5.3 Charges for Operating Reserve

The total cost of providing Operating Reserve for the Operating Day is the sum of the credits provided to PJM Members for supplying the Day-ahead and Balancing Market Operating Reserve except those Operating Reserve credits associated with the scheduling of units for Black Start service or testing of Black Start Units. The daily total cost of Day-ahead Operating Reserve excluding the total cost for resources scheduled to provide Black Start Service, Reactive Services or transfer interface control, is allocated and charged to PJM Members in proportion to their cleared day-ahead demand and decrement bids plus their cleared day-ahead exports. The daily total cost of Balancing Operating Reserve excluding the total cost for resources scheduled to provide Black Start Service is determined for each region (RTO, East and West) and allocated and charged to PJM Members in proportion to their real-time deviations from day-ahead schedules and generator deviations, or to PJM Members in proportion to their real-time load plus exports for generator credits provided for reliability. The total daily cost of synchronous condenser payments (other than that for synchronized reserve or reactive services) is allocated and charged to PJM Members in proportion to their real-time load (excluding losses) plus exports during that Operating Day. The total daily cost of reactive services is allocated and charged to PJM members serving load in the transmission zone in which the generator is providing reactive services in proportion to their real-time load (excluding losses) during that Operating Day. The total daily cost of day-ahead Operating Reserve for resources scheduled to provide Reactive Services or transfer interface control because the resource is known or expected to be needed to maintain system reliability in a zone(s) is allocated and charged to PJM Members in proportion to their total real-time load in the applicable transmission zone(s).The total monthly cost of Operating Reserves for resources providing Black Start service or testing of Black Start units is allocated to Network and Point-to-Point Transmission Customers based on their monthly transmission use on a megawatt basis. Additional details on this allocation can be found in the Black Start Service Accounting section of Manual 27.

PJM Actions

- PJM calculates for each Operating Day the Total Cost of Day-ahead Operating Reserve by summing the following credits for all PJM Members:
    - Total Day-ahead Operating Reserve generating resource credits excluding the total cost for resources scheduled to provide Black Start Service, Reactive Services or transfer interface control ($)
    - Total Day-ahead Operating Reserve transaction credits ($)
    - Note: Day-ahead Operating Reserve generating resource credits associated with the scheduling of units for Black Start service are allocated in accordance with the Black Start charge allocations and are not included in the Day-ahead Operating Reserve charge allocation.
    - Note: Day-ahead Operating Reserve generating resource credits for resources scheduled to provide Reactive Service or transfer interface control are allocated

in accordance with the Reactive charge allocations and are not included in the Day-ahead Operating Reserve charge allocation.

- PJM calculates for each Operating Day the Day-ahead Operating Reserve charges by allocating the total cost of Day-ahead Operating Reserve excluding the total cost for resources scheduled to provide Black Start Service, Reactive Services or transfer interface control to each PJM Member based on their daily share of cleared day-ahead demand and decrement bids plus cleared day-ahead exports.
- PJM calculates for each Operating Day the Total Regional Cost of Balancing Operating Reserve to be charged for reliability by summing the total Balancing Operating Reserve resource credits for reliability ($) for each region and for all PJM Members excluding those credits associated with the scheduling of units for Black Start service or testing of Black Start units.
- PJM calculates for each Operating Day the Balancing Operating Reserve charges for reliability by allocating the total cost of Balancing Operating Reserve for reliability on a regional basis to each PJM Member based on their daily share of the sum of their load plus exports in each region (RTO, East, and West). West region is defined as transmission zones AEP, AP, ATSI, ComEd, DEOK, DUQ, and Dayton, and EKPC, and East region is defined as transmission zones AE, BGE, DOM, Penelec, PEPCO, Meted, PPL, JCPL, PECO, Delmarva, PSEG, and Rockland. RTO region includes the East and West region and exports that are at interfaces or hubs not completely contained in either the East or West region.
- PJM calculates for each Operating Day the Total Cost of Balancing Operating Reserve to be charged to deviations by summing the following credits for all PJM Members:
    - Total Regional Balancing Operating Reserve generating resource credits for deviations ($)
    - Total Balancing Operating Reserve demand resource credits ($)
    - Total Balancing Operating Reserve transaction credits ($)
    - Total Balancing Operating Reserve cancellation fees ($)
    - Total Balancing Operating Reserve quick start resource credits ($)
    - Total Balancing Operating Reserve reduction/suspension credits ($)

