

PJM CAPSTF Alternate Capacity Market Design Initial Proposal

April 25, 2023

A decorative graphic at the bottom of the slide consisting of a dark blue curved line above a white curved line, which is above a green curved line, all spanning the width of the slide.

Two Stage Auction to Maintain Reliability and Value Zero Emission Resources



Minimum Reliability

Attributes Auction: Residual Auction in which PJM procures sufficient resources to satisfy locational reliability needs net of “SAPA” resources’ impacts on load

Stage 1 – Run auction to supply coincident peak load

- Calculate theoretical Stage 1 Auction Revenue
- All other capacity resources (MRAA Resources) participate with must-offer

Stage 2 – Run auction to supply net coincident peak load

PJM will use existing statistical procedures to determine net coincident peak load accounting for SAPA resource contribution (PJM already does this for BTM solar which has less visibility to PJM than utility scale wind/solar resources)

- Limited to MRAA resource participation
- Locational capacity clearing price determined for all MRAA resources
- Total Stage 2 auction revenue allocated only to MRAA Resources
- Net Load used to determine zonal UCAP Obligation

Avoided Load Costs = Stage 1 Revenue - Stage 2 Revenue

Allocated to SAPA Resources as a function of energy or capacity value since baseline reliability objective achieved in Stage 2

State Attributes

Procurement Auction: PJM provide LSEs with locational marginal reliability value of clean resources

	No Clean Energy Target	Clean Energy Target
Load	MRAA UCAP obligation reduced based on demand adjustment (“SAPA resource impacts on peak”)	Same
Clean Energy Incentive	No requirement to procure beyond local reliability value of resources	Centralized framework enabling LSEs to procure additional volume (non-reliability attributes) using common instrument
MRAA Costs	MRAA Clearing Prices based on reduced load requirement	Same
SAPA Costs	Limited to Marginal Reliability Benefit (“Avoided Costs”) which is also offset by lower MRAA Costs	LSEs determine how much they value non-reliability attributes
Investment	Local investment can occur without explicit state incentives	Through zone definitions, use transmission import limits to provide local price signal

Note

1 - When import limit below physical transmission limit soft penalties can be implemented to reflect price sensitivity of state policy

	SAPA Resources	MRAA Resources
Structure	Centralized market reduces transaction costs and provides signal to potential financial backers of resource value	Same as today but limit buyer-side pricing influence; volume effects will occur independent of market design due to state policy but are limited based on measured reliability impact ¹
Capacity Value	Not necessarily required since energy measurement	No Change
Compensation	Revenue (P*Q) signal potentially more consistent. Quantity affected by weather and equipment derates, but not peak-shifting effects. Pricing dependent on competitive outcomes.	Demand curve shift will have impact on clearing price, but there will be fewer resources participating with zero offers.
Committed MW	Resources can be compensated for both reliability and non-reliability attributes	Potentially lower level of commitment; Incremental auction provide opportunity to sell more (e.g., weather expectations affect both load and “SAPA” resource load impact)

Note.

1- PJM use engineering judgement on demand curve adjustments accounting for both commercial probability and weather effects on “SAPA” resources

With bi-furcated market framework provide a common product with common expectations for performance from resources looking to take on a common set of risks/obligation based on common set of incentives

Stakeholder Process

- Lower likelihood of market stoppages since “MRAA” can clear independent of the “SAPA”
- Stakeholders able to focus on common issues affecting common group of resources which should allow for greater compromise

Planning/Markets

- Simplify accreditation process while ensuring a minimum level of reliability is achieved
- Consistent treatment of front-of-the-meter and BTM impacts on load for weather dependent resources
- Simplify market design and limit exceptions in resource adequacy framework

State interaction

- Provide regulators with clear indication of the progress of energy transition and the continued need for non-preferred in-state resources

Questions?

