



Annual Black Start Revenue Education

David Hauske
Performance Compliance Dept.

MIC – Special Session
April 9, 2026

Annual Revenue Process and key dates are outlined in OATT, Schedule 6A – Section 17A.

Annual revenue requirements and supporting documentation are required to be submitted to the IMM with a copy to PJM between March 31 and May 3 each calendar year. Submissions after May 3 will not be accepted.

Black Start delivery years run from June 1 to May 31.

Acronym	Term & Definition
BFR	Base Formula Rate is a formula used for Black Start resource compensation for resources without capital cost.
BSSC	Black Start Service Cost is a component of the formula for calculating a generator’s annual Black Start revenue requirement. There are fixed Black Start Service Cost and variable Black Start Service Cost components in each of the annual revenue recovery formulas.
CRF	Capital Recovery Factor is a factor used in the Capital Recovery Rate used for Black Start resource compensation for resources utilizing capital costs to become Black Start or Fuel Assured Black Start Capable.
MTSL	Minimum Tank Suction Level is the amount of fuel at the bottom of an oil tank that is unable to be recovered for use. It is the lowest level of the tank where the pump can extract fuel from the tank.
RFP	A Request For Proposal is the method by which resources are selected in PJM to provide Black Start Service or Fuel Assured Black Start Service.
O&M	Operations and Maintenance costs attributable to supporting Black Start Service. Must be in accordance with PJM cost development guidelines.

***Annual Black Start Service
Revenue Requirement***

=

**{Fixed BSSC + Variable BSSC + Training
Costs + Fuel Storage Costs} * (1 + Z)**

Where:

- **Fixed BSSC** = Fixed Black Start Service Cost
- **Variable BSSC** = Variable Black Start Service Costs (approved O&M Costs)
- **Training Costs** = \$3,750 per plant per delivery year (50 staff hours per plant per year multiplied by \$75 per staff hour)
- **Fuel Storage Costs** are the costs defined in the tariff for oil units with on-site storage
- **Z** = Incentive Factor that will be one of the following:
 - 10% for Non-Fuel Assured Black Start Units
 - 20% for Fuel Assured Black Start Units
 - Zero (0) for Black Start Units that are recovering new or additional Black Start capital costs or Fuel Assurance capital costs under section 6 of Schedule 6A

Fixed BSSC (Black Start Service Costs) are calculated on one (1) of three (3) recovery rates:

1 Base Formula Rate

Standard recovery rate for units that have concluded a capital recovery rate or for units that require no capital costs to provide Black Start Service

2 Capital Cost Recovery Rate

Used by units that require recovery of capital costs for conversion to provide Black Start or Fuel Assured Black Start Service

3 NERC-CIP-Specific Recovery

Reserved for units to recover capital costs for the incremental equipment solely necessary to enable a Black Start Unit to maintain compliance with mandatory Critical Infrastructure Protection Reliability Standards

