Markets Gateway Roadmap

As of September 17, 2019
<table>
<thead>
<tr>
<th>Action Required</th>
<th>Deadline</th>
<th>Who May Be Affected</th>
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<tbody>
<tr>
<td>Resource Limitation Reporting &amp; Tracking – become familiar with new screen, refer to new version of External Interface Spec. to adjust XML queries</td>
<td>September 5, 2019 Complete</td>
<td>Markets Gateway UI &amp; XML Users</td>
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<tr>
<td>Electric Storage Participation Order 841 (dependent on FERC approval)</td>
<td>December 3, 2019</td>
<td>Markets Gateway UI &amp; XML Users</td>
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<tr>
<td>Jan</td>
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**Resource Limitation Reporting & Tracking**

- **Train: Aug. 1**
- **Production: Sep. 5 Complete**

**Electric Storage Participation**

- **Train**
- **Production**
In February 2018, FERC directed PJM to include Energy Storage Resources in their Markets.

- Electric Storage Resource (ESR) - a resource capable of receiving electric energy from the grid and storing it for later injection of electric energy back to the grid.
- An ESR must be permitted to:
  - Sell the energy, Capacity, and A/S (incl. Black Start etc.) the resource is technically capable of providing
  - Be dispatched and set price as seller and buyer

- Stakeholder discussions and Manual changes are complete
- Awaiting final FERC approval
The following fields will be added to Markets Gateway to accommodate ESRs:

- Mode selection (charging, discharging, continuous)
- Minimum discharge limit
- Maximum discharge limit
- Minimum charge limit
- Maximum charge limit
- Emergency minimum discharge limit
- Emergency maximum discharge limit
- Emergency minimum charge limit
- Emergency maximum charge limit
- Charge Spin Max
- Discharge Spin Max
- Charge Up ramp rate
- Charge Down rate
- Discharge Up ramp rate
- Charge Synchronized Reserve Ramp Rate
- Discharge Synchronized Reserve Ramp Rate
• Education session will be presented in late October

• Markets Gateway changes will be installed in the Training environment in early November

• The Production go-live date is scheduled for December 3, but dependent on FERC approval
This enhancement was installed in TRN on August 1, 2019 and into Production on September 5, 2019

Current Issue

- Many generation units in PJM have limitations on how many hours they are able to run in a given time period. These limitations are often related to compliance with environmental permits, fuel availability, and demineralized water availability.

- These limitations are dynamic, and the hours a unit has left heavily depends upon how often a unit has been running, which schedule and fuel the unit is running on, and how often the unit is being cycled.

- The current methods PJM uses to track resource limitations produce information for a snapshot in time and, importantly, are not linked to actual unit run time.
Resolution Overview

- The proposed upgrades are intended to provide more dynamic notice to dispatch if a unit is running close to its limitations, and will include a calculation of estimated hours remaining using member-entered hours remaining due to a limitation and unit runtime.

- Related changes to Manual 13 are currently in the stakeholder process (final approval scheduled for 7/25 MRC):
  - If a unit has less than 72 hours of run time at maximum capacity due to any resource limitation (primary or alternate fuel, emissions, demineralized or cooling water, other consumables), it along with any fuel limited units should be reported to PJM through the “Resource Limitations” page of Markets Gateway.
  - The information on the “Resource Limitations” page is used for situational awareness and multi-day operations planning. The parameters entered on this page are not utilized in the Day-Ahead or Real-Time Market clearing engines.
  - Any unit with less than 24 hours of run time remaining due to resource limitations should also update the Max Run fields in Markets Gateway.

- It is understood that the resulting calculations are estimates and are used purely for operational awareness and improved communication between Dispatch and generation owners about these types of limitations. The rules pertaining to Capacity Performance do not change.
Changes Users Will See

- Operational Restrictions will be moved from Generator > Schedules > Restrictions Information to Generator > Resource Limitations. (Except “Operational Restriction Other” since this is used for Capacity Performance Exception)
- Resources will have the ability to enter unit level or fuel level limitation information
- Users will enter the following information:
  - Limitation Start Date
  - Limitation Start Time
  - Limitation End Date
  - Limitation End Time
  - Hours Remaining at Full Load
  - Replenished Hours at Limitation End Date
  - PJM Estimated Hours Remaining

Status

- Train install planned for August 1
- Production planned for August 15
- External Interface Specification is posted on Markets Gateway page
Updated Generator > Schedules > Restrictions Information
### New Generator > Resource Limitations

#### “Unit Level” Limitations
- **Limitation Type**: Cooling Water, Demineralized Water, or Other Consumables

#### “Fuel Level” Limitations
- **Select Fuel Type related to limitation**
- **Limitation Type**: Emissions, Onsite Fuel

Enter hours remaining at full load between limitation start and end times.

Enter additional hours at full after end time (e.g. from fuel delivery or roll-over of emissions hours).

**Calculation** using actual on hours to count down Member-entered “Hrs. Remaining at Full Load” to create a dynamic estimate of runtime remaining due to a limitation.

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<tr>
<th>Limitation ID</th>
<th>Location</th>
<th>Fuel Type</th>
<th>Limitation Type</th>
<th>Start Time</th>
<th>End Time</th>
<th>Hrs. Remaining at Full Load</th>
<th>Replenished Hrs. at Limit.</th>
<th>Is Unreplenished at Reduced Output</th>
<th>PJM Edit. Hrs. Remaining</th>
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Product Details
Markets Gateway allows users to submit information and obtain data needed to conduct business in the Day-Ahead, Regulation and Synchronized Reserve Markets.

Key Product Features
- View Market Results
- Manage Generation and Load Response Portfolios
- Manage Ancillary Service Data
- Manage Market Offers and Transactions