Erik Heinle

Frederick.Heinle@vistracorp.com

Muhsin Abdur-Rahman

Muhsin.Abdur-Rahman@vistracorp.com

Appendix: Two-Stage Auction Design Details

	SAPA Resources	MRAA Resources
Resource Type	Resources whose annual energy value remains relatively consistent y-o-y, but annual capacity value diminishes	Annual energy production can vary significantly y-o-y but capacity value relatively constant
Weather Impact	Production is largely a function of weather rather than directly tied to demand levels	Production is affected by weather, but is not dependent on weather; Capable and incentivized to follow PJM market price signals as a function of costs
Market Incentives	Out-of-market incentivizes cause resource to operate when it would otherwise be uneconomic (i.e. zero or negative pricing)	Out-of-market incentives may be present, but are not the primary driver of market offer behavior
Availability	Improvement limited to technological advancement and/or transmission investment	Availability is largely affected by unit commitment and economic dispatch process; Availability can be improved through regulatory frameworks, market design, commercial arrangements, technology and transmission investment

Two-Stage Auction Design Summary



Auction	State Attributes Procurement Auction (“SAPA”)	Minimum Reliability Attributes Auction (“MRAA”)
Purpose	Enables PJM to provide states (via LSEs) with a price signal representing the aggregate locational marginal reliability value of “SAPA” resources to the market	Residual Auction in which PJM procures sufficient resources to satisfy the reliability need net of “SAPA” resources impacts to load
Load Requirement	Involuntary Locational Demand Reduction component associated with “SAPA” resources contribution to peak(s); LSEs can participate voluntarily to reflect additional economic value they ascribe to “SAPA” resources	<i>Involuntary Participation but limited to:</i> RPM Coincident Peak Load forecast adjusted for “SAPA” resource contribution to peak(s) ¹
Resource	“SAPA” resources only	“MRAA” resources Only
Coupling	Uses MRAA	Can be run independent of “SAPA”
Pricing	Involuntary allocation of reliability benefit to “SAPA” resources based on MRAA demand reduction; Auction used to clear voluntary demand bids with voluntary resource offers.	Same mechanism as Base Residual Auction

Note. 1 - Use existing ELCC apparatus to develop a statistical demand reduction accounting for weather and commercial likelihood effects on “SAPA” resource availability

Minimum Reliability Auction (“MRAA”)



Element	Description
Auction Units	UCAP (MW) ¹
Demand	<ul style="list-style-type: none"> Net Peak Load = (Gross Peak Load – End Use EE Adjustment) + EV Load – BTM PV - SAPA Demand Offset²
Reliability Requirement	<ul style="list-style-type: none"> RTO Reliability Requirement calculated just as today CETO and internal resource capacity calculation will need to account for SAPA exclusion
Demand Curve	<ul style="list-style-type: none"> No change; MRAA Reference Resource only since solving residual reliability need by LDA
Supply Curve	Limited to MRAA resources; Pricing based on prevailing MSOC rules
Timing	Same timing as current RPM framework; Prevailing settlement Framework for auction credits/charges and penalty assessment
Pricing Locations	LDA capacity balance and transmission import limits only

Note. 1 - Existing UCAP method or adjusted UCAP depending on future allocation of ambient derates and correlated outage risks; **2** – SAPA Demand Offset limited to deliverable portion of resource (capped at CIRs). Hourly Weather Models used to derive each component. Commercial probability applied to derate the SAPA Demand Offset for Planned resources

State Attribute Procurement Auction (“SAPA”)



Element	Description
Auction Units	Capacity Displacement units (“CDU”) , (MWh)
Demand MW	<ul style="list-style-type: none"> Segment 1: Linked CDU requirement (equivalent annual MWh from CIR resources) Segment 2 - n: Registered market participants (i.e., corporate entities, LSEs) with ESG or state policy mandates submit bids in excess of Linked CDUs
Demand Bids	<ul style="list-style-type: none"> Downward sloping price curve based on participant bids + Marginal Reliability Benefit Associated with Linked CDU
Supply	<ul style="list-style-type: none"> SAPA resources; CIR linked offers clear first and subject to prevailing MSOC rules; Non-CIR linked offers (Base CDUs) not price-capped since LSE has no obligation to buy
Timing/ Settlement	Conducted at the same time as MRAA; Modified Incremental auctions can be conducted to handle balancing issues; Pay-as-you go model given MWh units
Location	Rather than resource constraints, use artificial import limits which are capped at the transmission import limit to represent state (“LSE”) preferred resource zones
Term	Technology review conducted every “Quadrennial Review” period to evaluate resource participation ¹ .

Note. 1 - Resources must participate 100% in either SAPA or MRAA auction. Current ELCC resources except landfill gas, stand-alone storage, open-loop storage and hydro w/peaking can only participate in SAPA. Market selection can only occur during Technology review.