

Revisiting Root Causes and Their Implications in PJM's Powering Reliability Through Market Design

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Introduction and Disclaimer

- Thank you, PJM for hosting these workshops and publishing its Powering Reliability Through Market Design (PRTMD)
 - “May 6th Paper”
- PA OCA is still considering different proposals, so these remarks are preliminary and subject to change.

PJM's Request

- PJM requested presentations on the root causes of resource adequacy issues in PJM:

“The stakeholder community has consistently generated analysis and proposals that have advanced our collective understanding, and we expect this process to be no different. We welcome challenge, refinement and alternatives that this paper has not considered.”

(David Mills, May 6th Paper, p. 3)

Executive Summary

Problem: Growing resource adequacy shortage within PJM

Root cause of the problem **is**:

Accommodating the requests of data centers to rapidly interconnect massive amounts of load and managing the timing of electric infrastructure readiness.

Root cause of the problem **is not**:

Wholesale market pricing, lack of long-term contracting, or policymakers unwilling to accept high prices.

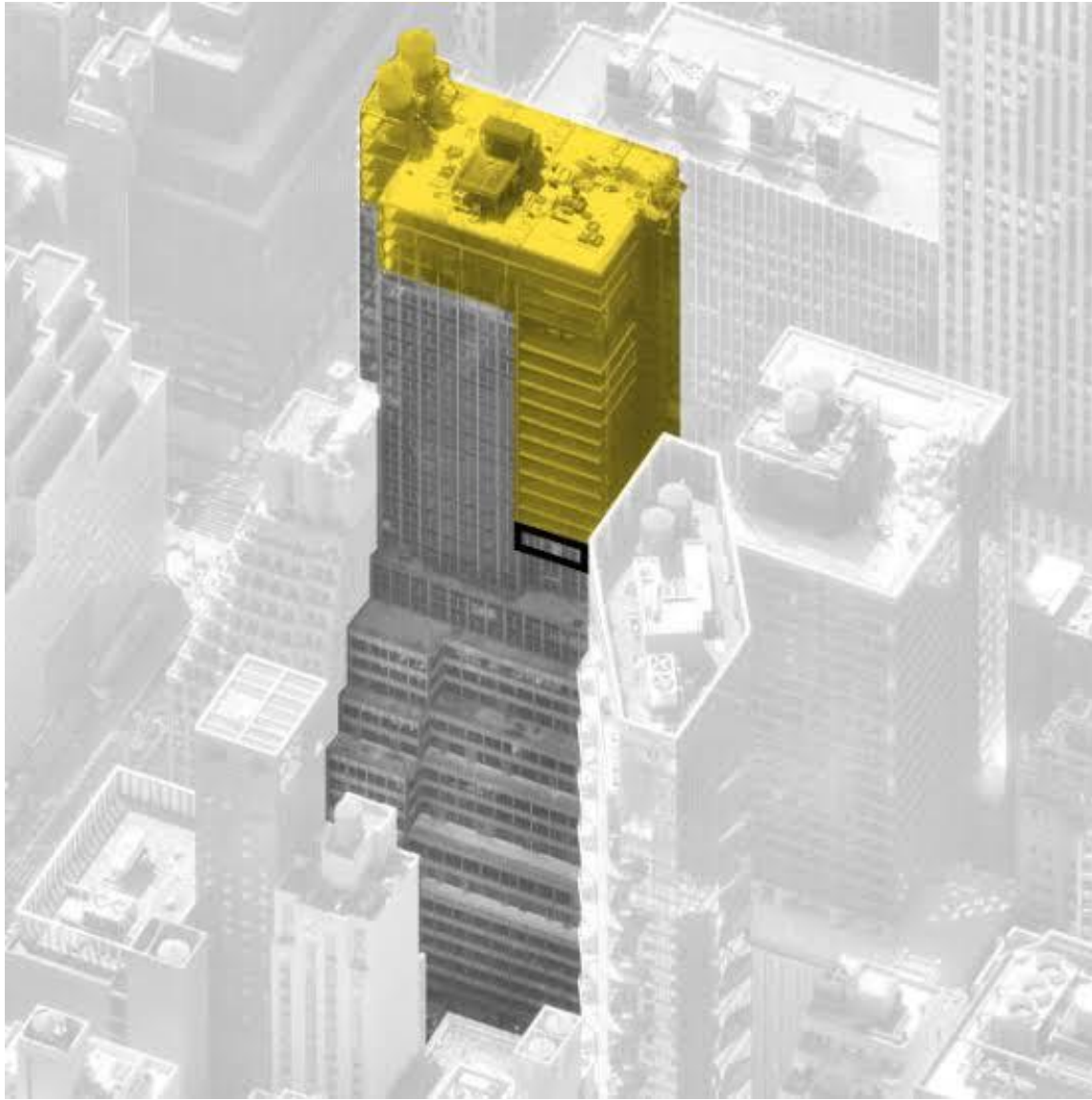
- Managing electricity infrastructure readiness to meet new electricity demand is not a new concept, and it must be recognized for what it plainly is.
- While we are facing a new challenge – an amount and speed of new demand from data centers that outpaces the speed at which electricity infrastructure can be constructed and integrated – managing integration is not a new concept.
- Energy utility industries – electric and gas – at interstate and intrastate levels – traditionally have managed this risk through administrative means, including interconnection queues and/or mandatory interruptible rates until necessary infrastructure is available at full capacity to protect critical load.
- Like residential customers in natural gas, who receive protection from curtailments over dual fuel customers, residential customers in electricity deserve protection over large loads with backup supply during this transition given that residential customers are neither the causers of the problem nor in the best position to bear/manage the risk of decreased reliability.

