

Resource Adequacy Commodity Exchange Concept

PRESENTED TO:

PJM Capacity Market Workshop – Session 3

PRESENTED BY:



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- ACP and SEIA would like to include a residual capacity market as a design to be considered by PJM and stakeholders
- ACP and SEIA believe multiple options need to be considered and examined
- The foundational pieces of a residual capacity market design include:
 - Market participants are free to transact amongst themselves on a bilateral basis for the supply resources of their choosing and gets credited for those contracts
 - PJM nets out bilateral trades (both supply and load) and procures the remainder needed for reliability through the centralized residual auction
- The ‘how’ of this can be constructed in a multitude of ways with PJM having more or less of a role in managing the bilateral market; this would be something that stakeholders need to weigh in on
- But as a starting point for the discussion, we offer up this proposal which outlines how this might fit into PJM’s existing framework
- ACP and SEIA look forward to working with PJM and other stakeholders on this important initiative

Concept Supports All of the Following



- Individual or multi-state procurements – RFP-based or other; any term – short or long; any combination of energy, capacity & RECs; any resource/technology type or combination of types
- Individual LSE or consumer procurements – same as above, to meet state requirements or individual goals
- Self-supply – utilities, public power, etc., can build capacity portfolios bilaterally or through a centralized auction construct
- Potentially innovative market actors – many innovations in the energy and REC markets for products to manage risk, hedges, and swaps – capacity credit swaps anyone?
- Potentially different resource adequacy regimes as technologies advance and reliability needs changed – for example, seasonal capacity credits

Key Take Away

- Totally flexible construct based on competitive markets and consumer choice that can support an evolving view of reliability and resource adequacy

New Bilateral Exchange Platform



- **Same** general RPM timeline, and Planning Parameters
- **New** Capacity Resource Model showing each resource's ICAP MW, LDA, and fuel type
- **New** Capacity obligation forecast for all Load Serving Entities (“LSEs”) published with Planning Parameters
- **New** Resource Adequacy Index reflecting reliability needs based on resource fuel mix
- **New** “Market Specifications” describing available products and terms
 - Bid/ask spread
 - Trading volume
 - Remaining capacity available
 - Pricing index
 - CETL/CETO limits
 - Real-Time Resource Adequacy Index



