



Circuit Breaker

Markets & Reliability Committee
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In the PJM Board [letter](#) regarding initiation of the Critical Issue Fast Path Process to Address Resource Adequacy Issues, they acknowledged the “importance of a well thought-out circuit breaker mechanism”. The Board [then](#) asked PJM management to propose a circuit breaker mechanism based on prior stakeholder discussions, obtain stakeholder feedback on the proposal, and present its proposal, including any revisions based on feedback received, to the PJM Board no later than July 2023.

- The circuit breaker (CB) discussions in the Energy Price Formation Senior Task Force (EPFSTF) were initiated on the basis of the expected increase in maximum prices from the FERC-approved downward-sloping ORDCs in the Reserve Markets. However, in December 2021, FERC issued the Order on Remand rejecting the downward sloping ORDCs that would have increased PJM’s maximum prices to over \$10,000/MWh (currently ~ \$3700) under the most extreme circumstances.
- The purpose of the circuit breaker is to limit the potential market risk associated with high prices over a sustained period of time.

PJM believes a circuit breaker should meet these criteria:

The CB should not degrade reliability when triggered.

The CB should not disincentive market participants from taking cost-effective actions that promote reliability (fuel purchases, participating in the Day Ahead Market, purchasing FTRs, etc.)

The CB should balance the unhedgeable costs associated with significant uplift payments.

The CB should only be triggered in the most extreme scenarios.

- We do not believe the circuit breaker should have been triggered during the Polar Vortex and Winter Storm Elliott.
- We are not aware of any events in PJM's recent history where we believe the CB should have been triggered.

Challenge

- Continue to incent resource performance and interchange

Balance

- PJM Markets have existing price caps
- Reduce “extreme” financial consequences that may not be defensible

Goal

- Maintain PJM Market health and integrity
- Minimize defaults and bankruptcies from Energy prices that do not incentivize additional reliability value



Circuit Breaker Criteria

Type of Trigger	LMP and Event
Market that can trigger CB	Real-time (RT) Only. If Circuit Breaker is triggered in RT it may* initiate in DA. <i>*Note: Timing of the DA market clearing will be a factor as well as forecast of system conditions and whether the “event” is forecasted to still be active.</i>
Entry Criteria	<p>In Real-time: Operational Emergency (EEA3) for 48 hours RTO Wide and Shortage Pricing is active due to a Manual Load Dump or Voltage Reduction action for the RTO</p> <p><i>Prior to invoking the circuit breaker, PJM will perform a review of system conditions to determine the impact of the circuit breaker on reliability as further defined in the PJM Manuals. If PJM determines, in the review of system conditions, that no adverse impacts to generation, load or reliability will result due to activating the circuit breaker, PJM will invoke the circuit breaker. PJM will not invoke the circuit breaker if adverse impacts to generation, load or reliability are identified. PJM will attempt to provide advance notice, no earlier than 60 minutes prior to the trigger time, alerting stakeholders to the status of invoking the circuit breaker.</i></p>
Exit Criteria	Once PJM is no longer in an EEA2 or EEA3 and Shortage Pricing is no longer active due to a Manual Load Dump or Voltage Reduction. If the Entry criteria is no longer met but the Exit criteria has not been met, the CB price cutting Methodology will remain in effect until the Exit criteria is met. If PJM is experiencing adverse effects on generation, load or reliability related to the activation of the circuit breaker, PJM shall terminate the circuit breaker prior to the exit criteria being met.

NERC Energy Emergency Alert (EEA) levels: EEA 1 — All available generation resources in use. EEA 2 — Load management procedures in effect. EEA 3 — Firm Load interruption is imminent or in progress.



PJM Determination - Review of System Conditions

Purpose: Add guidance around the factors PJM would use in its determination, prior to and throughout the activation of the circuit breaker, to identify any adverse effect to reliability from invoking the circuit breaker. Additionally, impose a requirement on PJM to demonstrate to members, after-the-fact, that due diligence was performed in the evaluation of invoking the circuit breaker.

Interchange

Verify other ISO interface prices at PJM seams. Determine if their prices are higher than \$2000 sufficiently to dis-incentivize economic imports or M2M activity.

Unit Availability

Collect current fuel costs and evaluate if implementing the CB will discourage suppliers from purchasing fuel to operate in PJM. Identify physical limitations that will prevent outaged units from coming back online as soon as possible.

Emergency Procedures

Confirm PJM is still in a NERC EEA2 or EEA3.

Transmission System

Identify if control of transmission constraints would be impeded with reduced LMPs. Determine if dispatch would be forced to manually dispatch an untenable amount of units.

Forecast

Monitor the load forecast for material increases. Determine if the CB price signal will deter new or additional supply from being available.

NERC Standards

Evaluate if invoking the CB will jeopardize PJM's ability to meet NERC standards.

TOTAL LMP CAP

Administratively cap Total LMP to \$2000**

a) if Energy Component \leq \$2000 and Total LMP \leq \$2000; no changes to Loss and Congestion Components.

b) if Energy Component \leq \$2000 and Total LMP $>$ \$2000; no changes to Loss Component and Congestion Component will be adjusted to make total LMP = \$2000.

c) If Energy Component $>$ \$2000 and Total LMP \leq \$2000 ; Energy Component will be set to \$2000; no changes to Loss Component and Congestion Component will be adjusted so total LMP remains the same.

d) if Energy Component $>$ \$2000 and Total LMP $>$ \$2000; Energy Component will be set to \$2000; no change to Loss Component; Congestion Components will be adjusted to make Total LMP = \$2000.

Performed post process in the pricing run

****NOTE:** Where \$2000 reflects the current offer cap; the Total LMP is getting capped to the offer cap not explicitly \$2000

Transparency	Stakeholder email communication; Addition of Circuit Breaker Status Icon to PJM Markets & Operations landing page and Data Viewer
Make Whole Credit Provisions	Status Quo
Make Whole Charge Allocation Provisions	Status Quo
FTR Settlements	Status Quo; No special rules to account for capping of Congestion Component of LMP
Reserve Pricing	Status Quo
Regulation Pricing	Status Quo (LOC based on uncapped prices)

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