Executive Summary (cont'd)

- Ordinary consumers and their representatives **do not want consumers to pay more for less reliability** when there are ways to accommodate reliably data center loads and have them pay for new capacity.
- Affordability and reliability should be the focus of PJM and stakeholder efforts.
- For PJM to work for ordinary ratepayers, data center interconnections need to be managed, new capacity resources installed, and transmission planning and cost allocation reformed.
- Market reforms may help and should be considered if they address the root cause.



Don't drive a 12-foot truck under an 11-foot bridge



Don't add stories to a building that cannot support them

Non-clearing of Markets is Frequent and Requires Non-price Rationing

“Indeed, both casual empiricism and scholarly economic research suggest that occasional non-clearing of competitive markets is the rule rather than the exception.¹ To quote one standard reference on this subject from the economics literature: ‘Waiting for a good and being unable to purchase a good when one wants it are typical rather than atypical experiences in many markets’.² ... Delivery lags are common in mining and manufacturing industries with large fixed costs, which are probably more relevant to the electricity industry. Typically, the willingness to pay more for goods that are in short supply is not sufficient to reduce or eliminate delivery lags. Increases in delivery lags, queuing, and other forms of non-price rationing are used *in conjunction with* prices to “clear” markets.³”

1. One reason markets sometimes fail to clear is that considerations of *fairness* prevent prices from rising sufficiently during emergencies. ... Spot energy prices would not necessarily be prevented from reaching market-clearing levels by such considerations, but to the extent that fairness considerations *do* intrude, the likelihood of non-economic disruptions is only increased.

2. Dennis Carleton, *The Theory and the Facts of How Markets Clear: Is Industrial Organization Valuable for Understanding Macroeconomics ?*, HANDBOOK OF INDUSTRIAL ORGANIZATION (Richard Schmalensee and Robert Willig, eds., Amsterdam: North-Holland, 1989), Elsevier Science Publishers B.V..

3. Dennis Carleton, *Equilibrium Fluctuations when Price and Delivery Lag Clear the Market*, 14 BELL J. ECON. 56272 (1983).

