Generation Deviation Changes

MIC Special Session - Operating Reserve Clarification for Resources Operating as Requested by PJM

October 11, 2024

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Background

- "Following dispatch" is a generic term used to describe how well resources follow PJM's instructions in the Energy Market.
- Following dispatch includes following:
  - Commitment instructions: Starting, shutting down
  - Dispatch instructions: Ramping up or down, operating at economic minimum or maximum.
- OA Section 3.2.3 (o): "Dispatchable pool-scheduled generation resources and dispatchable self-scheduled generation resources that follow dispatch shall not be assessed balancing Operating Reserve deviations."

Following dispatch

- **Following dispatch affects eligibility for:**
  - **Receiving BOR credits**
  - **Paying deviation charges**
- **PJM has several metrics used to determine if units are following dispatch for the purpose of assessing deviation charges.**
- **These metrics are:**
  - **Ramp Limited Desired MW**
  - **Dispatch Signal MW**
  - **Dispatch LMP Desired MW**

Generator Deviations

- **Generally, a dispatchable unit is deemed to be following dispatch when actual output is between the ramp limited desired and dispatch signal or within 10 percent.**
- **There are other triggers and thresholds defined in Section 3.2.3 (o) of Schedule 1 of the OA.**
- **Section 3.2.3 (o) of Schedule 1 of the OA also contains how the deviation MWh are calculated.**

Percent Off Dispatch

- **PJM calculates MW and percent off dispatch by using the lesser of:**
  - **Difference between actual output and dispatch signal.**
  - **Difference between actual output and ramp limited desired.**
- **If the dispatch signal or the ramp limited desired are not available, PJM uses the LMP Desired MW.**

Following Dispatch

- **A unit is following dispatch, for the purpose of not assessing deviation charges, if:**
  - RLD MW $\leq$ Actual MW $\leq$ Dispatch Signal MW or
  - Dispatch Signal MW $\leq$ Actual MW $\leq$ RLD MW or
  - Percent Off Dispatch $\leq 10\%$ or
  - $\text{ABS}\left[\frac{\text{Actual MW} - \text{RLD MW}}{\text{RLD MW}}\right] \leq 5\%$ or
  - Hourly Deviation < 5 MWh
- **Units with deviations that fall under these thresholds are not assessed deviations charges.**

Deviations against DA

- **Under some circumstances, deviations are measured against the day-ahead MWh.**
  - **Nondispatchable units in DA and RT**
  - **Dispatchable self scheduled units dispatched at eco min**
  - **Self scheduled units with RT Eco Max < 110% Eco Min (i.e. not dispatchable)**
  - **Units that clear DA and trip or do not operate**

Exemptions

- **Units are exempt from deviation charges when:**
  - **Assigned regulation**
  - **Backed down for real time synchronized reserves and operating below DA MW**
  - **Assigned real time synchronized reserves in condensing mode**
  - **Assigned real time nonsynchronized reserves**
  - **Backed down for real time secondary reserves and operating below DA MW**
  - **Assigned real time secondary reserves in condensing mode**
  - **Responding to a synchronized reserve event and assigned real time synchronized reserves**
  - **Manually dispatched (up or down) due to reliability / constraint control / reactive**
  - **For flexible resources, committed day ahead, not scheduled by PJM in real time**
  - **Units operating below 110% of eco min during min gen event**
  - **Hourly deviation < 5 MWh**

Proposed Solution

- **The introduction of Tracking Ramp Limited Desired (TRLD) will replace all other desired metrics.**
  - **TRLD will more accurately measure how closely a resource is following dispatch over a period of time than the status quo metrics.**
  - **TRLD will replace all current desired metrics:**
    - Ramp Limited Desired
    - Dispatch Signal (UDS Basepoint)
    - LMP Desired

Proposed Solution

- **Deviations will continue to be exempt from charges based on current thresholds (see slide 8).**
  - **Since TRLD replaces both Ramp Limited Desired and Dispatch Signal metrics, the exemption when Actual MWh is between Ramp Limited Desired and Dispatch Signal will be removed.**
- **Deviations will be based on day-ahead MWh under defined situations (see next slide).**
- **Deviations will be based on Tracking Ramp Limited Desired MWh under all other situations.**

Proposed Solution - Metrics

- **Deviations will be calculated as DA MWh minus Actual MWh when:**
  - **A self scheduled resource is dispatchable in real time and TRLD MWh equals Eco Min (status quo + desired replacement)**
  - **A self scheduled resource RT Eco Max < 110% Eco Min (status quo)**
  - **A resource is not dispatchable DA and RT (status quo)**
- **All other situations, deviations will be calculated as TRLD MWh minus Actual MWh.**
  - **This means that trips and units that do not operate in RT will be assessed using TRLD MWh, not DA MWh (change from status quo). DA MWh was previously used because there was no desired MW to use when the unit is offline. This change is possible because TRLD MWh will reflect the MWh desired if the units would have operated. This also provides equal treatment to units that trip, regardless of clearing DA.**

