

Overview

A PJM Interconnection stakeholder task force was created in 2012 to develop revised business rules for system restoration methodology and processes. One of the key outcomes of the task force is an RTO-wide request for proposal (RFP) process for new black start resources and for updating studies for existing black start units, which takes place every five years. The first five-year RFP process began in 2013 for resources needed in 2015 (this timing was intended to align with the significant impact to PJM's black start units from generator deactivations in 2015). In February 2018, PJM initiated the second RTO-wide RFP process cycle.

Did You Know?

- PJM refreshes the system restoration plan every five years via the RFP process. This five-year cycle aligns with NERC compliance requirements.
- Black start units can serve critical load needs in both the transmission zone where the critical load is located and adjacent transmission zones.

What Are Black Start Units?

Black start units are designated generators that are able to start and initiate system restoration without using an outside electricity supply in the unlikely event that power is lost throughout the entire PJM footprint. The main objective of system restoration is to restore power to the backbone bulk electric system, which can then facilitate restoration of the distribution system and end-use customer power supply. Once connected, black start units can supply start-up power — also called cranking power — to other generating units and help restore “critical load” in each transmission zone.

PJM-defined critical load includes the electricity needed for:

- Units with faster start-up times (four hours or fewer)
- Nuclear safe shutdown loads
- Electric-powered gas compressor station loads

Black start units are compensated for the service they provide to the electric grid. These costs are verified by PJM and the Independent Market Monitor (IMM) and have annual testing requirements.

System Restoration vs. Storm Restoration

Storm Restoration	System Restoration (Blackout*)
Usually pockets of service	Entire Interconnection out
Often anticipated	May happen with limited warning
Cause evident	Cause may not be immediately apparent
Restoration priorities well-established	Restoration priorities may seem counter-intuitive (focused on the bulk electric system and not distribution-connected critical load)
Restoration times can be provided	Restoration times dependent on system conditions at time of blackout
Crews and repair work evident	Most work coordinated within control center



Communications difficult

External communications may not be available

* The August 2003 blackout is considered a partial blackout.

A system restoration is very different from a storm restoration. In a storm restoration (the most-familiar power outage), electricity still flows through the transmission system grid and power will return to the distribution system once the damaged infrastructure is reconnected.

In a blackout, there would be no power anywhere in the grid (causes could include voltage collapse or cascading transmission outages). In that case, black start units use transmission paths — called cranking paths — to provide cranking power. That power is used to start up other generations (that can start in four hours or less) that are needed for continuing to restore the rest of the transmission system.

Black Start RFP Process

The RTO-wide RFP process evaluates new black start resource proposals, incorporates updated critical load values per transmission zone, and updates reliability studies for existing black start units (such as steady state and dynamic simulations required for NERC compliance), which refreshes restoration plans for PJM and the transmission owner. Existing black start units do not need to submit RFPs, since PJM assumes that these units will continue to provide black start service — unless the resource owner has provided a termination notice. PJM may also choose to terminate existing black start resources (in accordance with Tariff timelines) or keep the current black start fleet the same.

In the RFP selection process, PJM evaluates technical feasibility, fuel assurance and cost/schedule. PJM generally prefers black start units to be in close electrical proximity to PJM-defined critical loads. When evaluating natural gas unit RFPs, PJM will give a higher level of consideration in the RFP evaluation process to those with dual-fuel capability and/or primary, firm gas-transportation contracts because of the fuel assurance they offer.

In between five-year RTO-wide RFP cycles, PJM uses an incremental RFP process to address specific black start transmission zone needs that could arise from black start unit deactivations or terminations.

What's Next?

PJM began the RTO-wide RFP in February 2018. The black start RFP solution will be implemented in April 1, 2020.

