

Balancing Operating Reserves Status Quo

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Operating Reserves

- Accounting for Operating Reserve is performed daily
- Pool-scheduled resource is eligible to receive credits for providing Operating Reserve in day-ahead market and, provided that resource is available for entire time specified in its offer data, in balancing market
- Total resource offer amount for generation, including startup and no-load costs as applicable, is compared to its **Total Energy Market Value** for specified operating period segments during day
 - If Energy Market Value < Offer Amount, difference is credited to PJM Member

**Total
Energy
Market
Value**

- *Any amounts credited for ...*
 - Day-ahead scheduling reserve in excess of day-ahead scheduling reserve offer plus opportunity cost
 - Synchronized reserve in excess of synchronized reserve offer plus opportunity cost
 - Non-synchronized reserve in excess of opportunity cost
 - Resources providing reactive services

Balancing Operating Reserve (BOR) Segmented Make-Whole Credit

- BOR credits are calculated by operating segment within Operating Day
- Resource is made-whole for up to two segments for each synchronized start
 - Segment 1: Greater of Day-Ahead commitment and Min Run time at time of commitment
 - Segment 2: 5-minute intervals in excess of Segment 1
- With 5-minute settlements, segments can start/stop during intervals within hour
- Segment does not “carry over” to next day
- Startup costs are included in segment represented by longer of day-ahead schedule and minimum run time specified at time of commitment

Ramp-Limited Desired MW Calculation for Deviations

- Create greater incentive for generators to follow PJM real-time dispatch instruction rather than day-ahead schedule
- Determination of generation deviations made using following criteria:
 - Ramp-Limited Desired MW
 - % Off Dispatch
 - MW Off Dispatch
- Once generator is deemed “deviating,” charges are based on operational characteristics of generator and ...
 - Real Time MWh – Ramp Limited Desired MWh **OR**
 - Real Time MWh – UDS LMP Desired MWh **OR**
 - Real Time MWh – Day-Ahead MWh

Lost Opportunity Cost (LOC) Credit

- Generators whose output is reduced or suspended for reliability may be eligible for Lost Opportunity Cost (LOC) credit
- Flexible Resources are also eligible for LOC credit if committed Day-Ahead but not operating in Real-Time per PJM dispatch instructions
- Flexible Resources are defined as having ...
 - Combined startup and notification time less than or equal to 2 hours
 - Min Run time less than or equal to 2 hours
- Flexible Resources are not eligible for LOC if Real-Time Offer is greater than Day-Ahead Committed Offer
- If unit is decreased to provide Reactive Services, same calculations apply
- Pool scheduled resources are compensated using the *higher* of: Committed Offer & Final Offer

Resources Following Dispatch

Pool-scheduled and dispatchable self-scheduled resources operating above economic minimum are considered to be following dispatch if...

1. Actual output is between Ramp-Limited Desired MWh and UDS Basepoint, **OR**
2. % off dispatch is less than or equal to 10, **OR**
3. Hourly integrated Real-time MWh are within 5% or 5 MW (whichever is greater) of hourly integrated Ramp-Limited Desired MW

Resources Not Following Dispatch

Pool-scheduled or dispatchable self-scheduled generator not following PJM dispatch due to...

1. Actual output not being between its ramp-limited Desired MWh and UDS Basepoint MWh **AND**
2. % off dispatch is $> 10\%$

Assessed deviations as Real-time MWh – Ramp-limited Desired MWh

*If % off dispatch is $> 20\%$, deviations are assessed as Real-time MWh – UDS LMP Desired MWh

Resources Not Following Dispatch

Resources assessed deviations as Real-time MWh – Day-ahead Schedule MWh ...

1. Self-scheduled generating resource has economic maximum limit $\leq 110\%$ of economic minimum limit **OR**
2. Resource not dispatched by PJM above its economic minimum, unless it is lowering its output in accordance with PJM direction in response to minimum generation emergency event (or declaration)

Resources Not Following Dispatch

Each unit that has day-ahead schedule and trips or is scheduled day-ahead and does not run in real-time is assessed deviations ...

- Real-time MWh – Day-Ahead Scheduled MWh

Resources Not Dispatchable

- Each unit that is dispatchable day-ahead but is Fixed Gen in real-time is assessed deviations
 - Real-time MWh – UDS LMP Desired MWh
- Each unit that is not dispatchable in both day-ahead and real-time market is assessed deviations
 - Real-time MWh – Day-ahead Scheduled MWh
 - Units that choose to participate in day-ahead pumped storage optimization program are considered not dispatchable in Day-Ahead market

Resources Not Following Dispatch

Units assessed deviations as Real-time MWh – UDS LMP Desired MWh when...

- Unit's real-time economic minimum $>$ Day-ahead Economic Minimum by 5% or 5 MW, whichever is greater **OR**
- Unit's real-time economic maximum $<$ Day-ahead Economic Maximum by 5% or 5MW, whichever is lower **AND** UDS LMP Desired MW is either below real-time economic minimum or above real-time economic maximum, respectively

Resources Excluded from Deviation calculations

Hours during which generator is assigned by PJM for ...

1. Regulation **OR**
2. Synchronized Reserve (and actual MWh are less than day-ahead scheduled MWh) **OR**
3. Non-Synchronized Reserve **AND**
4. Actual MWh < day-ahead scheduled MWh

Are omitted from deviation calculation