Jaffe, Adam B., and Frank A. Felder. "Should electricity markets have a capacity requirement? If so, how should it be priced?." *The electricity journal* 9.10 (1996), p. 54. Emphasis in original.

Other Key Points

- Higher wholesale market prices that transfer a large amount of wealth from ordinary ratepayers to suppliers without solving the shortage of supply given demand growth are not the solution.
- Additional Paths should be considered.
- Today's remarks are aimed at expanding and improving ideas for consideration and should not be interpreted as a specific proposal.
- PA OCA is still considering different proposals, so these remarks are preliminary and subject to change.

Other Key Points (con't)

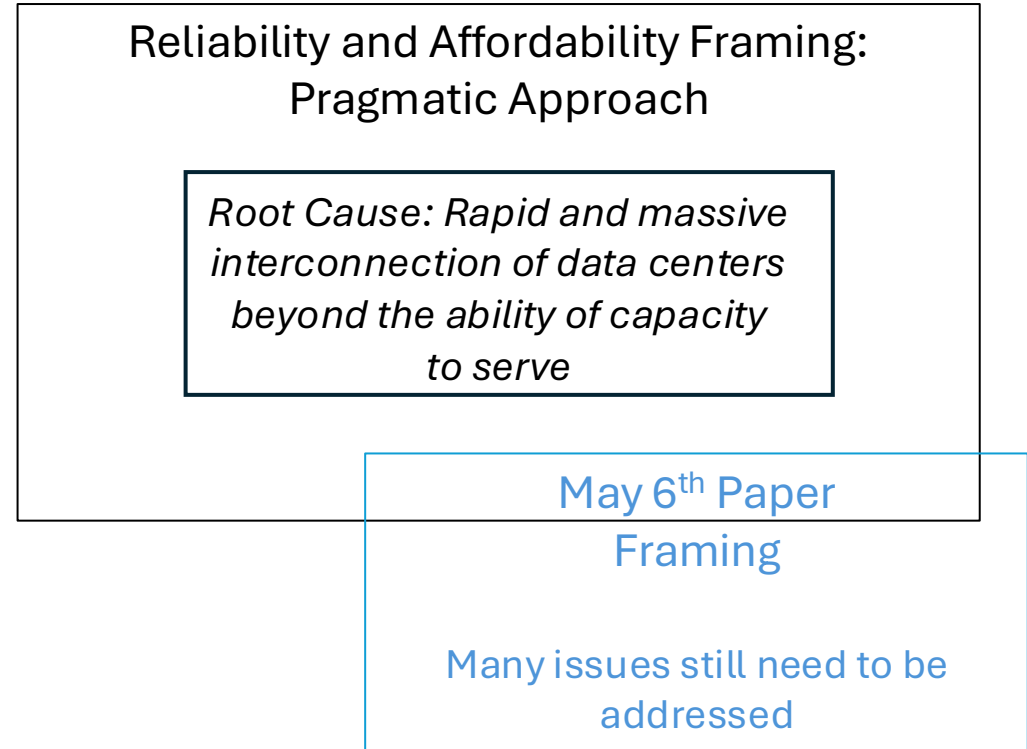
- Electricity is a common good.
 - A good that whose consumption by one person precludes its consumption by another (rivalrousness) and whose consumption by people who have not paid for it cannot be prevented (non-excludability).
- Electricity is a merit good.
 - Underutilization of electricity service threatens public safety and health, e.g., heat waves and increased mortality.
 - Electricity service is considered a good that all should have access to for equity reasons, food, housing and healthcare.
 - Electricity demand for households is inelastic because it is an essential modern necessity with few immediate substitutes.
 - Energy prices, including electricity, is highly regressive because energy burdens are less for higher income consumers and heaviest for lower income consumers.
 - Electricity affordability for households is a real and growing concern.