Balancing Operating Reserve generating resource credits associated with the scheduling of units for Black Start service or testing of Black Start units are allocated in accordance with the Black Start Service charge allocations and are not included in the Balancing Operating Reserves charge allocation.

- PJM calculates for each hour of the Operating Day the individual generating resource deviations as the sum of the absolute value of the five minute interval deviations in the hour divided by 12 for generating resources that are not following dispatch for each five minute interval as follows:
    - Each pool-scheduled or dispatchable self-scheduled generator not following PJM dispatch due to its actual output not being between its ramp-limited Desired MW and UDS Basepoint MW, and its % off dispatch is > 10%, will be assessed deviations as Real-time MW – ramp-limited desired MW. If the % off dispatch is > 20%, deviations will be assessed as Real-time MW – UDS LMP Desired MW (as

determined in the Credits for Pool-Scheduled Generating Resources section of this manual).

- For each self-scheduled generating resource with an economic maximum limit less than or equal to 110% of the economic minimum limit or not dispatched by PJM above its economic minimum, unless the resource is lowering its output in accordance with PJM direction in response to a minimum generation emergency event (or declaration) will be assessed deviations as Real-time MW – Day-ahead Schedule MW.
- Each unit that has tripped or is scheduled Day-ahead and does not run in Real-time will be assessed deviations as Real-time MW – Day-ahead scheduled MW
- Each unit that is dispatchable Day-Ahead but is Fixed Gen in real-time will be assessed deviations as Real-time MW – UDS LMP Desired MW
- Each unit that is not dispatchable in both the Day-ahead and Real-time market will be assessed deviations as Real-time MW – Day-ahead scheduled MW. Units that choose to participate in the Day-ahead pumped storage optimization program are considered not dispatchable in the Day-ahead market.
- Each unit where the 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 5MW, whichever is lower, and UDS LMP Desired MW for the hours is either below the real-time economic minimum or above the real-time economic maximum, will be assessed deviations as Real-time MW – UDS LMP Desired MW
- Each unit operating on a cost-based soak cost profile will be considered to be following PJM dispatch during their soak time and will not be assessed deviations.
- Each unit operating on a price-based soak cost profile will be determined to not be following PJM dispatch and assessed deviations as Real-time MW – Day-ahead Schedule MW during their soak time if the unit's price-based soak MW profile is not equal to the cost-based soak MW profile and the unit's total real-time soak MWh is greater than 110% or less than 90% of the total price-based soak MW profile.
- Deviations are not calculated if the absolute value of the deviation MW ratio to applicable day-ahead scheduled MW or desired MW is less than or equal to 5%

- Five minute intervals during which a generator is assigned by PJM for: Regulation; assigned by PJM for Synchronized Reserve (and actual MW are less than day-ahead scheduled MW), assigned by PJM for Non-Synchronized Reserve (and actual MW are less than the day-ahead scheduled MW), or Tier 1 resources that respond to a synchronized reserve event are omitted from this calculation.
- Resource five minute interval deviations for units located at a "single bus" will be able to offset one another. A "single bus" will be any unit located at the same site and that has the identical electrical impacts on the transmission system. Unit parameters do not have to be identical for the units' deviation MW to offset one another. Units at a "single bus" must be contained in the same customer account.