Proposed Solution - Exemptions

- **The current exemptions will remain:**
  - **When DA MWh is used and the deviation percent is less than 5%**
  - **When TRLD MWh is used and the deviation percent is less than 10%**
  - **Unit is assigned regulation**
  - **Unit is assigned real time synchronized reserves in condensing mode.**
  - **Unit is assigned real time nonsynchronized reserves**
  - **Unit is assigned real time secondary reserves in condensing mode.**
  - **Unit is responding to a synchronized reserve event and assigned real time synchronized reserves**
  - **Unit is manually dispatched (up or down) due to reliability / constraint control / reactive and manual instruction is not reflected in TRLD**
  - **For flexible resources, the unit is committed day ahead, and not scheduled by PJM in real time**

Proposed Solution - Removed Exemptions

- **The current exemptions will be removed:**
  - **Backed down for real time synchronized reserves and operating below DA MW: Not needed because TRLD will more accurately reflect the reserve assignment.**
  - **Backed down for real time secondary reserves and operating below DA MW: Not needed because TRLD will more accurately reflect the reserve assignment.**
  - **Manually dispatched (up or down) due to reliability / constraint control / reactive and manual instruction is reflected in TRLD: Not needed because TRLD will reflect the manual dispatch instruction.**
  - **Units operating below 110% of eco min during min gen event: Not needed because TRLD will reflect emergency min during min gen events.**
- **Despite removal of these exemptions, units that deviate by less than 10% continue to be exempt.**

Proposed Solution Summary - Metrics

Tariff Scenario	Status Quo Metric	Proposal Metric	Changes
A dispatchable self-scheduled resource that is not dispatched above economic minimum	Day Ahead MWh	Day Ahead MWh	No Change
A resource that is dispatchable day-ahead but is Fixed Gen in real-time	LMP Desired MW	Tracking Ramp Limited Desired MW	Change in Desired
If a resource's real-time economic minimum is greater than its day-ahead economic minimum by 5% or 5 MW, whichever is greater, or its real-time economic maximum is less than its Day Ahead economic maximum by 5% or 5 MW, whichever is lower, and dispatch LMP Desired MWh for the Real-time Settlement Interval is either below the real time economic minimum or above the real time economic maximum	LMP Desired MW	Tracking Ramp Limited Desired MW	Change in Desired
If a resource is not following dispatch and its % Off Dispatch is <= 20%	Ramp Limited Desired MW	Tracking Ramp Limited Desired MW	Change in Desired
If a resource is not following dispatch and its % off Dispatch is > 20%	LMP Desired MW	Tracking Ramp Limited Desired MW	Change in Desired
If a resource is not following dispatch, and the resource has tripped, for the Real-time Settlement Interval the resource tripped and the Real-time Settlement Intervals it remains offline throughout its day-ahead schedule	Day Ahead MWh	Tracking Ramp Limited Desired MW	Change from DA to Desired
For resources that are not dispatchable in both the Day-Ahead and Real-time Energy Markets	Day Ahead MWh	Day Ahead MWh	No Change

Proposed Solution Summary - Exemptions

Exemptions	Status Quo	Proposal
When Day-Ahead MWh is used in the Balancing Operating Reserve deviations calculation and the deviation percent is less than 5 percent	Yes	Yes
When TRLD MWh is used in the Balancing Operating Reserve deviations calculation and the deviation percent is less than 10 percent	Yes	Yes
Assigned regulation	Yes	Yes
Backed down for real time synchronized reserves	**Yes**	**No**
Assigned real time synchronized reserves in condensing mode	Yes	Yes
Assigned real time nonsynchronized reserves	Yes	Yes
Backed down for real time secondary reserves	**Yes**	**No**
Assigned real time secondary reserves in condensing mode	Yes	Yes
Responding to a synchronized reserve event and assigned real time synchronized reserves	Yes	Yes
Manually dispatched (up or down) due to reliability / constraint control / reactive and manual instruction is reflected in TRLD.	**Yes**	**No**
Manually dispatched (up or down) due to reliability / constraint control / reactive and manual instruction is not reflected in TRLD.	Yes	Yes
For flexible resources, committed day ahead, not scheduled by PJM in real time.	Yes	Yes
Units operating below 100% of eco min during min gen event.	**Yes**	**No**
Hourly deviation < 5 MWh	Yes	Yes

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