Backstop Reliability Auctions

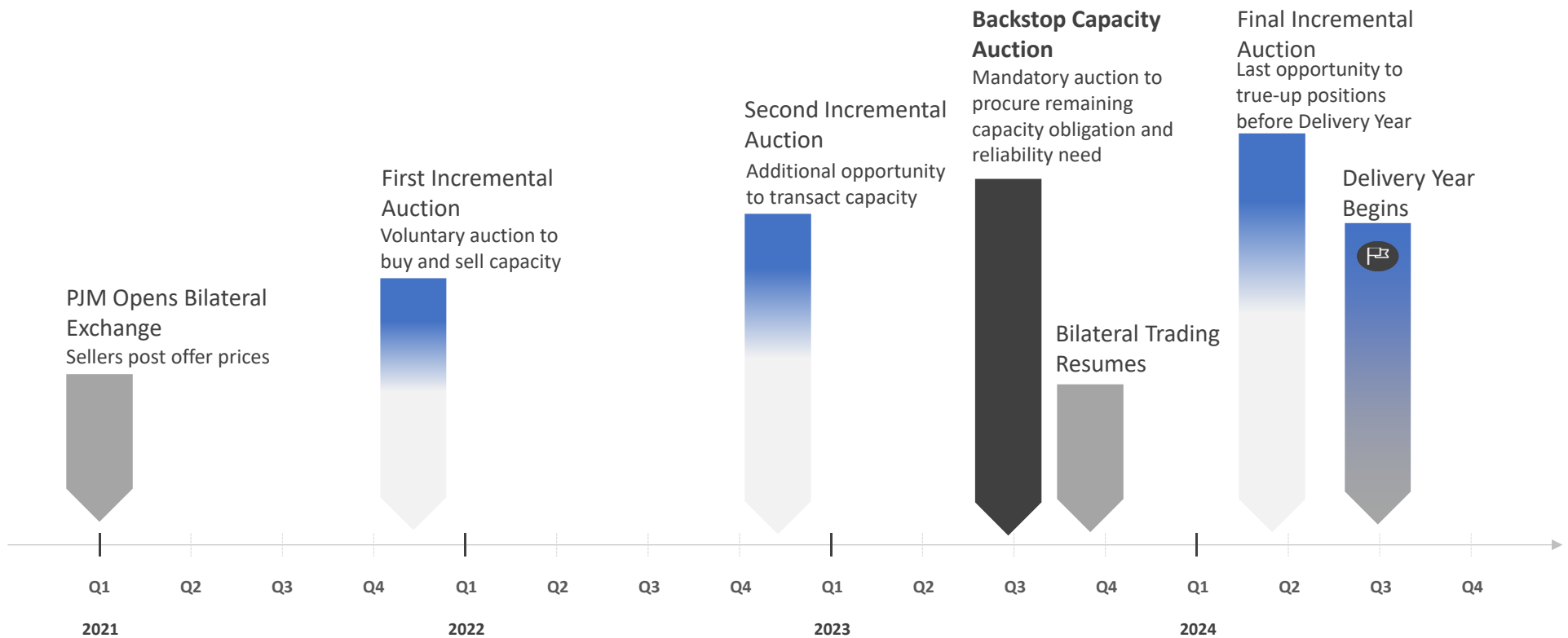


- Backstop mechanism to ensure PJM maintains reliability in response to both evolving system needs, and resource mix, both of which are expected to be more dynamic in the coming decade(s)
- Patterned on current single clearing price RPM design
- Incremental auctions held between bilateral window opening and start of Delivery Year
 - Provides additional opportunity for buyers and sellers to transact
 - Also allows parties to true-up sales and purchases before final RRA
- Mandatory backstop auction opens ~12-24 months before Delivery Year
 - PJM procures any remaining capacity obligations and resource adequacy needs using new resource adequacy metric
 - Addresses relationship between consumer resource procurements and the reliability services these assets provide
- Auction produces a transparent price that values system reliability needs and consumer choice

Key Take Away

- PJM becomes buyer of last resort in final backstop auction, but also makes sure resource mix is adequate to maintain local and regional reliability needs
- Buyer and seller strategies can reflect bilateral and auction pricing expectations and evolving market data

Example Market Timeline



Framework for a New “Sufficient Reliability Product”

Develop Baseline Reliability Services Index

- Baseline capacity portfolio that provides necessary reliability services
 - Energy to serve peak load and Installed Reserve Margin (“IRM”)
 - Voltage control, ramp, flexibility & ancillary services
 - Fuel assurance

Quantify Different Generators’ Ability to Supply Reliability

- Analytic approach applies to ***all*** resource types, including renewable and conventional generation and demand response
- Resource’s capacity value reflects ability to serve peak demand and provide Reliability Services

Compare LSE Capacity Portfolio to Baseline Reliability Index

- Reliability Services Index shows whether capacity portfolio satisfies reliability requirement plus IRM ***and*** necessary reliability services
- LSE’s can procure capacity from different resources
- PJM will procure capacity from sources that provide any Reliability Services missing from LSE portfolios

