



EPFSTF Update: Energy and Reserve Market Circuit Breaker

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Purpose:

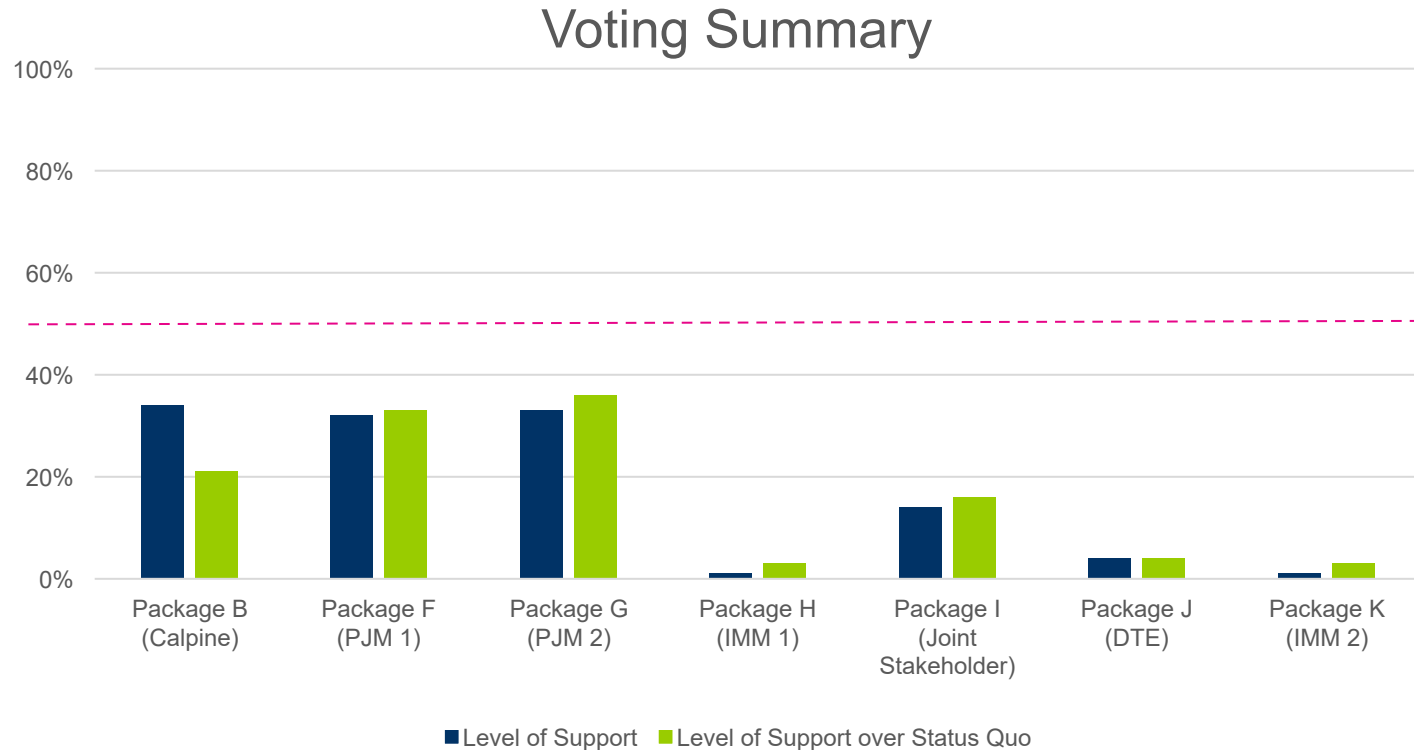
- Circuit Breaker Discussions were initiated to limit the duration of extreme pricing whose cost likely far exceeds the value of any contribution to preserving grid reliability.

Timeline:

- Circuit Breaker discussions started in August 2021.
- Two polls were issued to help identify areas of consensus.
- The stakeholder process produced seven (7) packages for consideration.

- PJM has provided lengthy education regarding price formation and presented analysis to simulate various pricing outcomes.
- The Senior Task Force discussed the following key questions at length:
 - When to trigger the Circuit Breaker?
 - What price level is “too high” to bear?
 - How long is “too long” to have high prices?
 - Operational consequences
 - Should PJM have discretion?
 - What happens after the Circuit Breaker is triggered?
 - What level is appropriate to cut prices to?
 - How long should it be kept in effect?

- No packages received 50% simple majority support or greater than 50% preference over status quo.
- Detailed voting information is on subsequent slides.