FERC-Approved Rates

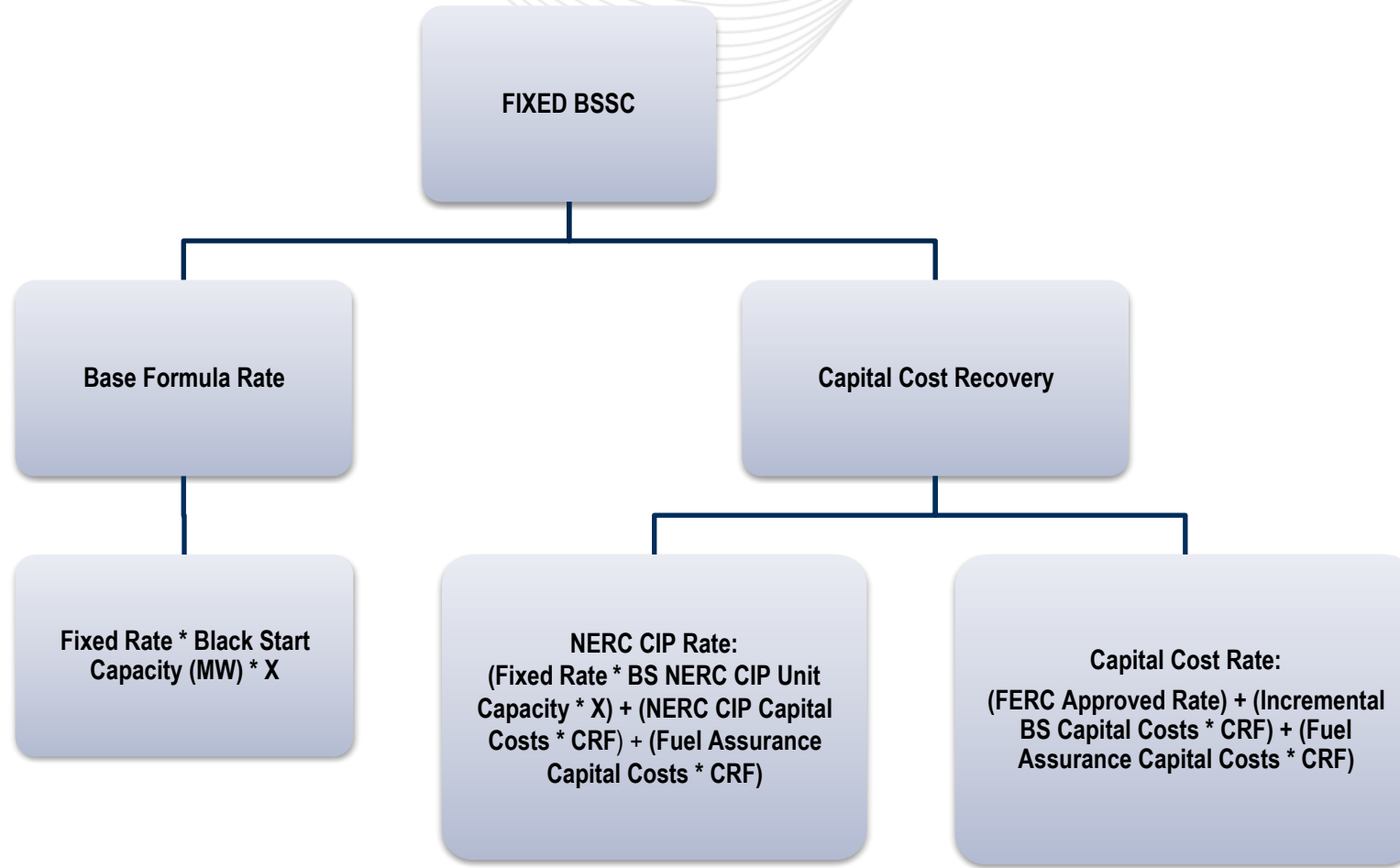
(Not Common)

Referenced in Schedule 6A

Bilateral Agreements Directly With the Transmission Provider

No Recovery Under Schedule 6A
Through PJM

Fixed Black Start Service Cost (BSSC) recovery options:

