

Section 13: Black Start Capital Recovery Factor (CRF) Calculation

13.1 Black Start Service

A Black Start Unit is a generating unit that has equipment enabling it to start without an outside electrical supply or a generating unit with a high operating factor (subject to Transmission Provider concurrence) with the demonstrated ability to automatically remain operating, at reduced levels, when disconnected from the grid--A Black Start Unit shall be considered capable of providing Black Start Service only when it meets the criteria set forth in Schedule 6A of the Tariff and PJM Manual 12.

13.2 Black Start Service Annual Revenue Requirements

Black Start Service revenue requirements for each Black Start Unit shall be based, at the election of the owner, on either (i) a FERC-approved rate for the recovery of the cost of providing such service for the entire duration of the commitment term set forth in either section 5 or 6 of Schedule 6A, as applicable, or (ii) the formula rates set forth in section 18 of Schedule 6A for the commitment term set forth in section 5 or 6 of Schedule 6A as applicable. Each generator's Black Start Service revenue requirements shall be an annual calculation performed in May and effective June 1 through May 31 of the following year.

Owners of Black Start Units selected to provide Black Start Service electing to recover new or additional Black Start Capital Costs in accordance with section 6 of Schedule 6A generally calculate the Fixed Black Start Service Costs (Fixed BSSC) Portion of their Black Start service annual revenue requirement by the following equation:

$$\text{Fixed BSSC} = \text{Incremental Black Start Capital Costs} * \text{CRF}$$

Where

"Incremental Black Start Capital Costs" are the new or additional capital costs documented by the owner or accepted by the Commission for the incremental equipment solely necessary to enable a unit to provide Black Start Service in addition to whatever other product or services such unit may provide. Such costs shall include those incurred by a Black Start Unit owner in order to meet NERC Reliability Standards that apply to Black Start Units solely on the basis of the provision of Black Start Service by such unit. However, Incremental Black Start Capital Costs shall not include any capital costs that the Black Start Unit owner is recovering for that unit pursuant to a FERC-approved recovery rate.

"CRF" or "Capital Recovery Factor " is equal to the Levelized CRF based on the age of the Black Start Unit

13.3 Capital Recovery Factors

Black Start Service revenue requirements for each Black Start Unit shall be based, at the election of the owner, on either (i) a FERC-approved rate for the recovery of the cost of providing such service for the entire duration of the commitment term set forth in either section 5 or 6 of Schedule 6A, as

applicable, or (ii) the formula rates set forth in section 18 of Schedule 6A for the commitment term set forth in section 5 or 6 of Schedule 6A as applicable. Each generator's Black Start Service revenue requirements shall be an annual calculation performed in May and effective June 1 through May 31 of the following year.

Black Start Units selected prior to {ADD EFFECTIVE DATE} will utilize the Capital Recovery Rates as published in Tariff, Schedule 6A-of-the-Tariff. Black Start Units selected after {ADD EFFECTIVE DATE} will utilize the CRFs as posted on the PJM website and updated annually as described in section 13.4 below.

Capital Recovery Factors are calculated using an economic pro-forma calculation for a 100MW Combustion Turbine with a \$1M capital investment for a recovery period based on the age of the Black Start unit. The following assumptions are used in the calculation:

- current federal tax and depreciation rates as established by U.S. Internal Revenue Service,
- an average of the income tax rates for all the states in the PJM Region,
- 50 percent equity for the capital investment necessary to make a unit qualify for Black Start Service,
- 50 percent debt for the capital investment necessary to make a unit qualify for Black Start Service,
- debt interest rate based on the most recent Net CONE quadrennial review after-tax weighted average cost of capital (ATWACC) and modified on annual basis by a 2% or greater changes in the Moody Utility Index for bonds rated Baa1
 - This interest rate will be updated during the Net CONE quadrennial review
 - If the 2-year change in the Moody Utility Index for bonds rated Baa1 is more than 2%, this change will be added to the interest rate used in the most recent Net CONE quadrennial review and used for the current year's interest rate
- debt term equal to the recovery period,
- an after tax internal rate of return on equity of 12%.

Debt Interest Rate Example Calculation

	<u>Value</u>
<u>Most recent Net CONE ATWACC</u>	<u>8% (2018 value)</u>
<u>(Current year -2) Moody Utility Index</u>	<u>4.68%</u>
<u>Current year Moody Utility Index</u>	<u>3.5%</u>
<u>Current year CRF Debt Interest Rate</u>	<u>ATWACC + (only if greater than 2%) [2020 Moody Utility index – 2018 Moody Utility Index]</u>

<u>Current year CRF Debt Interest Rate</u>	<u>8.0% + (only if greater than 2%) [3.5% - 4.68%] = 8%</u>
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Exhibit xx

13.4 Capital Recovery Factor Calculations

Capital Recovery Factors shall be calculated annually each April and posted on PJM.com by April 30th. Calculations shall include the most recent:

- federal tax rates as established by U.S. Internal Revenue Service,
- depreciation rate established by the U.S. Internal Revenue Service in effect at the time the unit entered Black Start Service
- average of all the PJM states' income tax rates,
- and debt interest rate based on the most recent Net Cone quadrennial review ATWACC and modified on annual basis by a 2% or greater changes in the Moody Utility Index for bonds rated Baa1

effective as of April 1.

13.5 Capital Recovery Factor Application

These new CRFs will be used in the Black Start annual revenue calculation performed in May each year and any Black Start request for proposal (RFP) issue after the calculation. New unit entering Black Start Service under Section 6 of Schedule 6A will use the CRF currently in affect for the annual revenue requirement period which are updated annually in accordance with Section 13.4.