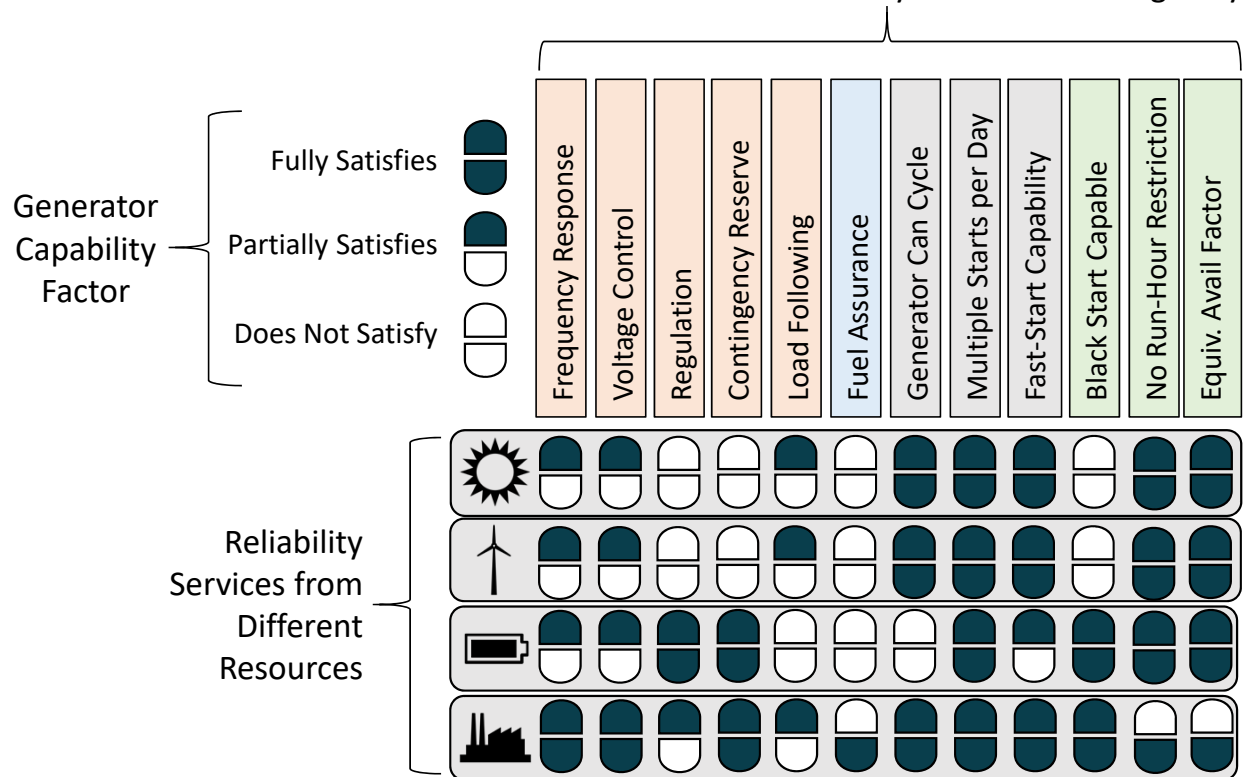
Key Take Away

- PJM initially proposed this approach in 2017 Evolving Resource Mix and System Reliability whitepaper
- Similar to Effective Load Carrying Capability (“ELCC”) capacity accreditation methodology
- Reliability Services Index provides transparent market signal about demand for Grid Reliability Services
- LSEs can self-supply demand for capacity ***and*** necessary Reliability Services though capacity portfolio or centralized backstop reliability auctions

Source: <https://www.pjm.com/~media/library/reports-notice/special-reports/20170330-pjms-evolving-resource-mix-and-system-reliability.ashx>

Prior PJM Analysis Provides Starting Point for Determining Reliability Characteristics that Different Resources Provide