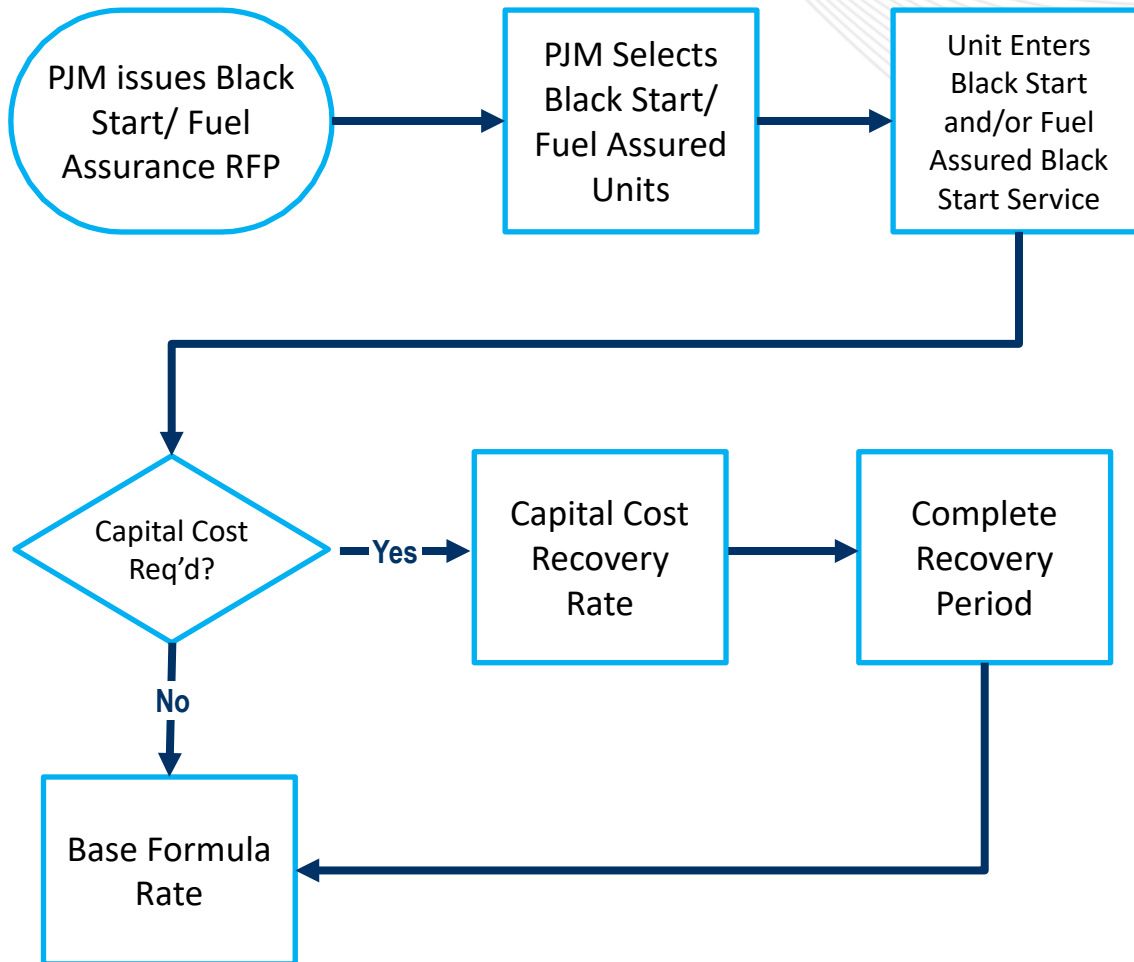


Fixed Black Start Service Cost (BSSC) recovery options:

Base Formula Rate	OR	Capital Cost Recovery	
Fixed Rate x Black Start Capacity (MW) * X		NERC CIP Rate: (Fixed Rate * BS NERC CIP Unit Capacity * X) + (NERC CIP Capital Costs * CRF) + (Fuel Assurance Capital Costs * CRF)	Capital Cost Rate: (FERC Approved Rate) + (Incremental BS Capital Costs * CRF) + (Fuel Assurance Capital Costs * CRF)

Variables:

X =	0.01 for Hydro Units 0.02 for Diesel or CT Units 0.02 for Fuel Assured (FA) Units (including FA Hydro Units)
CRF =	Capital Recovery Factor (Refer to Schedule 6A to determine which CRF should be utilized)
Fixed Rate =	Fixed Rate for 2026 is \$284.62 Escalated from 2025 using the Handy Whitman index.



Notes:

- All capital, O&M and fuel storage costs must be approved by IMM and PJM.
- Units electing Capital Recovery Rate will have a lifetime commitment to Black Start/Fuel Assured Service (for units selected after June 6, 2021).
- Units electing Base Formula Rate will provide two (2)-year initial commitment to Black Start/Fuel Assured Service. One (1)-year notice is required to terminate service.