- If the hourly sum of the absolute value of the five minute interval deviations for a generating resource divided by 12 for an hour is less than 5 MWh, then the generating resource is not assessed a Balancing Operating Reserve deviation for that hour.
- PJM calculates for each hour of the Operating Day for each Market Participant their total generating resource deviations as the sum of their individual generating resource deviations for the hour.
- PJM calculates for each hour of the Operating Day the withdrawal deviations as the sum of the five minute interval real-time deviations from day-ahead values for each customer account as follows:
    - Absolute Value of (cleared day-ahead demand bid MW + cleared day-ahead decrement bid MW + day-ahead sale transaction MW – real-time load de-rated for transmission losses including the impact of load reconciliation MW – real-time sale transaction MW) divided by 12
    - Withdrawal deviations will be calculated separately for each zone, hub, and interface whereby allowing netting to occur within each of those locations. Further netting will also occur for any hubs and aggregates fully contained within a given zone.
    - Dynamically scheduled export transactions are omitted from this calculation.
    - Positive demand deviations (real-time withdrawal MWs less than day-ahead withdrawal MWs) will not be included in the total withdrawal deviation by location during five minute intervals in which an Primary Reserve or Synchronized Reserve shortage in real-time occurs or when PJM initiates the request for emergency load reductions in real-time in order to avoid a Primary Reserve or Synchronized Reserve shortage.
- PJM calculates for each hour of the Operating Day the injection deviations as the sum of the five minute interval real-time deviations from day-ahead values for each customer account as follows:
    - Absolute Value of (cleared day-ahead increment offer MW + day-ahead purchase transaction MW – real-time purchase transaction MW) divided by 12
    - Injection deviations will be calculated separately for each zone, hub, and interface whereby allowing netting to occur within each of those locations. Further zonal netting will also occur for any hubs and aggregates fully contained within a given zone.
- Generating resource, withdrawal, and injection five minute interval deviations that occur within a single zone (including applicable hubs and aggregates) will be associated with a particular PJM region (East or West). Five minute interval deviations at an interface shall be associated with the East or West region with which the majority of the buses that define the interface are most closely electrically associated. Five minute interval deviations at hubs (not fully contained in a zone) shall be associated with the East or West region if all buses that define the hub are located in the region.
- PJM calculates a Market Participant's total regional hourly deviations by summing the five minute generation resource, withdrawal, and injection deviations in the hour in each region (RTO, East, and West).

- PJM allocates the total cost of Balancing Operating Reserve for deviations for an Operating Day on a regional basis to each customer account based on their daily share of the sum of the total hourly deviations in each region (RTO, East, and West).
- A PJM Member's deviations in the RTO region include deviations at hubs, aggregates, and interfaces that are not associated with either the East or West region as well as deviations in either the East or West region.
- PJM calculates for each Operating Day the Balancing Operating Reserve charges for reliability by allocating the total cost of Balancing Operating Reserve for reliability on a regional basis to each PJM Member based on their daily share of the sum of their load plus exports in each region (RTO, East, and West).
- A PJM Member's load plus exports in the RTO region include exports at hubs and interfaces that are not completely contained in either the East or West region as well as load plus exports in either the East or West region.
- Any Operating Reserve charges attributable to generators operated on behalf of transmission owners for local constraints, or on behalf of generation owners for special unit constraints, are directly assessed to the applicable requesting party.
- PJM calculates for each Operating Day the synchronous condensing charges by allocating a pro-rata share of the total cost of synchronous condensing payments to PJM exports (excluding dynamically scheduled exports) with the remaining costs separately allocated based on PJM Region real-time load (excluding losses) ratio shares.
- PJM calculates for each Operating Day the total cost of reactive services for the purpose of maintaining reactive reliability. The cost of reactive services are allocated and charged to each market participant based on real-time load (excluding losses) ratio shares in the transmission zone(s) in which the reactive services were provided.
- PJM calculates for each Operating Day the total cost of Day-ahead Operating Reserves for resources scheduled to provide Reactive Services or transfer interface control because they are known or expected to be needed to maintain system reliability in a zone(s). The Day-ahead Operating Reserve costs for these resources are charged to each market participant based on real-time load (excluding losses) ratio shares in the applicable transmission zone(s).