

RTO Wide RFP for Black Start Service and Black Start Fuel Assurance FAQs

PJM initiated the 2023 RTO Wide Black Start Request for Proposal for New Black Start Service and Black Start Fuel Assurance on June 20, 2023. The RTO-wide RFP process evaluates new black start resource proposals, incorporates updated critical load values per transmission zone, and is implemented every 5 years to align with NERC requirements. In addition to proposals for new Black Start Service, PJM is also seeking proposals for Black Start Fuel Assurance in accordance with the new Black Start Fuel Assurance business rules developed in the Fuel Requirements for Black Start Resources stakeholder process and filed with FERC on May 12, 2023 (FERC Docket: ER23-1874).

PJM is using a two-step proposal process, with a high level initial proposal including basic proposed Black Start Unit and Fuel Assured Black Start Unit information due July 25, 2023, and more detailed proposals submitted by November 1, 2023.

PJM conducted an Operating Committee Special Session on Tuesday, June 27, 2023, during which PJM provided an overview of the current RFP process and collected stakeholder questions. A link to the overview presentation is provided here: <https://www.pjm.com/-/media/committees-groups/committees/oc/2023/20230627-special/item-02---2023-rto-wide-black-start-rfp-process.ashx>

The following list of questions includes inquiries documented at the June 27, 2023 Operating Committee Special Session, as well as questions that PJM has received since then. In addition, relevant questions from the previous RTO-wide Black Start RFP processes are included for informational purposes. PJM will continue to periodically update this document throughout the remainder of the current market window period.

Questions and responses are provided below in the following categories:

- Process
- Technical
- Compensation

Any questions regarding the 2023 RTO Wide Black Start Request for Proposal for New Black Start Service and Black Start Fuel Assurance can be sent via email to blackstart@pjm.com.

Process

P1. Please provide additional details on use of the Level 1 and Level 2 proposal forms posted with the RFP document.

All proposals for this RFP should be submitted using the Level 1 and Level 2 forms provided. For Level 1 proposals the intent is to provide a consistent method for resource owners to submit initial high level information to PJM without having to invest significant engineering or development efforts needed to submit a full detailed proposal. Based on an initial assessment of location, critical load and fuel assurance needs, PJM will use this initial information to identify which proposals will be asked to submit a Level 2 proposal.

Resource owners are requested to submit individual Level 1 forms for each proposed location. If the resource owner wishes to submit multiple options at the same location, a single form can be used. For example, a resource owner proposing black start and/or fuel assurance at location A, with perhaps two options at location A, would only submit one Level 1 form. But if a resource owner is proposing black start and/or fuel assurance at 2 locations, then two separate Level 1 forms would be required. For each Level 1 proposal the type of Black Start Service and/or Fuel Assured Black Start Service proposal should be identified as indicated at the top of each form.

For Level 2 proposals, the intent is to provide a standardized response method for resource owners to submit and PJM to collect proposal data for a more detailed set of proposal information. Many of the details were previously embedded in the RFP document text, and PJM's intent is to use this proposal format for all Black Start RFPs moving forward.

For Level 2 proposals, a single excel file is required from each resource owner that indicates the various proposed black start / fuel assurance locations, as well as the options at each location. Each location / option should be entered in this form using the separate columns provided. For example, if a resource owner is proposing black start and/or fuel assurance at location A, and there are two options, then columns "H" and "I" should be populated. That process would repeat for each proposed location /option combination in subsequent columns.

Please note the dropdown menus provided at the top of each proposal column to designate the respective Black Start Service and/or Fuel Assured Black Start Service proposal type for each proposal. PJM may make minor revisions to this form, but any minor revisions will be finalized and posted prior to PJM making any Level 2 proposal notifications.

P2. What is the timetable for the Black Start RFP Process?

After receipt of Level 1 proposals, PJM will work with Transmission Owners to determine if a Level 2 proposal would be warranted from a RFP respondent. Refer to slide 4 of the Special OC Session held on 6/27/2023 for details on milestones dates. <https://www.pjm.com/-/media/committees-groups/committees/oc/2023/20230627-special/item-02---2023-rto-wide-black-start-rfp-process.ashx>

P3. Who is the appropriate entity to submit the proposals? Can an entity other than the unit owner submit a proposal to the RFP?

