



Section 6: Synchronized Reserve Accounting

Welcome to the *Synchronized Reserve Accounting* section of the **PJM Manual for Operating Agreement Accounting**. In this section, you will find the following information:

- A description of how Synchronized Reserve are provided and accounted for in the PJM Energy Markets (see “*Synchronized Reserve Accounting Overview*”).
- How credits are calculated for providers of Synchronized Reserve (see “*Credits for Synchronized Reserve*”).
- How the total cost of Synchronized Reserve is allocated (see “*Charges for Synchronized Reserve*”).
- How Synchronized Reserve charge reconciliations are calculated (see “*Reconciliation for Synchronized Reserve Charges*”).

6.1 Synchronized Reserve Accounting Overview

Accounting for Synchronized Reserve is performed on an hourly basis. Synchronized Reserve shall be supplied from resources located within the metered boundaries of PJM. Resources participating in the reserve market are divided into two tiers. Tier 1 is comprised of all those resources on-line following economic dispatch and able to ramp up from their current output in response to a synchronized reserve event. Tier 2 consists of the additional resources that are synchronized to the grid and operating at a point that deviates from economic dispatch (including condensing mode) to provide additional synchronized reserve not available from Tier 1 resources. Synchronized Reserve resources include generators and demand side response resources.

The total PJM Synchronized Reserve Requirement is defined as the amount of 10-minute reserve that must be synchronized to the grid in accordance with the applicable NERC Council standards.

Tier 1 synchronized reserve credits are awarded to all resource owners whose resources increased output or decreased consumption in response to a synchronized reserve event (with the exception of those resources that were assigned Tier 2 synchronized reserve). Tier 2 synchronized reserve credits are awarded to all resource owners that have assigned self-scheduled or pool-scheduled synchronized reserve.

Tier 1 synchronized reserve credits are equal to the integrated increase in MWh output or decrease in MWh of consumption from each resource over the length of a synchronized reserve event times the synchronized energy premium less the hourly integrated LMP. The synchronized energy premium is defined as the average of the 5-minute LMPs calculated during the synchronized reserve event plus \$50/MWh

The synchronized reserve offer price for Tier 2 resources will be capped at a maximum value of the unit's Operating and Maintenance cost (as determined by the Cost Development Task Force) plus \$7.50/MWh.

If a unit is called on by PJM for the sole purpose of providing synchronized reserve, the unit is guaranteed recovery of all costs including start-up, no-load and minimum energy costs.

Demand side response resources which respond to a synchronized reserve event, and are



eligible for make-whole payments to recover shutdown cost, will be made-whole in the Operating Reserve for Load Response billing line item.

Resources that are assigned regulation when a synchronized reserve event is initiated will be compensated based on the amount of response provided beyond their regulation commitment, as well as for any response in excess of their regulation high limit or economic maximum (whichever is lower).

Each PJM Member LSE incurs a synchronized reserve obligation based on their hourly real-time load ratio share and applicable synchronized reserve zone's requirements during that hour. During hours when the Synchronized Reserve Clearing Price is the same throughout the synchronized reserve zone, an LSE's synchronized reserve obligation is equal to its real-time load ratio share times the amount of synchronized reserve assigned for the entire synchronized reserve zone. During hours when congestion causes the Synchronized Reserve Clearing Price to separate, each LSE's synchronized reserve obligation is equal to its real-time load ratio share within its synchronized reserve zone or sub-zone and the amount of synchronized reserve assigned in that synchronized reserve zone or sub-zone.

Participants may fulfill their synchronized reserve obligations by: owning Tier 1 resources from which PJM obtains synchronized reserve, entering bilateral arrangements with other PJM market participants or purchasing synchronized reserve from the PJM synchronized reserve market.

6.2 Credits for Synchronized Reserve

At the end of each hour, PJM calculates the credits due each PJM Member for Synchronized Reserve.

PJM Actions:

- PJM retrieves the following information:
 - Synchronized Reserve Ramp rate for Tier 1 resources
 - Synchronized Reserve maximum for Tier 1 resources
 - Synchronized Reserve availability for Tier 2 resources
 - Synchronized Reserve assigned quantity for Tier 2 resources (MW)
 - Synchronized Reserve offer price for Tier 2 resources (\$/MWh)
 - Energy use for condensing Tier 2 resources
 - Condense-to-generate startup cost
 - Synchronized Reserve bilateral transactions
 - 5-minute interval LMP data
 - Total PJM synchronized reserve requirement as determined in whole MWh for each hour of the operating day
- PJM calculates the hourly Synchronized Reserve credits for each Tier 1 resource as follows: