LS Power

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CIFP - Large Load in the Capacity Market

LS Power

Constraints and Considerations

- Load is being added to load forecast faster than supply can be built to meet it
- The scale of expected load increases far outstrip the ability to rely on demand side measures over the long term
- Cost increases are driving enhanced political intervention from state executives
- Competitive generation benefits from multi-year price transparency to incent large-scale build out

- LS Power Solution:
- Ensure the markets continue to produce prices that reflect supply and demand dynamics to incent new investment while shielding customers from price increases caused by large load interconnection

Updates

Changes Since Prior Presentation

- Change accelerated Interconnection Process to 10-months
- Additional description and demonstration of 2-Clear revenue flow process
- Further distinguish our proposal from others
  - Only proposal that seeks to harness competitive market signals to provide long-term solution
  - Addresses political reality without resorting to cost capping
- Additional thinking around processes external to PJM CIFP that will influence PJM outcomes
  - SPP Large Load Generation Interconnection Process
  - DOE ANOPR

Why LS Power's Approach is Superior

Key Differentiators

Comprehensive Solution:

- Addresses near-term AND long-term challenges in integrated package
- Not piecemeal modifications

Financial Accountability:

- Load forecast deposit mechanism ensures real commitment

Consumer Protection:

- Two-clear structure protects existing consumers from large load price impacts
- Entry fee provides scarcity price signal to supply and potential price relief to existing load

Investment Certainty:

- 7-year price lock based on proven ISO-NE model
- Provides longer-run revenue transparency to promote increased new competitive generation

Market-Based:

- Relies on competitive forces, not mandates
- Maintains RPM integrity while addressing unprecedented load growth

Our Solution - Two-Pronged Approach is Self-Enforcing

Near-Term Energy Shortage:

- Fine tune load forecast
  - Put skin in the game for Large Load Additions
- Identify depth and duration of shortage
  - Granularity of energy emergency crucial in identifying solutions
- Determine if operating at this level is manageable in real time
  - If not, determine what extraordinary administrative fixes are required

Long-Term Capacity Scarcity:

- Allow the capacity market to price scarcity
- Implement mechanisms to support multi-year contracting
- Implement different allocation of costs per load type
- Restructure the BRA to a "2-Clear" clearing mechanism with Clear 1 excluding unpaired Large Load Forecasts and Clear 2 including unpaired Large Load Forecasts
  - Implement immediately to address long-term issue

- Reliance on a Cost Collar to “reduce volatility” only “kicks the can” to next year without sending a signal to build new supply
- LS Power solution is the only proposal that seeks to rebuild the signal for organic supply growth in the market while protecting existing load from price shocks of large load entry
  - Under our proposal, supply expansion not solely tied to bilateral contracting with Large Loads

Package Components Work Together

Self-enforcing components

These elements must be implemented together

Near-Term Energy Shortage – Additional Requirements

- **Tie load forecast to Transmission projects:**
  - Tie back near-term load forecast to committed Supplemental Projects with Construction Approval
  - Reconcile large load forecast with transmission upgrades in TEAC
- **PJM to provide clarity:**
  - Clear articulation of number of hours per year of expected shortage
  - Assessment of whether operating at this level of energy shortage is manageable in real time
- **If not manageable:**
  - Requirement for accelerated interconnection timelines for entry of all new supply resources
  - Up to and including appealing to the DOE for emergency orders to install and recover costs

Near-Term Energy Shortage - Available Resources

Once PJM identifies depth and duration of energy shortage, sellers can develop near-term solutions

- **To address any near-term energy shortage issues, PJM may need to facilitate faster entry of available supply, including:**
  - **Uprates** - Existing facility enhancements
  - **Smaller scale generators** - Aeroderivatives, reciprocating gensets
  - **Demand response** - Existing DR programs

Near-term energy shortage solutions are a subset of solutions to long-term capacity concerns; they are what is feasible in the next 5-7 years

Near-Term Energy Shortage - Load Forecast

Put skin in the game for new large loads (>50 MW at same POIC) included in the BRA forecast:

- **Deposits tied to the 2-Clear VRR clearing process with two alternative requirements:**
  - **Clear 1 -** for loads with partner generation. **Deposit based on Point A price** (securitize based on highest possible capacity obligation); **OR**
  - **Clear 2 -** for unpaired load seeking entry. **Entry Fee based on pro rata $ value** of all unpaired large load MWs included in PJM load forecast based on the entry fee (securitize price impact of load addition);
- **Return of Clear 1 deposit** with demonstrated commercialization of loads included in load forecast
- Clear 2 entry fee nonrefundable and credited toward auction revenues for unpaired Large Load participation
- Security requirements can be passed on to underlying customers through Data Center retail tariffs
- **Forfeited security** would flow to capacity market sellers as compensation for phantom load bid to maintain market incentive for new entry

Long-Term Capacity Scarcity - Market Solutions

Core Principle: Let market forces work while mitigating consumer price shock

- **Key Mechanisms:**
  - Implement allocation of costs per load type based on cost causation
  - Implement multi-year price certainty mechanisms
  - Modify reliability backstop trigger

New 2-Clear VRR Clearing Mechanism

Clear 1 - Initial Round:

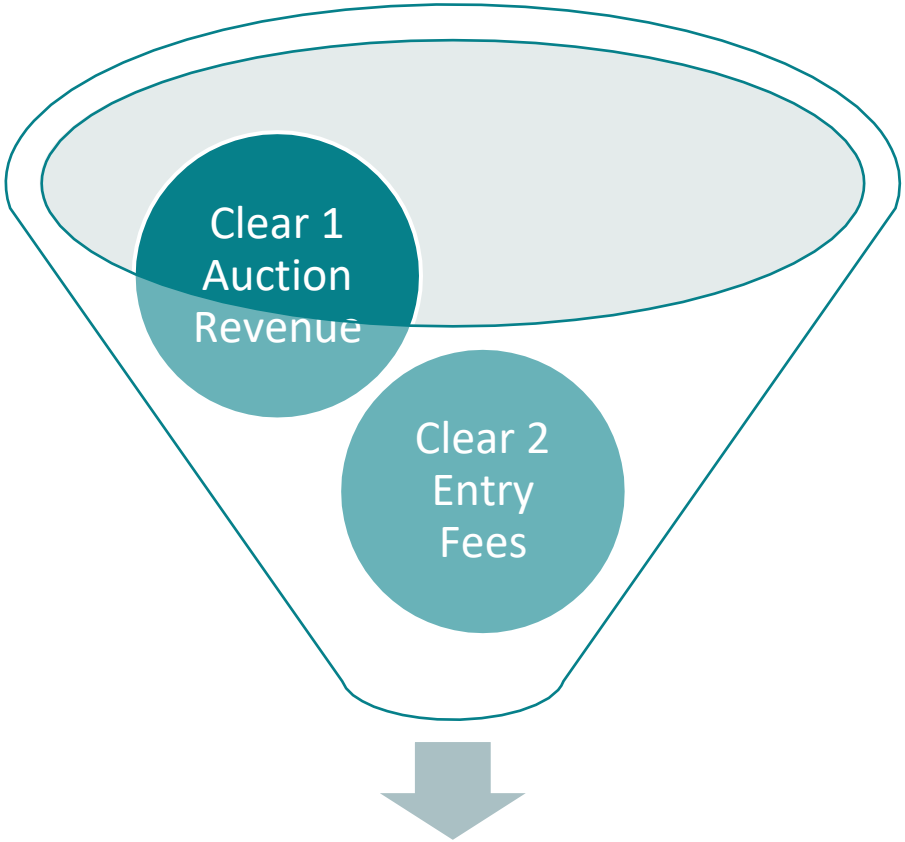
- VRR curve clears normally with just "Organic" Load; and
- Large load additions paired with offsetting supply
  - Large Load may be included in Clear 1 if it shows PJM a contract to bring on new offsetting supply that will also be participating in the auction
  - This generation will go through separate accelerated interconnection queue process

Clear 2 - Second Round:

- Run with Large Load with no offsetting generation that elects to pay entry fee
  - **Unpaired Large load additions can choose to pay an entry fee** valued at **gross overnight CONE** on a $/kW basis of a Combined Cycle (most recent Quad Review)
  - Payments included in total auction revenue and distributed to supply
  - Entry Fee revenues that increase supply compensation over VRR price cap are rebated to Clear 1 buyers
    - Sends supply scarcity price signal while reducing price to existing load