The entity submitting the proposal must be either the Market Seller or the unit owner, and have the contractual authority to commit the unit to Black Start Service and/or Fuel Assured Black Start Service. Typically, the entity that submits the proposals is also the main point of contact for PJM through the RFP evaluation process. If the RFP respondent is an entity other than the unit owner, the entity with contractual authority to commit the unit to Black Start Service and/or Fuel Assured Black Start Service must submit to PJM a fully-executed Declaration of Authority using the form posted on the PJM website demonstrating the rights to submit the unit for Black Start Service and/or Fuel Assured Black Start Service.

P4. Can the cost estimate in the Level 2 response be an engineering estimate?

Yes, a level 2 response can include engineering estimates. As noted in the RFP, if a submitted proposal is accepted, and after project award and commencement of work the Black Start Unit Owner projects either a significant delay in the original schedule or a significant increase in estimated costs, the Black Start Unit Owner will notify PJM as soon as possible upon becoming aware of these significant changes.

P5. Would responses that have an availability date beyond 12/1/2025 be considered? For example, what if the availability date would be not until sometime in 2026?

PJM would consider units that will be in service later than 12/1/2025 but an explanation of the potential delay should be included in the RFP response. The in-service date is an important factor in PJM's proposal evaluation, but PJM may be more flexible for RFP responses that may take longer to finish if they are technically viable and are in key areas.

P6. How does PJM manage unexpected delays and ensure that Black Start need is met?

The targeted in-service date for all new Black Start Service and Fuel Assurance Upgrades is 12/1/2025. In the event of unanticipated delays, PJM would work closely with the Black Start resource owner and Transmission Owner, as needed, to ensure adequate Black Start capability in the interim period.

P7. The duration from the end of the PJM evaluation, award date, and the required in service date is approximately one year. Has PJM considered the time required for submitting and receiving the required construction and environmental permits? Will PJM work to accommodate these potential schedule impacts after notice of award and extend the required in service date accordingly?

PJM suggests that if timing due to environmental permits is a concern, responders should include several scenarios such as the earliest possible in service date, the potential latest in service date, and the most likely in service date for project time line estimates.

P8. Is isochronous mode operation specified in the Level 1 or Level 2 RFP response?

Isochronous mode should be confirmed by the respondent in the Level 2 RFP response. All Black Start resources are required to have the ability to operate in isochronous mode which allows the unit to be very responsive to changes in system frequency.

P9. Will PJM keep the responders data confidential?

PJM will abide by the terms in the OA & Tariff but will have to share certain data with the IMM and the host zone Transmission Owner. In addition, any information provided to State Commissions would not include unit specific information.

P10. Are there any penalties for withdrawing a black start service project proposal?

There are no penalties for withdrawing a Black Start Service RFP proposal, other than loss of future black start revenues if the proposal is selected. PJM's intent for the dates indicated in the RFP Section 3.1 "Offer in Effect" wording was to ensure that offers remain in effect during the PJM proposal evaluation phase.

P11. Are there a maximum number of units or modules, per site, for which we may submit proposals?

No, there is no limit on the number of units or modules for which you may submit proposals.

P12. Are there a maximum number of units or modules, per site, that may be selected?

No. There is no limitation on the number of units or modules, per site, that may be selected. Based on the needs of the area, PJM will select units to fulfill that need.

P13. Is the Unit Market ID the same as the RPM Resource ID?

The Unit Market ID (what you see in Markets Gateway) may be the same as the RPM resource ID, but depending on what configurations you offer into each market, they won't necessarily be the same.

Technical

T1. Will Primary Frequency Response be a requirement or an evaluated factor as part of the RFP evaluation process?

All Black Start resources are required to have the ability to operate in isochronous mode which allows the unit to be very responsive to changes in system frequency. Note that during a restoration event only one unit at a multi-unit site would be required to operate in isochronous mode. The other units at a multi-unit site would be operated in droop mode to provide primary frequency response during a restoration event.

T2. After Level 1 evaluation, will details be provided to the organization offering about the line charging capabilities or will machine restraints be respected?

PJM evaluation will respect the physical capabilities of the unit, but PJM will not share line charging data with generator.

