

# Fuel Requirements for Black Start Resources

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Monitoring Analytics

# Zonal Levels of Fuel Assurance

- **Fuel assurance needs to be defined and transparent.**
  - **No appropriate criteria for more than one resource per zone.**
  - **Zones are not relevant for a regional plan.**
- **PJM: one fuel assured BS unit per zone, with exceptions.**

# Criteria for Fuel Assured

- **16 hours for all resource types, without exception**
- **Dual fuel units capable of starting solely on onsite fuel.**
- **Gas only units connected to multiple interstate pipelines.**
- **Gas only units connected to a single gas source fed directly from a gas supply basin / gathering system.**
- **If a fuel assured BS site is not currently available, two BS sites connected to two different interstate pipelines is acceptable approach.**
- **Intermittent resources should not be black start resources.**

# PJM Criteria for Fuel Assured

- **Intermittent resources**
  - **PJM: Ability to provide black start MW for the minimum run time duration with 90 percent confidence as calculated by PJM and meet all requirements.**
- **Storage resources**
  - **PJM: The storage level must be maintained to satisfy run hour requirements to meet the black start commitment.**

# Trigger for Fuel Assured Need

- **If an existing black start resource creates an issue related to fuel assurance, the problem should be resolved or the unit's black start status terminated with appropriate penalties for nonperformance.**
- **PJM: Any gas-only black start site identified by zonal reliability analysis that causes an incremental restoration time increase of 10 hours or more will be mitigated by awarding a fuel conversion(s) or awarding additional black start site(s) via an RFP to reduce incremental restoration time below 10 hours.**

# Criteria for Fuel Assurance

- **Run Hour requirements should be 16 hours, including three starts, without exceptions.**
  - **PJM: 16 hours**
  - **PJM: But exceptions to 16 hour requirement**
- **Emission permits/limitations should be submitted and verified.**
- **Predefined waivers should be required to accommodate operations during restoration period.**
  - **PJM: best efforts to obtain emission and effluent permit modifications and or waivers.**
  - **PJM: All BS resources must provide details of their emissions permit limitations upon PJM request**

# Criteria for Fuel Assurance

- **Non fuel consumables availability must support black start duration requirement.**
- **Bilateral compensated black start resource must meet fuel assurance requirements in order to be fuel assured.**



# Fuel Assurance Options

- **Natural gas/dual fuel:**
  - **On site fuel storage**
  - **Multiple pipeline connections**
  - **Details of gas supply arrangements**
  - **Special pipeline rules for system restoration**
  - **Location of supply.**
  - **PJM: Need to add specific rules. Not just PJM judgment.**
- **Oil:**
  - **Oil storage for 16 hour run time.**
- **Storage**
  - **If 16 hour run time always available**



# Fuel Assurance Options

- **Intermittent resources should not be black start and should not be fuel assured black start.**
- **PJM: Includes intermittent resources as fuel assured.**

# Run of River Hydro

- **Run of river hydro should be set to most restrictive seasonal flow (MW). No facility costs should be assigned to black start service.**
- **PJM: must be 16 hours for fuel assured**
- **PJM: 90 percent confident in MW level/duration**
  - **ELCC data not relevant**
  - **Relationship between CIRs and MW not specified.**
  - **Requirement to be capacity resource not specified**

# Pumped Hydro

- **The pond level must always satisfy 16 hour run hour requirement to meet the black start commitment.**
- **No facility costs should be assigned to black start service.**
  - **PJM: The pond level must be maintained to satisfy run hour requirements to meet the black start commitment.**

# Storage Resources

- **Energy Storage Resources must meet minimum 16 hours run time duration requirement at all times.**
  - **PJM: The storage level must be maintained to satisfy run hour requirements to meet the black start commitment.**
- **Rules for black start from DER/DR with onsite generator must be more specific. Need to wait for PJM's DER/DR rules to be defined. PJM's approach not appropriate for black start. Same rules should apply to all black start resources.**

# Hybrid Resources

- **Hybrid resources must meet minimum run time duration requirements at all times.**
  - **PJM: Ability to provide black start MW for the minimum run time duration with 90% confidence as calculated by PJM and meet all requirements in Design Component Section B and PJM OATT Schedule 6A.**

# Intermittent Resources

- **Intermittent resources should not be eligible to provide black start service.**
  - **PJM: Ability to provide black start MW for the minimum run time duration with 90% confidence as calculated by PJM and meet all requirements in Design Component Section B and PJM OATT Schedule 6A**

# Testing and Verification for Fuel Assured Resources

- **Black start resources with dual fuel should be tested in the same year, ability to switch between fuels should be demonstrated.**
  - **PJM: Separate testing for each fuel in the same year**
- **Black start resources connected to the same fuel source should be tested concurrently on an annual basis.**
  - **PJM: No requirement**

# Testing and Verification for Fuel Assured Resources

- **Fuel inventory verification at least weekly.**
- **Need explicit criteria for gas supply. Units need to demonstrate gas availability if called on, regardless of time of day or nomination cycle.**
- **Changes must be reported immediately and any inability to meet black start obligations.**
  - **PJM: Resources must provide fuel/energy verification to PJM every six months or upon request. Fuel / energy level telemetry to PJM is acceptable.**
  - **PJM will validate all contractual arrangements for gas supply**



