



Working to Perfect the Flow of Energy

PJM Manual 27:
Open Access
Transmission Tariff
Accounting

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Section 7: Black Start Service Accounting

Welcome to the *Black Start Service Accounting* section of the **PJM Manual for Open Access Transmission Tariff Accounting**. In this section, you will find the following information:

- An overview of the black start service accounting process (see “*Black Start Service Accounting Overview*”).
- How credits for black start service are calculated (see “*Black Start Service Credits*”).
- How charges for black start service are calculated for Network and Point-to-Point Transmission Customers (see “*Black Start Service Charges*”).

7.1 Black Start Service Accounting Overview

To ensure the reliable restoration following a shutdown of the PJM Transmission System, black start service is necessary to facilitate the goal of complete system restoration. Black Start Service is the capability of generating units to start without an outside electrical supply or the demonstrated ability of a generating unit with a high operating factor to automatically remain operating at reduced levels when disconnected from the grid. Black Start Service enables the Transmission Provider in collaboration with Transmission Owners to designate specific generators (Black Start Units) whose location and capabilities are required to re-energize the transmission system following a system-wide blackout (see the [PJM Manual for Balancing Operations \(M-12\)](#) for more details and eligibility).

Black Start Service is provided by the Transmission Provider, and all Transmission Customers must purchase this service from the Transmission Provider, pursuant to the PJM Open Access Transmission Tariff Schedule 6A. The charges for this service are based on a formula rate that allocates generation owners’ black start revenue requirements and applicable Day-ahead and Balancing Operating Reserve Credits to Network and Point-to-Point Transmission Customers based on their monthly transmission use on a megawatt basis. Customers serving zonal Network and Point-to-point load are allocated a ratio share of the total revenue requirements and applicable Day-ahead and Balancing Operating Reserve Credits in the applicable zone(s). Customers serving non-zone load (including Point-to-Point Transmission Customers not serving PJM load) are allocated a ratio share of the total revenue requirements and applicable Day-ahead and Balancing Operating Reserve Credits for PJM. Effective 12/1/2012, the applicable Day-ahead and Balancing Operating Reserve Credits are those credits associated with the scheduling of units for Black Start service or testing of Black Start units.

7.2 Black Start Service Credits

Each generation owner of Black Start Units that meet PJM and NERC criteria receives a monthly Black Start Service credit equal to one-twelfth (1/12) of its annual black start revenue requirement. Revenue requirements for Black Start Service may include the following, where applicable: NERC CIP Capital Costs, fixed black start unit costs, variable black start costs, training expenses, oil-fuel storage costs for liquefied natural gas, propane, or oil and an incentive factor. Revenue requirements for units with the ability to disconnect from the grid automatically and remain operating at reduced levels (ALR) may only recover training costs, NERC compliance costs, and an incentive factor. For more information on

Black start unit revenue requirements, please see **Schedule 6A, PJM's Open Access Transmission Tariff (OATT)**.

Monthly black start service revenues are forfeited for: units that fail a black start test and do not successfully pass a test within a ten day grace period immediately following a failed test; and, for units without a successful black start test on record with PJM within the last thirteen months.

Revenue requirements for joint-owned black start units are allocated to the owners based on their ownership shares. Zonal revenue requirements equal the total revenue requirements of all black start units nominated as critical by the Transmission Provider in that zone regardless of zonal location and the share of annual revenue requirements of black start units designated as critical across multiple zones (cross-zonal coordination).

The current zonal revenue requirements are posted on the PJM website under Markets & Operations/Market Settlements (<http://www.pjm.com/markets-and-operations/market-settlements/black-start.aspx>).

7.3 Black Start Service Charges

This section describes the process of calculating the Black Start Service charges. Charges for black start service are calculated for zone (Network Customers and customers serving load with Point-to-Point Transmission Service) and for non-zone (Non-Zone Network Customers and Point-to-Point Transmission Customers) load separately. The sum of all customers' monthly charges equal one-twelfth (1/12) of the total annual black start revenue requirements that are credited to generation owners of black start units as well as a share of the applicable Day-ahead and Balancing Operating Reserve Credits that are credited to generation owners of black start units for the month. Effective 12/1/2012, the applicable Day-ahead and Balancing Operating Reserve Credits are those credits associated with the scheduling of units for Black Start service or testing of Black Start units.