Units that were selected for Black Start Service Prior to June 6, 2021 shall use the following CRF values as outlined in Schedule 6A:

Age of Black Start Unit (Years)	Term of Black Start Commitment (Years)	Levelized CRF
1 to 5	20	0.1180
6 to 10	15	0.1348
11 to 15	10	0.1767
16+	5	0.3097

Units entering Black Start Service or Fuel Assured Black Start Service after June 6, 2021 will use a variable CRF rate as outlined below:

Variable CRF rate is calculated by PJM and the IMM annually in March. Values are posted to PJM.com by March 31st each calendar year.

CRF values are calculated based on annual changes to Federal and State tax rates and debt rates.

Units are required to use the newly calculated CRF values each Delivery Year for the annual revenue requirement.

Units that entered Black Start Service between January 1, 2023 through January 18, 2025 are required to use the phased out *bonus depreciation*. Units entering service January 19, 2025 and later are eligible for 100% *bonus depreciation*.

CRF calculations include bonus depreciation for Black Start assets

For assets/units placed in service after January 1, 2023 and prior to January 19, 2025, federal tax law required a phased down bonus depreciation which was dependent upon the year a unit entered Black Start service (see below).

Bonus depreciation values are fixed for the term of the recovery period based on the year the unit enters Black Start service.

<i>2022 and earlier:</i>	100% Bonus Depreciation
<i>2023</i>	80% Bonus Depreciation
<i>2024</i>	60% Bonus Depreciation
<i>2025 and after:</i>	100% Bonus Depreciation - new Tax Law (40% for Jan 1 to Jan 18)

Recovery periods in the CRF calculation are based on the age of the unit on the date the unit enters Black Start or Fuel Assured Black Start Service:

Age of Black Start Unit (Years)	Term of Black Start Commitment (Years)	Fuel Assurance Capital Cost Recovery Period (Years)
1 to 5	20	20
6 to 10	15	15
11 to 15	10	10
16+	5	10

$$\text{Variable BSSC} = (\text{Black Start O\&M}) * Y$$

Black Start O&M

- Maintenance costs for Black Start equipment related directly to Black Start service
- O&M expenses must be in accordance with the Cost Development Guidelines and M15.
- Option to Use 1% of Energy VOM for Black Start O&M costs

Note: Units that elect default VOM values are not eligible to use 1% of Energy VOM.

Y- Factor:

- Typically equal to 1 if O&M costs are directly related to Black Start service
- Typically equal to 0.01 if using 1% of energy VOM

Note: Units requiring Y-factors other than 1 or 0.01 should contact PJM prior to cost submission.

Eligible O&M Expenses

For expenses directly related to Black Start service

- Diesel generator maintenance expenses including fuel consumed for generator testing. (Does not include fuel consumed by the Black Start unit).
- Unit upgrades typically are not allowable O&M expenses and may be covered under a new CRF capital recovery if approved by PJM and the IMM.
- Other maintenance costs may be considered if directly related to Black Start service.

Documentation is required for all O&M expenses. All O&M expenses are reviewed and approved by the IMM.

Black Start Units that store liquefied or compressed natural gas, propane, or oil on site are eligible to receive fuel storage costs.

Fuel Storage Costs: $MTSL + \{\# \text{ Run Hours} \times \text{Fuel Burn Rate}\} * \{12 \text{ Month Forward Strip} + \text{Basis}\} * \text{Bond Rate}$

Variables:

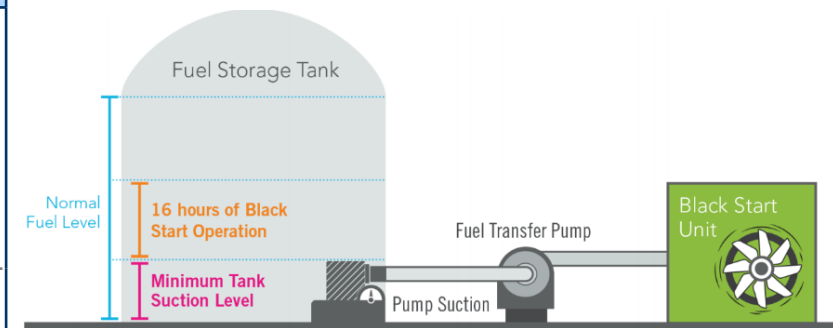
MTSL – Minimum Tank Suction Level

Run Hours – The lesser of 16 hours or run hours defined in the TO restoration plan

Fuel Burn Rate – Actual fuel burn rate of the Black Start Unit in gallons per hour

12-Month Forward Strip and **Bond Rate** are calculated by the IMM annually each April. Calculation details can be found in Schedule 6A.