Question		Count			Tally	Pass/Fail
		Yes	No	Abstentions		
Do you support:	Package B (<i>Calpine</i>)?	59	115	19	34%	FAIL
	Package F (<i>PJM 1</i>)?	60	128	5	32%	FAIL
	Package G (<i>PJM 2</i>)?	62	128	3	33%	FAIL
	Package H (<i>IMM 1</i>)?	1	181	6	1%	FAIL
	Package I (<i>Joint Stakeholder</i>)?	25	159	4	14%	FAIL
	Package J (<i>DTE</i>)?	7	175	6	4%	FAIL
	Package K (<i>IMM 2</i>)?	1	181	6	1%	FAIL

Question		Count			Tally	Pass/Fail
		Yes	No	Abstentions		
Do you support over Status Quo:	Package B (<i>Calpine</i>)?	37	137	18	21%	FAIL
	Package F (<i>PJM 1</i>)?	62	125	6	33%	FAIL
	Package G (<i>PJM 2</i>)?	59	107	23	36%	FAIL
	Package H (<i>IMM 1</i>)?	6	176	6	3%	FAIL
	Package I (<i>Joint Stakeholder</i>)?	30	154	4	16%	FAIL
	Package J (<i>DTE</i>)?	7	175	6	4%	FAIL
	Package K (<i>IMM 2</i>)?	6	176	6	3%	FAIL

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Energy Price Formation Senior Task Force



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Appendix - Summary of Packages



Summary of Packages

	Package B (Calpine) 34% support	Package F (PJM) 32% support	Package G (PJM) 33% support
Type of Trigger	Event Based on Shortage Pricing	Revenue + Event Based on Emergency Conditions	Event Based on Emergency Conditions
Trigger Details	<ul style="list-style-type: none"> Initial trigger: 90 hours of total shortage events (can be non-consecutive) since June 1 (DY) Subsequent triggers during the DY with 3 hours of consecutive shortage 	\$2,000/MWh average LMP for rolling 24 hours and ANY of the following: <ol style="list-style-type: none"> Emergency Procedures Called DA: Max Gen Alert issued during entire rolling 24–48 hour period In RT: Manual Load Dump/EEA3 or voltage reduction issued when/after the LMP trigger has been met, or Force majeure for CB 	Any of the following: <ol style="list-style-type: none"> Emergency procedures called DA: Max Gen Alert issued during entire rolling 24–48 hour period In RT: manual load dump/EEA3 or voltage reduction issued for entire last rolling 24-hour period, or Force majeure for CB
PJM Discretion	No discretion	Discretion to invoke if conditions that warrant its use are present and not invoke if adverse effects on reliability are present	Discretion to not invoke if adverse effects on reliability are present
Termination	Lasts from point of trigger until termination of shortage event; status quo for existing shortage event termination	5 consecutive business days where circuit breaker cap was not administered	5 consecutive business days where circuit breaker cap was not administered
Circuit Breaker Methodology	Administratively cap Energy Component of LMP to \$2,000 ; Reserve MCPs status quo	Administratively cap Total LMP to \$2,000 ; reserve MCPs status quo	Administratively cap Total LMP to \$2,000 ; Reserve MCPs status quo

	Package H (IMM) 1% support	Package I (Joint Stakeholder) 14% support
Type of Trigger	Event based on emergency conditions	Revenue based on LMP
Trigger Details	As soon as emergency action (Max gen alert, manual load dump, voltage reduction, pre-emergency or emergency demand response) or force majeure is declared for any amount of time, including local issues	\$1,000/MWh average LMP for any single rolling 24-hour period or \$850/MWh for any rolling 168-hour period (7 days)
PJM Discretion	No discretion	Discretion to invoke if conditions that warrant its use are present and not invoke if adverse effects on reliability are present
Termination	5 consecutive business days without the event triggers being met	5 consecutive business days where circuit breaker cap was not administered
Circuit Breaker Methodology	<ul style="list-style-type: none"> • Only use one ORDC penalty factor in LMP. • All reserve prices are capped at \$850 per MW. No additivity. • No use of limit control less than 100% in RT SCED and LPC • Applies in dispatch and pricing run 	Administratively cap Total LMP to \$850 ; reserve MCPs all capped to \$850



Summary of Packages

	Package J (DTE) 4% support	Package K (IMM) 1% support
Type of Trigger	Event Based on Shortage and Emergency	Event Based on Emergency Conditions
Trigger Details	1 Hour at Reserve Shortage, coincident with the declaration of an Emergency Action or force majeure, including local issues	<ul style="list-style-type: none"> • Phase 1: Manual load dump or voltage reduction OR the forecasted reserves for any hour is less than the 30-minute reserve requirement. • Phase 2: Manual load dump or voltage reduction in effect for 24 hours or more and affecting the entire PJM footprint
PJM Discretion	No discretion	No discretion
Termination	<ol style="list-style-type: none"> 1. Termination of the Emergency Procedure or 2. Absence of shortage conditions for 12 consecutive intervals (or 1 hour in DA) 	End of triggering event operating day
Circuit Breaker Methodology	Penalty cost for each reserve product (subzone or RTO) will be equal to lower of \$850 or \$1,000-Energy Component of LMP (floored at \$0) where the shortage exists.	<ul style="list-style-type: none"> • Phase 1: Use lower penalty factors for ORDCs and 100% of line rating, do not reduce the limit control percent below 100%, and apply ambient-adjusted line ratings and short-term line ratings consistent with PJM operations. • RMCP: Primary Reserve \$500, Synchronized Reserve \$300, 30-Minute Reserve \$50 • Phase 2: In addition to phase 1, turn off all reserve constraints and shortage pricing. • RMCP: Primary, Synchronized and 30-Minute Reserves = \$0 • Applied in pricing and dispatch

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