Flowchart Example of Clearing Mechanism

2-Clear Auction Revenues Flow

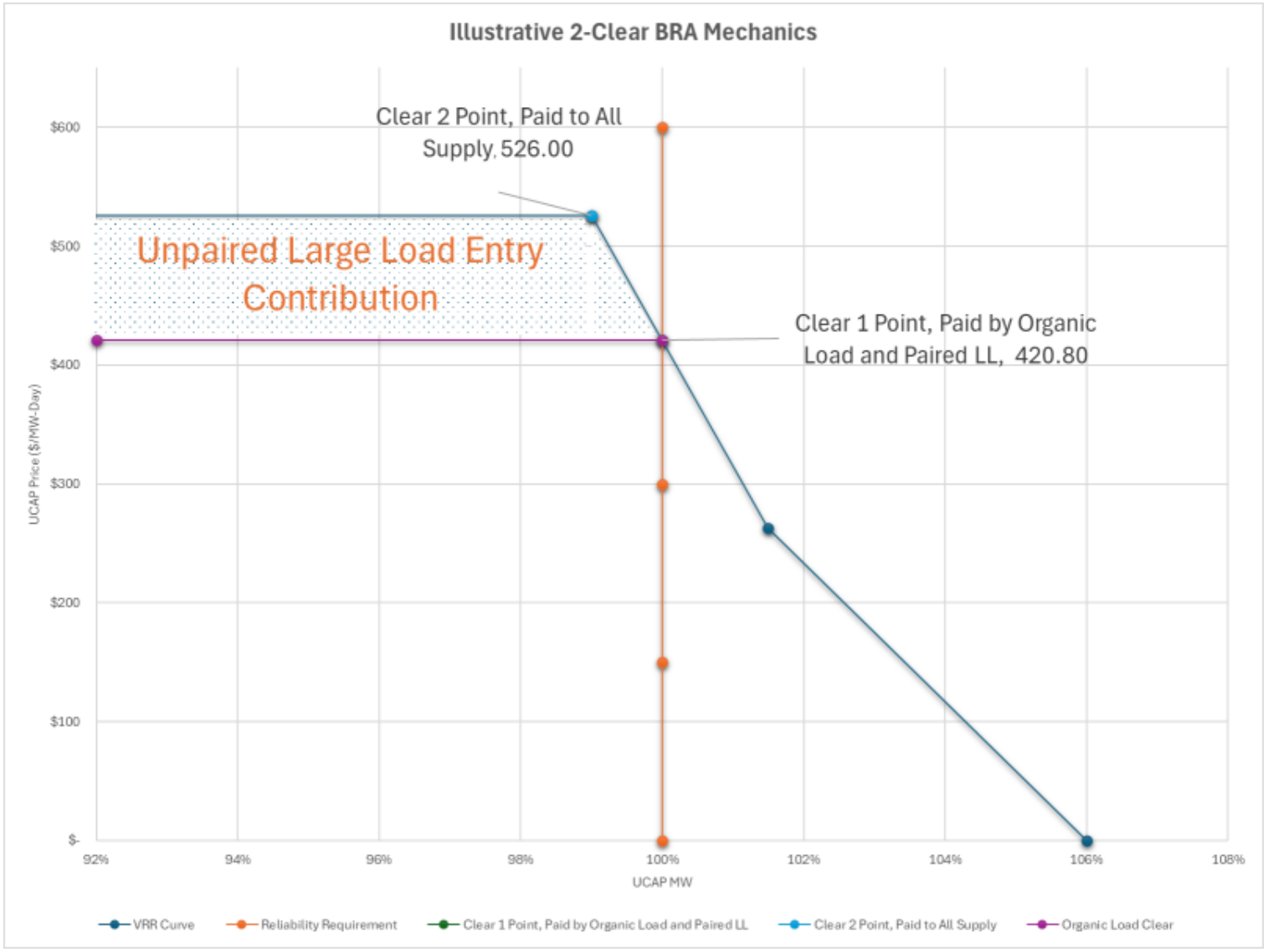


Auction Revenues Available for Supply Compensation

- Pay prorata to all supply for Revenues up to VRR Curve Price Cap
- Any remaining revenues paid prorata to Clear 1 Loads to offset Clear 1 Auction Obligation

Two-Clear Structure to Shield Non-Data Center Load from Price Impacts

New VRR Clearing Mechanism



Illustrative 2-Clear Auction Revenues Flow
Solely for demonstration of Concept

Component	Input	Result
Clear 1 Supply (MW)	140,000	
Clear 1 Price ($/MW-Day)	350	
Clear 1 Revenue ($)		17,885,000,000
Clear 2 Load (MW)	5,000	
Clear 2 Incremental Supply (MW)	-	
Clear 2 Entry Fee ($/kW)	1,800	
Clear 2 Revenue ($)		9,000,000,000
Total Revenues ($)		26,885,000,000
Total Revenues ($/MW-Day)		526.13
VRR Curve Max Price ($/MW-Day)	526.00	
Excess Entry Fee Collected ($/MW-Day)		-0.13
Excess Revenue Collected ($)		(6,628,571)
Clear 1 Final Price ($/MW-Day)		349.87
Supply Payment ($/MW-Day)		526.00

Interactive Table – Double-click to enter calculation mode

7-Year Price Lock (ISO-NE Market Design Precedent)

Multi-Year Price Lock Mechanism

How it works:

- Market clears based on new entry in BRA
- Subsequent 6 years, resources participate using the **PJM NEPA method**:
  - Units are entered into the auction at the lesser of their initial offer price or 90% times the Net CONE applicable in the first BRA
  - If not clearing, the offer price is reduced until all MWs cleared
  - Resource is paid uplift from the clearing price to previous offer price

Administrative Backstop to 7-year lock:

- Modification to the reliability backstop to allow faster triggering of multi-year contracting with PJM
- Avoid dipping more than the Reference Resource UCAP MW below Point A on the VRR curve
  - This would move the clearing point back to the inflection point on the VRR curve
- This would potentially allow for faster entry of new supply if market response is inadequate

10-Month Expedited Interconnection for New Supply (patterned from Manual 14H, Section 11 Upgrades and PJM proposal)

Key Requirements:

- New supply requests commit to **fully fund new Network Upgrades** necessary to obtain their Capacity Injection Rights (CIRs) and establish their Installed Capacity (ICAP) and Maximum Facility Output (MFO)
- Commit to a **completion date with sufficient incentives** to ensure the completion date is achieved (PJM could look to the RRI commitments and incentive as a model)

Alignment with Issue Charge:

- Consistent with Issue Charge Item 3: "Explore potential solutions that include further changes to interconnection rules targeting resource adequacy challenges to the extent they are narrowly focused, such as accelerated queue options, with objective for consensus by EOY 2025"
- Like PJM's proposal, will impact the Cycle process

Integration:

- Ties to proposed auction clearing mechanism that pairs new loads with supply ability to enter market

** SPP HILLGA process provides a potential alternative track for faster interconnection. See next slide*

SPP HILLGA Proposal and DOE ANOPR

- SPP High Impact Large Load Generator Assessment (HILLGA)
  - Expedited, serial, limited study process – 150 Days
  - Geographically restricted (within 1 or 2 substations depending on voltage)
  - Significant deposit requirements for generation ($8,000/MW security)
  - Limited Interconnection Service with requirement to complete standard IC process for full Network Integration
  - Similar to other proposals brought forward in CIFP and may represent alternative fast-path interconnection option
- DOE Large Load Advance Notice of Proposed Rulemaking (ANOPR)
  - Some key observations:
    - Assertion of FERC jurisdiction over large load interconnections with specific discussion of coordination of corresponding entry of new supply (hybrid resources)
    - Standardization of study deposits, readiness requirements, and withdrawal penalties.
    - Incentives to encourage curtailability of LLs or Hybrids

LS Power Approach Advantages

Benefits vs. Other Proposals

Component	LS Power Proposal	DCC/Governors Proposal	Silver/Glatz	NRDC	PJM Proposal
Load Forecast	Financial commitment requirement, deposit mechanism to ensure accountability	Similar to PJM	LLA attestation and utility feasibility determination	LLAs responsible for self-provision of capacity, isolating existing loads	State Commission review, duplication inquiry
Price Impact Mitigation	Two-clear VRR structure isolates impact to data center load	Extend Price Collar by One Year. Expanded role for DR and additional Curtailment of LLA when paired generation delayed	NCBL mandatory treatment or BYOG offsets capacity price impacts	NCBL mandatory treatment or BYOG offsets capacity price impacts, Curtailment of LLAs reduce energy price impacts	Voluntary PRD/DR
Multi-Year Contracting	Concrete 7-year price lock mechanism with ISO-NE precedent	NA	NA	NA	Exploring backstop acceleration
Generator Incentives	10-month process + 7-year revenue certainty drives investment	Accelerated Interconnection when paired with LLA	NA	Limited fast interconnection process to serve LLA	10-month EIT (limited volume)
Cost Allocation	Entry fee and bifurcated pricing protects existing consumers	Extend Price Collar by One Year	Potential different price for new and existing supply	Single price for existing loads, negotiated entry of supply between new LLA and new Supply	No bifurcation
Market Integration	Integrated solution tying load, supply, and interconnection	Focus on expedited interconnection of paired supply	Focus on load growth and restraining LLA	Focus on load growth and restraining LLA	Separate expedited track

Conclusion & Next Steps

LS Power's proposal offers:

- ✓ Near-term solutions for energy shortage
- ✓ Long-term framework for capacity scarcity
- ✓ Consumer protection through cost differentiation
- ✓ Investment certainty through multi-year mechanisms
- ✓ Accelerated interconnection for critical resources
- ✓ Financial accountability for load forecasting

This comprehensive package addresses PJM's unprecedented challenges while maintaining competitive market principles and protecting existing consumers.

We look forward to engagement with the PJM Board as it decides the appropriate path forward in addressing the issues identified in this CIFP Process.

Questions?

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