Basis – Transportation costs from the location referenced in the forward price data to the Black Start Unit plus any variable taxes



For oil tanks that are shared between Black Start Units and other resources, only a proportionate share of the MTSL can be allocated for Black Start. In this case, a Black Start Tank ratio must be used:

Black Start Tank Ratio:

$$\frac{(\text{Fuel Burn Rate} \times \text{Minimum Run Hours})}{(\text{Tank Capacity} - \text{MTSL})}$$

For shared tanks, the following fuel storage calculation is used:

Fuel Storage Costs:

$$(\text{Black Start Tank Ratio} \times \text{MTSL}) + \{(\# \text{ Run Hours} \times \text{Fuel Burn Rate}) \times (\text{12-Month Forward Strip} + \text{Basis}) \times \text{Bond Rate}\}$$

Incentive Factor – Z-factor

Reserved for only Black Start Units on the BFR rate under section 5 of Schedule 6A. Z will be one of the following:

10% for Non-Fuel Assured Black Start Units

20% for Fuel Assured Black Start Units

Zero (0) for Black Start Units that are recovering new or additional Black Start capital costs or Fuel Assurance capital costs under section 6 of Schedule 6A

Fuel Assured Black Start Service

Same requirements as Black Start Service but meets one (1) of these additional requirements

Additional Requirements for Fuel Assurance:

- The ability to store 16 hours of fuel and/or non-fuel consumables on site
- The ability to operate independently on 2 or more interstate pipelines
- Capable of providing no less than 16 hours of operation per day, which need not be continuous, at a megawatt level that provides a confidence level of 90% based on an evaluation of the unit's historical operation over a representative period of time

Participation as a Fuel Assured Black Start unit requires an award by PJM through a Black Start RFP process.

All documentation for the annual revenue process is due to the IMM and PJM between March 31 and May 3. Late submissions will not be accepted.

IMM Requirements

- Back-up documentation (i.e., invoices, contracts, etc.) related to O&M costs
- Details related to MTSL calculations including the unit Fuel Burn Rate
- Send all documents to blackstart@monitoringanalytics.com

PJM Requirements

- Submit a completed cost form to PJM no later than May 3. (Cost forms available at PJM.com)
- Submit cost forms through eDart with the Type of File as “Cost”
- Back-up documentation for costs are not required unless submitting a disagreement to the IMM annual revenue determination. Disagreements are due to PJM no later than May 21. Late submissions will not be accepted.
- Black Start costs not submitted to PJM may not be eligible for consideration for any disagreements.
- Send any supporting documents and additional requests to blackstart@pjm.com

If a Black Start Unit owner disagrees with the IMM's determination of Black Start Service revenue requirements, they can submit notice of disagreement and relevant documentation to PJM at blackstart@pjm.com with a copy to the IMM at blackstart@monitoringanalytics.com

What to Include:

- Written notice of Disagreement, submitted no later than May 21
- All relevant documentation (i.e., invoices, contracts, calculations, etc.) related to components in the revenue calculation

PJM will determine whether to accept the values by May 27.

New CRF values for the 2026/27 Delivery Year have been posted to PJM.com.

PJM Cost Forms have been updated with the new fixed rate for the BFR. Generator owners should download the latest forms from PJM.com and use the latest version for this year's cost submittal. Links to the new forms are listed on the Document Links slide (slide 26).

Additional information regarding Black Start Service is available on the Ancillary Services page on PJM.com.

Black Start and Fuel Assured Black Start Service requirements are outlined in OATT Schedule 6A & Manual 12, Section 4.5.