T3. A black start unit will need to start and operate initially at very low load covering only its auxiliaries. Most units can do that for an extended period of time. However, emissions can be poor at those loads and would not be in compliance with a unit's permit limits for normal operation. Can PJM offer any guidance regarding the time a black start unit will need to be able to operate at essentially no load?

While there are no requirements in the PJM manuals on duration of black start units at low loads, we are aware that there are environmental and operational concerns about operating for extended periods at minimal loads. PJM's strong preference is for units that can operate full speed low load or at low loads for an extended time. Our rough estimate is that you should assume that the black start unit will be operating for approximately 2 hours until the TO has coordinated additional load pickup for you to move up your loading curve. Any environmental or operational concerns beyond this 2 hour marker, should be clearly indicated in your RFP response so that PJM and the TOs can ensure that your specific restrictions are considered in our analysis and included in the TO system restoration plans. An exception to the above statement is as follows: An RFP unit that is selected for use within a nuclear safe-shutdown power plan may need to operate at low loads well beyond the 2 hour mark. These specifics will vary among the particular cases, but these generally longer run-time expectations would be communicated to the RFP responder by PJM and the TOs.

T4. Can a configuration be offered that relies on a small unit cranking a larger unit to provide Black Start Service?

Yes, a large unit can be cranked by a small CT. In the case where the small cranking unit's MW are not offered into either of PJM's Capacity or Energy Markets, the large unit would be considered the Black Start unit. However, in the case where the small CT is offered into either the Capacity or Energy Markets, then the small CT would be considered the Black Start unit. See section 6.5 of the RTO-Wide Black Start RFP for additional details.

T5. How can the Black Start capability differ from the full plant capability?

An example would be a combined cycle plant where only one of the CTs is being proposed as a Black Start unit. PJM wants to know the Black Start CT's capability along with the entire generating station's capability. Another example would be where a CT/CC's plant ICAP rating is dependent on power augmentation sprays which are not available during a winter restoration event.

T6. How does PJM define Black Start MW for Level 1 RFP responses?

For the Level 1 response, usually Black Start MW is the ICAP that is submitted in the PJM RPM auctions. However, for a Combined Cycle unit, the Black Start MW would be the ICAP MW of only the CT(s) offered in the Black Start RFP. The steam turbine MW are typically not included in the Black Start MW. PJM does not consider the steam turbine MW because it is typically not feasible to match load to the steam turbine MW during its startup and maintain a stable frequency during a restoration event.

T7. Should the RFP responder coordinate with the Transmission Owner (TO) regarding any upgrades to the TO owned equipment which would be required to allow the plant to be black start capable, such as modifications to relays, etc. Should these TO costs be included in the RFP response?

PJM would prefer that the responder coordinate with the TO if it is known that modifications to the TO equipment are required. The TO's estimated expenses should be included in the Level 2 response but be clearly delineated as a TO expense. In addition to the TO expenses, information such as the scope of the modifications and timing of the TO work should be included in the response. The TO's expenses will not be included in responder's annual revenue requirements but will be used in the overall evaluation of the proposal. If the proposal is accepted, the TO will be responsible for the upgrades. If it is uncertain whether TO modifications are required, the responder is requested to make note of this in the RFP response and PJM will facilitate working with the TO to determine if any modifications will be required.

T8. With respect to the 180-minute time to breaker close requirement, what assumption should be applied to a unit (hot, warm or cold start)?

The 180-minute time requirement is absolute, irrespective of the unit temperature state condition.

Compensation

C1. Please clarify why Fuel Assured Run of River Hydro, Intermittent and Hybrid resources would not incur the penalty of having their monthly revenues foregone if they can't meet the 16 hour run hour requirements.

Fuel Assurance provisions for Run of River Hydro, Intermittent and Hybrid Black Start Units would not require these resources to typically store 16 hours of fuel onsite. PJM performs an evaluation of the resource using historical data to determine the MWs the Fuel Assured Black Start Unit can provide for 16 hours based on a 90% confidence level. Since there isn't a "storage" component to maintain that run hour requirement as there would be for Thermal, Pumped Storage Hydro, Energy Storage and DER resources, a Fuel Assured Run of River Hydro Black Start Unit would not be penalized for failing to store 16 hours of fuel.