EXAMPLE ONLY - Grid Reliability Services PJM Originally Identified



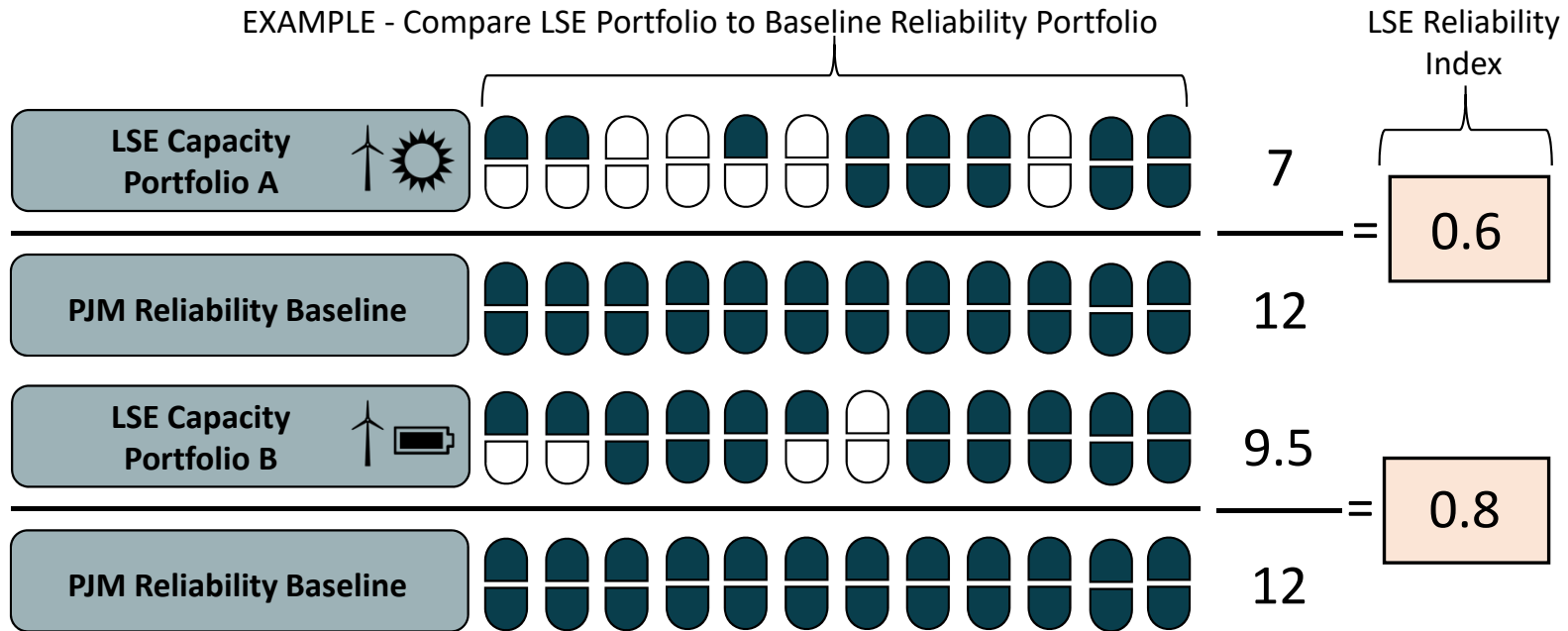
Key Take Away

- Generator Capacity Factor multiplied by total available UCAP
- Represents aggregate reliability value from different resources
- LSEs can satisfy missing Reliability Services by aggregating capacity from different resources
- **Specific services and resource capabilities would be defined by stakeholders and could evolve over time**

Note: that this is used for illustrative purposes only – we do not endorse nor agree/disagree with any specific elements identified or classified.

LSE Sufficiently Reliable Product Portfolio Example

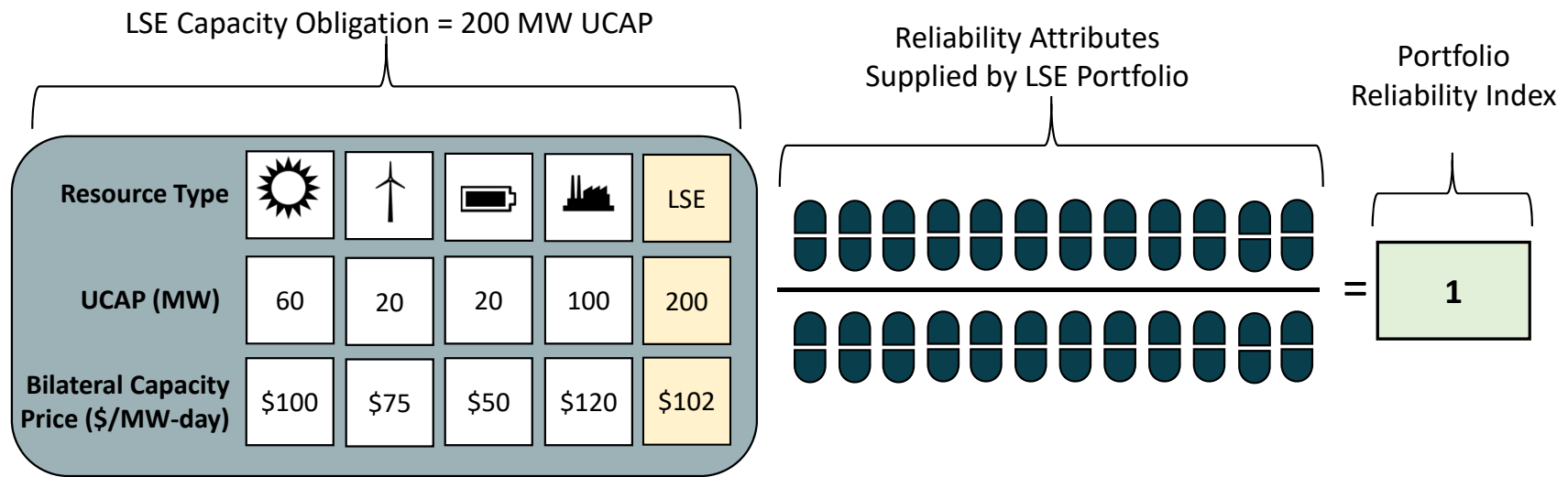
EXAMPLE - Compare LSE Portfolio to Baseline Reliability Portfolio