OATT Schedule 6A provides additional information on Black Start Service, including the following:

Additional details on revenue calculations

Requirements for Black Start and Fuel Assured Black Start Service

Additional requirements for terms of commitment for providing Black Start Service

The screenshot shows the PJM.com website navigation menu with 'markets & operations' highlighted. The left sidebar contains a list of menu items, with 'Ancillary Services' highlighted. The main content area displays the 'Ancillary Services' page, including a breadcrumb trail, a description of ancillary services, a list of markets (Synchronized Reserve, Non-Synchronized Reserve, Secondary Reserve, and Regulation), and a 'Contact PJM' section with a 'Member Community' button and phone numbers.

The screenshot shows two sections of the PJM.com website. The top section is 'Zone Preliminary Billing Data', which includes a table of documents related to Regulation Redesign Phase 2, such as 'Sample Regulation Up and Regulation Down Test Signal Pattern' and '40-Minute Performance Score Template'. The bottom section is 'Black Start Service', which lists various requirements and reviews, including 'Five (5) Year Review', 'Active Requests for Proposals', and 'PJM Calculated Annual Capital Recovery Factor (CRF)'.

May 3

- Revenue requirements and supporting documents due to the IMM
- Deadline to submit copy of revenue requirements to PJM

May 14

Deadline for stakeholder and IMM to agree on final annual revenue requirements

May 21

Deadline for stakeholders to submit revenue disagreements with PJM

May 27

Deadline for PJM to accept submitted disagreements with the IMM

June 1

Revenues effective

May

June

Tool/Documentation

Link

OATT:

<https://www.pjm.com/directory/merged-tariffs/oatt.pdf>

M12:

<https://www.pjm.com/-/media/DotCom/documents/manuals/m12.pdf>

M15:

<https://www.pjm.com/-/media/DotCom/documents/manuals/m15.pdf>

Cost Forms:

Formulaic (BFR): <https://www.pjm.com/-/media/DotCom/markets-ops/ancillary/formulaic-bfr-cost-submittal-form.xlsx>

Capital Recovery (CFR): <https://www.pjm.com/-/media/DotCom/markets-ops/ancillary/capital-recovery-crf-cost-submittal-form.xlsx>

NERC CIP: <https://www.pjm.com/-/media/DotCom/markets-ops/ancillary/nerc-cip-cost-submittal-form.xlsx>

Ancillary Services Page:

<https://www.pjm.com/markets-and-operations/ancillary-services>

eDart User Guide:

<https://www.pjm.com/-/media/DotCom/etools/edart/edart-user-guide.pdf>

Facilitator:

Jason Shoemaker

jason.shoemaker@pjm.com

Secretary:

Stefan Starkov

stefan.starkov@pjm.com

SME/Presenter:

David Hauske

david.hauske@pjm.com

For additional questions or information, please contact the PJM Black Start team via email at blackstart@pjm.com

Annual Black Start Revenue Education



Member Hotline

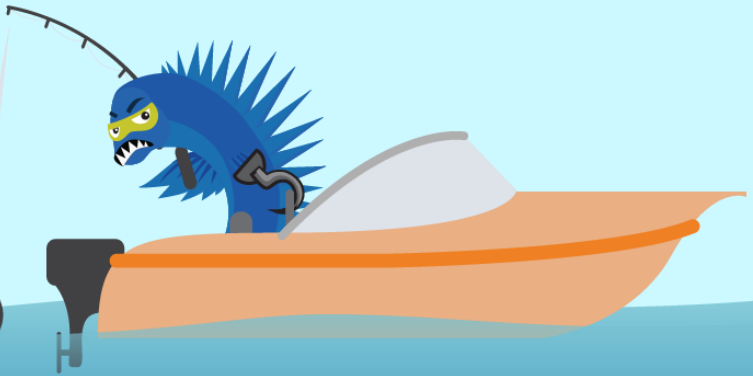
(610) 666 – 8980

(866) 400 – 8980

custsvc@pjm.com

**PROTECT THE
POWER GRID**

**THINK BEFORE
YOU CLICK!**



**BE ALERT TO
MALICIOUS PHISHING
EMAILS**



**Report suspicious email activity to PJM.
Call (610) 666-2244 or email it_ops_ctr_shift@pjm.com**