# Testing and Verification for Fuel Assured Resources

- **Inability to meet black start requirements for starting and meeting run time requirement and all related status changes must be reported immediately.**
- **PJM: Fuel Assured units must communicate starting system limitations as soon as possible but within one hour of recognition to PJM if starting systems not able to meet the run time requirement**

# Testing and Verification for Fuel Assured Resources

- **Inability to meet black start obligations based on availability of non fuel consumables must be reported immediately.**
- **PJM: Fuel Assured units must communicate non fuel consumables inventory limitations as soon as possible but within one hour of recognition if consumables fall below the run time requirement**

# Fuel Assurance Compensation

- **On site fuel storage should be compensated for fuel carrying costs in accordance with schedule 6A. Third party independent verification of the storage tank MTSL must be provided.**
  - **PJM: Units that store oil, propane or LNG onsite can be compensated for fuel carrying costs in accordance with Schedule 6A and also by taking into account run time hours.**

# Fuel Assurance Compensation

- **Fuel assurance capital costs will use a new schedule 6A Fuel Assurance 20 year CRF recovery period unless the unit is a least 20 years old then a 10 year CRF will be used.**
- **The unit will commit to service for the remainder of its life. After the CRF recovery period the units compensation will be based on the base formula rate.**
- **CRF rates will be reviewed annually and updated as needed.**
  - **PJM: The greater of the schedule 6A recovery period based on the age of the unit or 10 years.**

# Fuel Assurance Compensation

- **Capital costs solely associated with fuel assurance recoverable following the process in schedule 6A. Only the portion of a fuel assurance capital investment solely needed for black start service (16 hour run time) will be capitalized.**
- **PJM: Only the portion of capital cost needed to make unit fuel assured. Definition of this amount not based on actual costs and not clearly defined.**
  - **PJM: In order to determine how much of the capital recovery is solely necessary for Black Start, any energy revenues obtained as a result of a fuel assurance conversion minus the unit's cost to provide those MWs, by month, would be netted from the black start revenues for that month.**

# Fuel Assurance Penalties

- **If any requirements of fuel assured black start service not met, PJM must be notified immediately and monthly black start revenues will be forfeited for each such month.**
  - **PJM: If the onsite fuel inventory, water level, stored energy, etc. of a Fuel Assured black start resource falls below the run hour requirements for any length of time during any period, PJM dispatch must be notified within 24 hours. Black start monthly revenues will be foregone for months in which the fuel inventory is deficient. If the fuel inventory, water level, stored energy falls below the run hour requirement as the result of a regulatory requirement for approved planned outage (full derate), monthly Black Start revenues will not be withheld.**

# Fuel Assurance Compensation

- **For fuel assurance testing, units will be compensated for fuels burned during testing.**
  - **PJM: Units will be compensated for fuel assurance testing on both fuels.**
- **The base formula rate incentive factor for fuel assured units should remain at 10 percent.**
  - **PJM: For fuel assured resources selected via RFP Z factor = 20 percent**
  - **PJM: For all other resources, Z factor = 10% (Status Quo)**

# Fuel Assurance Compensation

- **The base formula rate for storage resources that meet the requirements of fuel assurance black start should have an allocation X factor of 0.01 and an incentive factor of 10 percent.**
  - **PJM: Fuel assured run of river black start sites Allocation X factor = 0.02 and Black Start MW equal to monthly 90% percent confidence value**
  - **PJM: Fuel assured pumped hydro black start sites Allocation X factor = 0.02**



# Fuel Assurance Compensation

- **Cost allocation should be system wide.**
  - **PJM: Zonal cost allocation**

# Implementation

- **Existing black start resources can bid to provide fuel assured black start service.**
- **Existing black start units should not be terminated until after the cost recovery term has been completed and after the obligation to provide service for the life of the asset.**
  - **PJM: Existing non-fuel assured black start sites can participate in future RFPs with fuel assured proposals.**
  - **PJM: PJM will conduct outreach to black start units to validate fuel assurance status ahead of each RTO-wide RFP. Participating as a fuel assured black start unit is voluntary and non-fuel assured resources can continue to provide black start service.**

# Definition of Black Start MW

- **Black start MW capability used for procurement and compensation should be based on:**
  - **ICAP for non intermittent resources**
  - **ICAP/ELCC/CIR for storage resources**

# Definition of Black Start MW

- **PJM: Black start MW used for restoration planning and procurement:**
  - **For Fuel Assured and Non-Fuel Assured Non-Intermittent Resources: ICAP**
  - **For Non-Fuel Assured Intermittent Resources: ICAP \* (% of year unit can provide ICAP for 16 hours)**
  - **For Fuel Assured Intermittent Resources: MW the unit can provide for 16 hours with 90% confidence based on an annual calculation**

# Implementation

- **The reliability back stop in PJM Manual M14D allows TO ownership. TOs should not own generation.**
  - **PJM: Existing Reliability Backstop Process in PJM Manual M14D Section 10.3 to be implemented in the event of insufficient response to RTO wide RFP or future incremental RFP (2 failed RFP processes), to meet minimum of one black start site per zone meeting fuel assurance criteria and reliability (PLUS) criteria beyond minimum criteria for high impact black start sites.**
  - **PJM: For Reliability Backstop RFP, TO required to submit RFP proposal.**

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