C2. Does the lifetime commitment requirement apply to just the Capital Recovery Period, or does it apply even if unit is on a Base Formula Rate?

Black Start Units that are selected under this RFP and choose to recover documented Black Start Capital Cost and/or Fuel Assurance Capital Costs under a Capital Cost Recovery Rate shall commit to provide Black Start Service from such Black Start Units for an initial capital recovery period based upon the age of the Black Start Unit plus the remaining life of the Black Start equipment. After the unit completes the Capital

Recovery Period, it rolls over to the Base Formula Rate and the lifetime commitment requirement would apply.

C3. Please clarify termination business rules for Black Start Units.

Black Start Units that are selected under this RFP and choose to recover documented Black Start Capital Cost and/or Fuel Assurance Capital Cost under a Capital Cost Recovery Rate may terminate their lifetime Black Start Service commitment with one year advance notice and consent of PJM, provided the Black Start Unit's owner demonstrates to the satisfaction of PJM that at least one of the reasons stated in the Tariff for such termination apply.

C4. After the capital recovery rate is complete, what is the compensation structure? For example, if a diesel generator is installed and the capital cost recovery mechanism is used for a certain term based on the age of the plant (i.e. 5 year term), if the plant remains a Black Start facility beyond that term, then is the plant then going to get the "formulaic rate" for the remainder of the time the plant is a Black Start beyond the initial term?

At the end of the capital recovery period, unless a resource provides PJM the required 1-year termination notice, the Fixed Black Start Service Cost portion of the annual revenue requirement will be calculated using the Base Formula Rate.

C5. Please provide more details on the referenced capital recovery rate.

The tariff rate referred to is the rate structure described in schedule 6A of the PJM OATT.

Current PJM OATT:

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

Fuel Assured Black Start Service related OATT Schedule 6A revisions:

<https://www.pjm.com/-/media/committees-groups/committees/mrc/2022/20221024/item-01---11-tariff-schedule-6a-revisions---redline.ashx>

C6. If a generator is not FERC regulated, what capital recovery rate is used?

A generator's Fixed Black Start Service Costs are typically compensated on one of the two capital recovery rates in Schedule 6A of the Tariff. A generator, if selected for Black Start Service, has the option to file its own desired capital recovery rate with FERC for approval if it is different from that contained in Schedule 6A of the Tariff, irrespective of whether or not the generator is FERC-regulated. A generator that chooses to file for a FERC approved rate could not begin Black Start Service or receive compensation until the rate has been approved by FERC.

C7. Is Black Start Service provided under the RFP compensated according to TO rates or PJM rates?

Black Start Service in PJM is compensated under rates in Schedule 6A of the Tariff.

C8. Will Black Start Units selected to provide Fuel Assured Black Start Service receive two annual revenues requirements, one for Black Start Service and one for Fuel Assured Black Start Service?

Units selected for Black Start Service or Fuel Assured Black Start Service will receive only one annual revenue requirement in accordance with Schedule 6A of the Tariff. Fuel assurance revenues are included in the unit's annual Black Start Service annual revenue requirement.

C9. Can you provide additional information about the detailed revenue requirement calculations?

Black Start unit owners are credited monthly an annual revenue requirement that has four basic components – Fixed Black Start Service Costs, Variable Black Start Service Costs, Training Costs, and Fuel Storage Costs.

- a) Fixed Black Start Service costs are for black start capital and fuel assurance recovery. There are three different rates available – the Base Formula Rate, the Capital Cost Recovery Rate – NERC-CIP Specific Recovery, and the Capital Cost Recovery Rate. A Black Start unit owner can only choose one Fixed Black Start Service Cost rate to be used in the calculation of the unit’s annual revenue requirement. The Base Formula Rate is for units that do not require capital equipment upgrades to provide Black Start Service. The NERC-CIP Specific Recovery Rate is for a black start unit already has all the equipment needed for Black Start Service other than capital upgrades to be NERC-CIP compliant and provide fuel assurance(if applicable). In the Capital Cost Recovery Rate the unit can include all the capital upgrades needed for Black Start Service and/or fuel assurance plus the NERC-CIP compliance costs.
- b) Variable Black Start Service Costs are for annual Black Start O&M costs (diesel monthly testing or maintenance) including annual NERC standard compliance costs.
- c) Training costs are fixed at \$3,750 per black start plant per year.
- d) Fuel Storage Costs if applicable are the annual carrying cost for maintain 16 hours of fuel on-site.
- e) This spreadsheet can be used to estimate your annual revenue requirement. There is one tab for each Fixed Black Start Service Cost Rate. You can use the various tabs to assess which rate is the best for your situation. Note this worksheet does not currently include fuel assurance costs because FERC has not yet approved PJM filing and provided an effective date for providing fuel assurance.