Key Take Away

- Aggregating different resources increases Reliability Services Index for LSE portfolio B
- Higher Reliability Services Index decreases LSE exposure to Backstop Auction capacity allocation

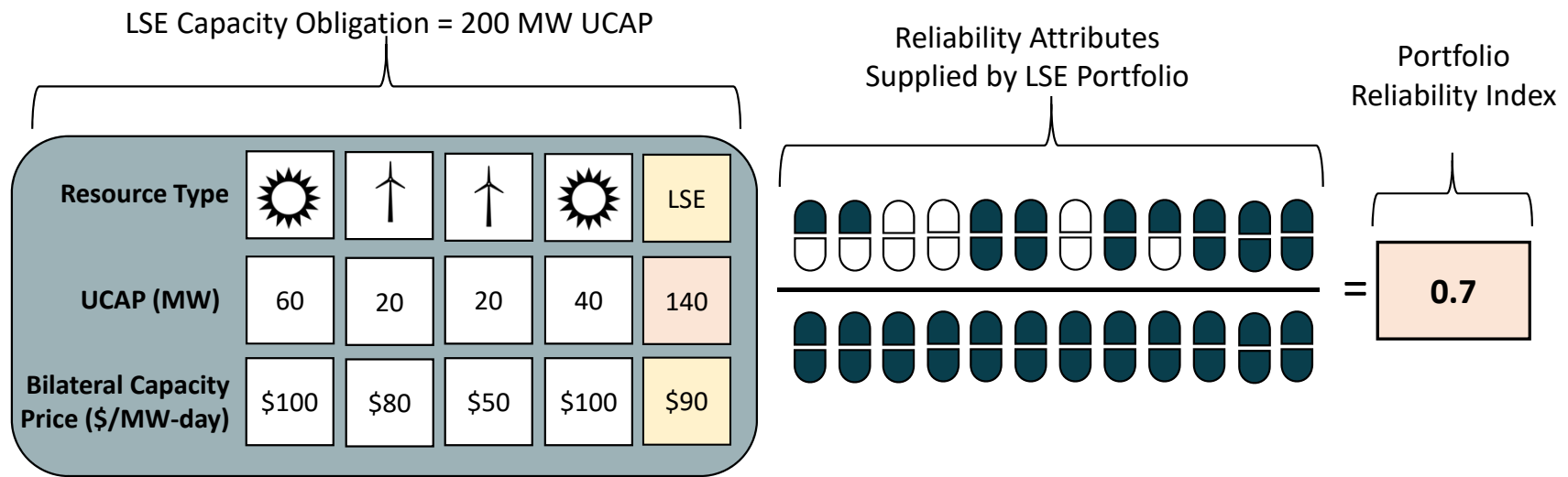
Transaction Example – Pure Merchant LSE



Key Take Away

- LSE logs MW quantity and price for each bilateral transaction into capacity exchange
- No exposure to back stop auction costs because portfolio fully satisfies capacity and reliability obligations
- Exchange publishes bilateral transaction details providing transparent price signals for capacity from different resources