Each Transmission Customer's charge is calculated by determining the Transmission Customer's monthly zone and non-zone transmission use on a megawatt basis.

- Monthly zone transmission use is the sum of a Transmission Customer's Network daily peak load contributions to a PJM zone and daily average Point-to-Point energy reservations where the point of delivery is within a PJM zone.
- Monthly non-zone transmission use is the sum of a Transmission Customer's non-zone Network daily peak load contributions and daily average Point-to-Point energy reservations where the point of delivery is the border of PJM.

Transmission Customers with monthly non-zone transmission use are charged a share of the total PJM pool-wide black start revenue requirement and applicable Day-ahead and Balancing Operating Reserve Credits based on their portion of the total PJM monthly transmission use. Transmission Customers with monthly zone transmission use are charged a share of the applicable zonal black start revenue requirements and applicable Day-ahead and Balancing Operating Reserve Credits (less the total share of revenue requirements recovered from non-zone transmission use) based on their portion of monthly transmission use in that zone(s).

PJM Actions:

- The PJM accounting process collects each generation owner’s annual black start revenue requirement for each zone. Monthly black start revenue requirements equal 1/12 of the annual revenue requirements. Annual revenue requirements for black start units that are shared and designated to serve multiple zones will be allocated by Transmission Owner designated critical load percentage to determine the amount applicable for each zone.
- The PJM accounting process collects each generation owner’s day-ahead operating reserve credits and balancing operating reserve credits that are associated with the scheduling of units for black start service or black start testing for each zone. Additional details on testing of units for Black Start service can be found in Manual 12. The PJM accounting process retrieves the point-to-point energy reservations for each Transmission Customer.
- The PJM accounting process calculates each Transmission Customer’s monthly non-zone transmission use (MW) by summing for all hours in the month all of their point-to-point energy reservations (adjusted for PJM curtailments) and dividing that value by 24.
- The PJM accounting process calculates each Transmission Customer’s monthly zone transmission use (MW) by summing for all days in the month all of their daily network integration transmission service peak load contributions for each zone (see *Network Integration Transmission Service Accounting* section of the **PJM Manual for Open Access Transmission Tariff Accounting**).
- The PJM accounting process calculates charge allocations for each Transmission Customer with monthly non-zone transmission use as follows:

$$\text{Monthly Non - Zone Charge} = \left(\frac{\text{Transmission Customer's Monthly Non - Zone Transmission Use}}{\text{PJM Total Transmission Use}} \right) \times (\text{PJM Total Generation Owners' Monthly Black Start Revenue Requirements} + \text{PJM Total Monthly Day - ahead and Balancing Operating Reserves Credits associated with Black Start})$$

- The PJM accounting process calculates an Adjustment Factor to be applied to all monthly zone charges as follows:

$$\text{Adjustment Factor} = \frac{\text{Total Monthly Zone Transmission Use for all PJM Zones}}{\text{PJM Total Monthly Transmission Use}}$$

- The PJM accounting process calculates charge allocations for each Transmission Customer with monthly zone transmission use as follows:



$$\text{Monthly Zone Charge} = \left(\frac{\text{Transmission Customer's Monthly Zone Transmission Use}}{\text{Total Monthly Zone Transmission Use in Zone}} \right) \\ \times (\text{Total Generation Owners' Monthly Black Start Revenue Requirements in Zone} + \\ \text{Total Generation Owners' Monthly Day - ahead and Balancing Operating Reserve Credits associated with Black Start in Zone}) \\ \times \text{Adjustment Factor}$$

- The PJM accounting process calculates each Transmission Customer's total monthly black start service charge by summing its monthly charge allocations for all zone and non-zone transmission use.