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

C10. Please provide an estimate of what the ongoing annual black start revenue requirement would be for a non-fuel assured combined cycle unit assuming it was already Black Start capable for the 2023/2024 delivery year.

The annual revenue requirement of a unit providing Black Start Service would be calculated using the formula below:

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

The unit’s Fixed Black Start Service (Fixed BSSC) would be calculated using the Base Formula Rate. The spreadsheet in the link below can be used to estimate your annual revenue requirement. There is one tab for each Fixed Black Start Service Cost Rate. You can use the various tabs to assess which rate is the best for your situation. Note this worksheet does not currently include fuel assurance costs because FERC has not yet approved PJM filing and provided an effective date for providing fuel assurance,

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

C11. What Incentive Factor (Z) will be used in the calculation of a Black Start Unit’s annual revenue requirement?

The Incentive Factor (Z) for Units using the Base Formula Rate for Fixed Black Start Service Costs is 10% for non-fuel assured resources and 20% for fuel assured resources. The Incentive factors for Units on the Capital Cost Recovery Rate or the Capital Cost Recovery Rate – NERC-CIP Specific Recovery will be 0%. There is a 12% rate of return built into the Capital Recovery Factors used in the annual revenue calculation for units on the Capital Recovery Rate Capital Cost Recovery Rate – NERC-CIP Specific Recovery.

C12. What Capital Recovery Factor (CRF) will be used in the annual revenue calculation for my unit recovering Black Start Service and/or fuel assurance capital costs?

The CRFs used in the annual revenue calculation for a unit recovering either Black Start Service and/or Fuel Assurance Capital Costs can vary annually. PJM calculates the new CRFs annually in March, posts them on www.pjm.com, and they are effective from June 1 through May 31 of the following year. CRFs can change as federal tax rates, state tax rates, and interest rate changes year to year.

C13. Are there any impacts on my Capacity or Energy Market Revenues if I added dual fuel capability via Fuel Assurance Capital Costs?

There are no impacts on a unit's Capacity or Energy Market Revenues if it added dual fuel capability via Fuel Assurance Capital Costs. However, the unit's monthly Black Start revenues will be debited the energy revenues from running on the added fuel minus the cost of running on that fuel and monthly Black Start revenues will also be debited any additional capacity revenues from any ICAP increases that resulted from added the additional fuel.

C14. What if a Fuel Assured Black Start Unit fails to maintain fuel and/or consumables on-site for 16 hours of full load operation?

If the unit fails to maintain on-site storage of fuel and/or consumables required for 16 hours of full load operation, monthly black start revenues will be forfeited from the time of the first day of the month in which the failed to store fuel or consumables for 16 hours of full load operation until the first day of the first month AFTER the unit successfully restores fuel and/or consumables storage level(s).

C15. We have a plant with a small size CT (< 40 MW) and larger frame CTs (>100 MW). The small CT and the large CTs offer into the PJM Energy Market. Can the RFP response include the installation of a new diesel generator to be used to crank the small CT which in turn will crank the large CT, thus considering the large CT as the black start unit?

Please refer to Section 6.5 of the RFP. In the case of the above proposed configuration and assuming that the diesel generator does not offer into the PJM Energy Market, only the small CT would be considered as the black start unit. If the responder would like to offer in a large CT as the black start unit then a diesel generator(s) large enough to crank a large CT should be included in the proposal.

C16. Assume that an RFP response was submitted that involves adding a small diesel (assume < 5MW) to an existing 100 MW plant. The developer has a choice of whether to (A) go through the interconnection process to make the new diesel a capacity resource in PJM or (B) limit its use to starting the existing 100MW plant. How would PJM analyze choices A and B in an RFP response?

