language.
Directive 2: Add to the Model

G. Enhance the participation model to more appropriately account for an ESR’s State of Charge, Maximum State of Charge, and Minimum State of Charge through bidding parameters or other means in both PJM’s day-ahead and real-time market dispatch.
Issue Tracking and Contact Information

• **Electric Storage Participation: Issue Tracking:**
• Questions?
  – [ESR@pjm.com](mailto:ESR@pjm.com)