

Brookfield

Black Start Fuel Assurance Proposal for Run of River and Pumped Storage Hydro

Run Hour Requirements:

Run of River and Pumped Storage Hydro will be able to choose between a 10 hour or 16 hour minimum run requirement (or as defined by TO restoration plan) at full load. Units that choose the 16 hour minimum will be eligible for a greater Black Start Annual Revenue Requirement when on the Base Formula Rate.

Proposal for determining amount of Black Start MWs at a Hydro Station:

Run of River Hydro with or without Storage shall use the daily volumetric inflow values for the past 20+ years from the appropriate USGS river flow gauges or other instrumentation agreed to by the Hydro Generation Owner and PJM with input from IMM to determine the maximum number of black start MW for each month that can be supported for chosen minimum run hour requirement (10 or 16 hours). Run of River Hydro with storage can use the normal, daily starting elevation levels for storage values within licensing limits in the Black Start MW calculation with PJM concurrence. The Black Start MW calculation shall be based on river flows of 9075% confidence ~~level to correspond to the current average PJM-CT Equivalent Availability Factor~~ (e.g. - for a BS commitment of 100 MW assume 100 MW would be available, for either 10hrs or 16hrs, 9075% of the time based on historical river flows and daily storage).

Pumped Storage Hydro shall maintain sufficient pond level to support either a 10 hour or 16 hour minimum run requirement (or as defined by the Transmission Owner commensurate with the TO restoration plan) at full load of the assigned black start MW.

Black Start Annual Revenue Requirement for Hydro Units on the Base Rate Formula:

Current:

Fixed Black Start Service Costs (Fixed BSSC) – OATT Schedule 6A, Section 5

Formula = ((Net CONE * Black Start Unit Capacity * X) + Variable BSSC + Training) * (1 + Z)

Net CONE = Current installed capacity (“ICAP”) net Cost of New Entry (\$/MW year) for the CONE Area where the Black Start Unit is located.

Black Start Unit Capacity = either (i) Black Start Unit’s installed capacity (MW); or (ii) awarded MW by the Transmission Provider

X = Black Start Service allocation factor (Black Start Units with a commitment established under Schedule 6A, Section 5, X shall be .01 for Hydro units and .02 for CT units)

Variable BSSC = Black Start O&M Costs including NERC Reliability Standard Compliance Cost

Training = Black Start Training Cost = \$3,750.

Z = Black Start Incentive Factor

Propose changes for Hydro Black Start Resources:

X = .01 for 10 hour min run commitment, or as defined by the TO restoration plan = Net CONE * Black Start Unit Capacity * .01

Z factor = 10% for 10 hour min run commitment

X = .02 for 16 hour min run commitment = Net CONE * Black Start Unit Capacity * .02

Z factor = 20% for 16 hour min run commitment

Example: Hydro Resource 100 MW Black Start Commitment, Net CONE = \$264.40/MW-Day

Run Hour	Formula Rate	Fixed BSSC
10 hours	100 MW * \$264.40 * 365 days * 0.01	\$ 96,506.00
16 hours	100 MW * \$264.40 * 365 days * 0.02	\$193,012.00

Add Variable BSSC, Training Costs, and Incentive Factor Z:

Example 100 MWs Black Start Commitment, Net CONE = \$264.40, VOM = \$100,000

Run Hour	Base Formula Rate	Fixed BSSC
10 hours	(\$96,506 + (\$100,000 * 0.01) + \$3,750) * 1.10	\$111,381.60
16 hours	(\$193,012 + (\$100,000 * 0.01) + \$3,750) * 1.10	\$217,538.20

Proposed changes with additional increased Incentive Factor Z to 20 percent for 16 hours

Run Hour	Base Formula Rate	Fixed BSSC
10 hours	(\$96,506 + (\$100,000 * 0.01) + \$3,750) * 1.10	\$111,381.60
16 hours	(\$193,012 + (\$100,000 * 0.01) + \$3,750) * 1.20	\$237,314.40

Monthly Black Start Revenue Calculation:

Run of River Hydro, on the base formula rate, monthly revenue calculations for Fixed Black Start Service Costs will be calculated as the lesser of the assigned monthly black start MW or the average MW achievable for either a 10 hour or 16 hour min run from the unit(s) for the prior month. The average achievable MW will be determined by PJM using the closest applicable USGS river flow meter capable of providing a daily flow. Alternatively, the unit owner can provide an estimate of the average 10 hour or

16 hour MW capability using flow and daily storage readings from dam instrumentation for PJM approval.

For Pumped Storage Hydro Black start resources, monthly revenues will be withheld for months in which water level falls below the run hour requirement. Monthly revenues will not be withheld if the water levels falls below the run hour requirement as a result of a regulatory requirement, an approved outage, or restoration event. If water levels fall below the run hour requirement during a PAI event, monthly Black Start revenues will be foregone.