Proposal for Penalty Rate and Overperformance Bonus for Non-PAI Load Management Events

Voltus

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Component 1. Non-PAI Penalty Design

Two options have been discussed at MIC thus far . . .

PJM Proposal:
- 50% of PAI penalty rate
- Rationale:
  - (1) estimate expected capacity revenue per MW per dispatch-hour for a DR customer that clears the BRA, based on assumptions of # of dispatch hours per year and customer-CSP split;
  - (2) target a $ value for the penalty such that the total incentive to perform in a non-PAI dispatch is roughly equal to the expected capacity revenue allocated to the dispatch;
  - (3) express this penalty $ value as a percentage of the PAI penalty.

Two options have been discussed at MIC thus far . . .

Previous Voltus Proposal:

- ~16% of PAI penalty rate
- Rationale: follow the framework used in the Ontario Market (IESO)
  - Non-PAI performance is assessed a penalty = underperformance in UCAP x daily capacity rate x a Non-Performance Factor;
  - Factor would be set to event duration in hours to establish severity.

New Voltus proposal: Model non-PAI penalty rate off of existing PAI penalty rate structure

How PJM calculates the PAI penalty rate today:

- (1) Assume a certain number of dispatch hours per year;
- (2) Penalty rate = Net CONE for a MW-year of a reference resource in the relevant Delivery Year and LDA divided by expected # of dispatch hours
- The rationale is intuitive:
  - If the expected number of PAI intervals occur, then the expected value of the annual penalty for a customer that fails to perform in every PAI interval is equal to the replacement rate for the capacity they withheld from the system (the customer pays for the non-performing MW at Net CONE).

New Voltus proposal: Model non-PAI penalty rate off of existing PAI penalty rate structure

An analogous way to arrive at the non-PAI penalty rate

- (1) Model the expected number of non-PAI hours in the year;
- (2) Select a target annualized non-PAI penalty rate—i.e., the total rate that a market participant should pay for missing all non-PAI dispatch hours, if the expected number of non-PAI dispatch hours occurs;
- (3) Divide the target annualized rate by the modeled number of hours.

New Voltus proposal: Model non-PAI penalty rate off of existing PAI penalty rate structure

What should the target annual penalty rate be?

- PAI intervals are most critical to system reliability and drive marginal capacity costs, as captured by the targeting of the annualized PAI penalty to Net CONE.
- The non-PAI annualized penalty should be significantly lower in line with the fact that non-PAI events are called earlier in emergency procedures than PAI events, with PAI events requiring additional emergency triggers. The target non-PAI rate could be expressed as the PAI penalty rate (i.e., Net CONE) times a discount factor, $x < 1$. So we can express the annualized non-PAI penalty rate as x of Net CONE.
- This discount factor x is a parameter PJM chooses to capture the relative "criticality" of non-PAI as compared to PAI intervals.

New Voltus proposal: Model non-PAI penalty rate off of existing PAI penalty rate structure

What is the expected # of non-PAI hours?

- Voltus requests that PJM provide some modeling of this number based on forecasts, historical data, etc. In any case, there will generally be more non-PAI dispatches intervals in a year than PAI dispatch intervals, since the former are called prior to the latter, and we can express the expected # non-PAI intervals as a multiple $y > 1$ of the expected # of PAI intervals (the number used to derive the PAI penalty).

- Then, the non-PAI rate, defined as target annual non-PAI penalty / expected # of non-PAI hours, becomes
  - $(x *$ Net CONE$) / (y *$ expected # of PAI intervals$) = x/y *$ PAI penalty rate.

How the numbers shake out (see also table on next slide)

- Voltus finds it plausible for x to be in the range ¼ to ½ range . . . i.e. perhaps PJM considers non-PAI intervals to have 25-50% the reliability impact of PAI impact.
- Reasonable values for y may range from 2 to 3 and could also be updated annually.
- Under these assumed values, the non-PAI penalty rate would range from 8.3% to 25% of the PAI penalty rate.
- Our previous proposal worked out in the most recent DY to about 16% of the PAI penalty rate. So, this proposal expands the window on both sides but parametrizes it based on a logic consistent with the derivation of the PAI penalty rate.

Non-PAI penalty rate as percentage of PAI penalty rate

Expected # of PAI dispatch hours	30
PAI Penalty Rate (approx)	$2,300

Non-PAI Penalty Rate as % of PAI Penalty Rate

				x = discount factor on Net CONE			
		0.125	0.25	0.375	0.5	0.625
y = multiple of expected # of PAI dispatch hours	1	12.50%	25.00%	37.50%	50.00%	62.50%
	1.5	8.33%	16.67%	25.00%	33.33%	41.67%
	2	6.25%	12.50%	18.75%	25.00%	31.25%
	2.5	5.00%	10.00%	15.00%	20.00%	25.00%
	3	4.17%	8.33%	12.50%	16.67%	20.83%

Component 2. Non-PAI Overperformance Bonus

Voltus endorses Bruce Campbell's proposal from last MIC

- Overperformers are eligible to receive up to 1.2x whatever the non-PAI penalty rate ends up being, per unit of overperformance, until the underperformance collection pool is exhausted. In the case that dollars remain in the pool after reaching the 1.2x cap, they are returned to ratepayers via proportional payouts to LSEs (as per PJM proposal).
- This approach incentivizes overperformance while avoiding windfalls in the case of just 1 or 2 overperforming CSPs, and also enables compensating ratepayers if total underperformance significantly exceeds overperformance.

Component 3. Fair Adjustment in Case of Dispatch Hours > Expected

Rationale

- CSPs have repeatedly expressed concern over dispatch fatigue: if load management dispatches continue to increase, then long-lead time sites will migrate to 30-minute DR, and there will be similar attrition among high cost-of-curtailment sites. Capacity revenue per dispatch decreases as dispatches become more frequent. This leads in a reduction in DR capacity resources available to PJM.
- Financial incentives in case of a many-dispatch-hour delivery year would counteract this effect. Idea: make additional dispatch past some threshold more valuable.

Adjustment proposal

- The non-PAI penalty design proposed above asks PJM to model/assume a certain # of non-PAI dispatch hours. The penalty rate is based on this #.
- If the actual number of non-PAI dispatch hours exceeds this expectation in any given year, *the underperformance penalty should be decreased, and/or the overperformance bonus increased, for these additional hours*.
- Voltus suggests that if non-PAI dispatch hours exceed the expected # used to calculate penalties, then the non-PAI overperformance bonus cap should be increased from 1.2 to 1.5 the non-PAI penalty rate.