PJM's interpretation of both options is detailed below.

Option A:

1. Both the 5 MW diesel and the 100 MW existing unit would have to offer into RPM, and either or both could potentially clear.
2. Only the 5 MW diesel would be considered a Black Start unit (if chosen by PJM), since it is both a capacity resource, and the only unit at the plant that can start by itself with no outside power.
3. The existing 100 MW unit would NOT be considered a Black Start unit, even if the diesel's output could be used to get the existing unit started in less than 3 hours.

4. If PJM decided to retain the diesel as a Black Start resource after its initial capital recovery period, the formula rate for compensation would be based on the <5MW capacity of the diesel.

Option B:

1. Only the 100 MW existing unit would have to (be able to) offer into RPM, since the diesel has no CIRs, and is accepted as being installed and maintained only to provide cranking power to the 100 MW unit so that the 100 MW unit can qualify as a Black Start unit for PJM.
2. The new <5 MW diesel would NOT be considered a Black Start unit, since it is not a capacity resource, and is not set up to provide energy outside the plant fence.
3. The existing 100 MW unit would be considered a Black Start unit, if chosen by PJM.
4. If PJM decided to retain the 100 MW unit as a Black Start resource after the initial capital recovery period for the starting diesel and related equipment, the formula rate for compensation would be based on the 100 MW capacity of the existing unit.
5. Note that if the 5 MW Diesel needs to use the transmission system to power the 100 MW units, the injection MWs from the diesel will need to be studied by PJM Planning.

C17. What can be included in the projected annual Variable Black Start Service Costs (Variable BSSC)?

Operating and maintenance costs that are attributable to maintain the unit in a state of black start readiness, including the cost to maintain compliance with NERC Reliability Standards can be included in the projected annual Variable Black Start Service Costs (Variable BSSC). Documentation of these expenses is required and revised expenses can be submitted annually in May of each year for a June 1st effective date. Unless a higher or lower value is supported by the documentation, the resource owner can recover 1% of the Unit's O&M costs on the unit's cost-based energy schedule, calculated based on the Cost Development Guidelines in the PJM Manuals.

C18. How does an overhaul/upgraded unit that gets accepted for Black Start service get compensated if it participates in the Capacity Market?

PJM would evaluate the additional costs of the refurbishment and revenue would be netted against any revenues generated by participating in the capacity market.

C19. Can firm gas costs be included in Black Start service?

No. Firm-gas contract costs cannot be included in a Black Start annual revenue requirement. Firm-gas contract costs can be included in the ACR portion of a unit's capacity offer.

C20. Which portions of a combined cycle can be offered in for Black Start service?

At a combined cycle plant, any or all of the CTs can be offered to provide Black Start Service. If not all CTs at a location are selected to provide Black Start Service, the others can still test annually to verify they are black start capable. These are uncompensated but can be used as a substitute in the event that the Black Start unit becomes unavailable.

C21. Are monthly costs still paid if the Black Start resource is on an outage (planned or other)?

Yes. Revenues are only withheld if there is not a successful Black Start test on file from sometime in the previous thirteen months.

C22. Please clarify when payments will begin for new Black Start Service.

New Black Start Unit owner's monthly Black Start credits will be held by PJM, until PJM, or the Federal

Energy Regulatory Commission, accepts the owner's annual revenue requirement pursuant to Section 17B of Schedule 6A of the Tariff. Monthly Credits for the unit's annual revenue requirement, including recovery of actual upgrade costs, will begin after the Black Start Unit's annual revenue requirement is reviewed by the Market Monitoring Unit and accepted by PJM and will include monthly credits held by PJM, back to the unit's in-service date, including any required estimated revenue true up, as applicable.

C23. What if a black start resource fails the annual black start test?

If a unit fails a black start test, the unit is given a ten day grace period within which it may retest without financial penalty if within the thirteen month testing period. If the unit does not successfully pass a black start test within the ten day grace period immediately following notification of PJM a failed test, monthly black start revenues will be forfeited from the time of the first day of the month in which the unsuccessful test occurred until the first day of the first month AFTER the unit successfully passes a black start test.