Transaction Example – Merchant LSE Partial Portfolio







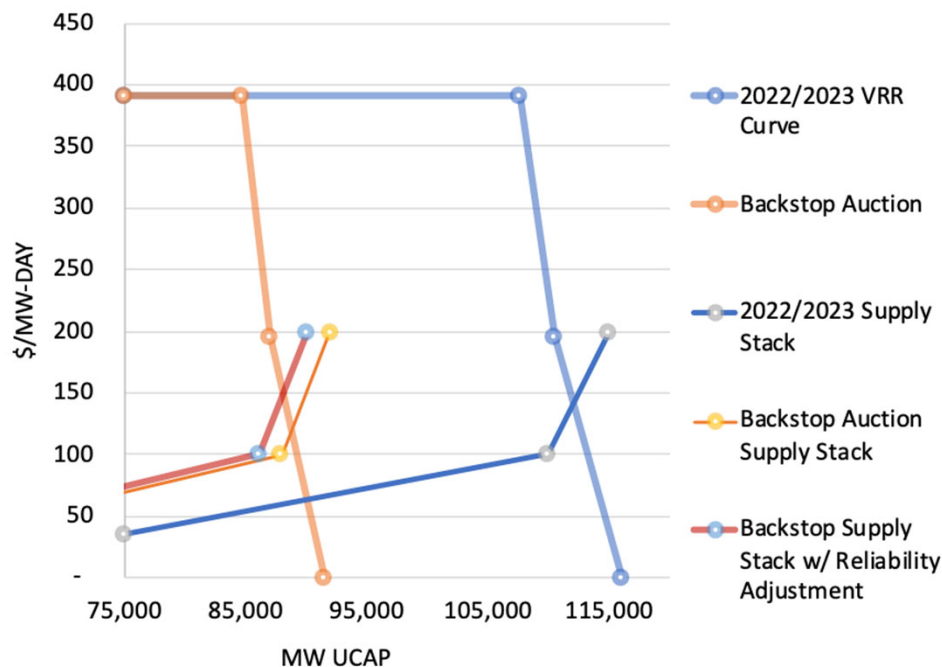
Key Take Away

- LSE also enters bilateral transaction details in exchange, but PJM also procures additional capacity in backstop auction to satisfy 60 MW UCAP shortfall
- LSE has incremental exposure to cost of additional capacity that PJM purchases to satisfy missing reliability attributes
- Final capacity cost equals weighted average of bilateral transactions plus backstop auction allocation

Backstop Auction Configuration Examples

Bilateral UCAP Procurements

	Offered	Bilateral	Available
	2,000	1,000	1,000
	2,000	1,500	500
	1000	500	500
	110,000	20,000	75,000
	115,000	23,000	92,000



Bilateral Construct Minimizes Role of MOPR



- Bilateral purchases of mitigated capacity are “in market” by definition
- Mitigation should target the most acute market power risk consistent with FERC precedent
 - Buy-side mitigation patterned to be consistent with FERC affiliate transaction review standards and *Mobile-Sierra* framework
 - FERC vertical and horizontal market power screens for monopoly power
 - Direct buy-side out-of-market payments to specific suppliers or at predetermined prices
- Mitigated offer floor in bilateral window floor equals resources avoidable costs or out-of-market subsidy value net of forecast energy and ancillary revenues
- Mitigated resources can participate in RRA at any price up to Net CONE ***but*** cleared offers are pay-as-bid while unmitigated suppliers receive single auction clearing price

Key Take Away

- Provides direct path to market for resources that support local energy policies
- Demand-side discretion as well as pay-as-bid construct substantially decreases and may eliminate need for MOPR mitigation in RRA
- Manages market power by calibrating incentives and risks for mitigated suppliers

Consistent with OPSI's Proposed Principles



Market Design Principle	Consistency
State procurements, competitive solicitations, policy choices, emissions levels, or clean energy requirements must be respected and accommodated, rather than over-ridden or made infeasible by PJM market rules	✓
States should have the option of specifying the clean energy, emission levels, or other content of their own resource mix, in whole or in part, which the PJM market would then account for or procure on a competitive least-cost basis, consistent with reliability	✓
Because states retain primary authority for resource adequacy under the Federal Power Act, any re-imagined resource adequacy solution must continue to allow states the option of meeting resource adequacy through a mechanism independently, similar to the current Fixed Resource Requirement	✓
Effective and appropriate market power mitigation is imperative for a properly functioning market design, and for PJM-administered markets generally	✓

Compatible with Necessary Market Design Principles



Competitive Markets Providing Transparent Prices for Reliability and Clean Energy Goals

- Provide transparent price signals that value the PJM region's reliability and clean energy needs and that accurately quantify and equitably compensate every resource type's contribution toward meeting PJM's reliability
- Respect and accommodate, rather than interfere with, state, self-supply, and end-use customer procurements or competitive solicitations, desired emission levels, policy choices, or clean energy goals while still respecting the resource adequacy value of each resource
- Effectively mitigate market power to ensure a properly functioning and competitive market but must not impede state or federal policies that support supply-side resources (including demand response and energy efficiency) in a generally applicable, competitive manner
- Durable and adaptable design given expected changes to PJM's resource mix, the regulatory environment, and changes to federal and state policies

We Look Forward to Continuing This Constructive Dialogue



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