(Brown et al, 2020; Roberston, 2022)

Re-framing the May 6th Paper

Framing the Problem

- Replacing the May 6th Paper's Framing with the “Pragmatic Approach”
- Within the May 6th Paper's Framing, many issues still need to be addressed



The **Pragmatic** Approach Should Replace the May 6th Paper's Framing

- The White House National Energy Dominance Council (NEDC) and PJM Governors policy, the White House Ratepayer Protection Pledge, and the FERC June 18, 2026 Show Cause Order make clear that data centers should bring and pay for new capacity to protect ordinary ratepayers.

“FERC today issues tailored show cause orders under Section 206 of the Federal Power Act to each of the six regional grid operators under its jurisdiction. These groundbreaking proceedings represent historic action by the Commission to push our country’s electric markets and economy into the future by speeding the integration of large energy users, like data centers and manufacturing operations, onto the electric grid. **These actions are designed to ensure that consumers nationwide continue to enjoy reliable, affordable power, as demand soars and technology leaps forward.**”

FERC Fact Sheet, June 18, 2026, <https://www.ferc.gov/news-events/news/fact-sheet-ferc-takes-action-supercharge-americas-grid-efficiency-reliability-and>, emphasis added.

The May 6th Paper's Framing Should be Changed

- Working within the May 6 Paper's Framing results in inconsistent and incomplete recommendations.
- The problem is not higher prices; the problem is that higher prices will not solve the problem.
 - The May 6 paper does not address the rapid and massive interconnection of data centers without new capacity and the likelihood that this will continue.
 - The core of the May 6 paper is that higher energy, capacity, and ancillary service prices at politically untenable levels are needed.
 - The May 6 paper does not demonstrate that higher prices and a longer-term capacity product solves the reliability problem and brings on new supplies that will restore the PJM wholesale markets to a more politically acceptable equilibrium.
- The PJM framing does not address how non-market forces are hindering new supply (permitting, interconnection queues, transformer shortages, etc.) should be considered.
- Any load, especially data centers, can and are entering into bilateral contracts that are not limited by price caps, and furthering such arrangements, including via mandatory connect and manage, is critical.
- Some of the Paths that the May 6th Paper considers exacerbates the credibility trap by increasing wholesale prices.
- Instead, PJM and stakeholders have before them other Paths that address the root cause and protects ordinary ratepayers.

A Few Comments on the May 6th Paper

1. Path A only suggests long-term contracts for capacity, not energy and ancillary services, yet Path A and Path C suggest increasing the role of energy and ancillary service prices in resource revenue recovery.
2. Path A suggests capacity hedging for durations well below what the May 6 paper says are needed.
3. Path A may result in locking in high capacity prices for many years and, if combined with Path C, may also increase energy and ancillary services prices.
4. The aspect of Path B that focuses on “physical accountability” does not require “a fundamental reorientation of how the PJM system allocates reliability as a scarce good.”
5. Instead, Path B should separate different types of services (e.g., firm and non-firm energy and transmission) from the region’s resource adequacy policy.
6. Path C depends on an administrative construct (e.g., scarcity pricing and operating demand curve), which is susceptible to “stroke of the pen” changes that is a concern with capacity markets.
7. Additional capacity market reforms should be considered, such as a prompt capacity market perhaps with voluntary longer-procurement contracts, explicit buy bids, facilitation of contracts between data centers and suppliers, and ELCC reform.
8. In times of scarcity, concerns about market power should be heightened; not of the suggested Paths focus on market power monitoring, mitigation, gaming, and other anti-competitive behavior.
9. Many claims in the May 6th Paper are asserted without sufficient support or references.
10. Others comments as well.

Recommendations

Recommendation #1

Request for Additional Information

- PJM should provide the results of the Charles River Associates (CRA) Request for Information (RFI) bilateral contracting and central procurement feedback from suppliers and large loads regarding what they are looking for in their business arrangements (subject to reasonable confidentiality provisions).
 - This already collected data could provide helpful information regarding accelerating new capacity and accommodating data centers.
- PJM updates its Energy in Transition in PJM: Resource Retirements, Replacements & Risks Feb. 24, 2023 (“4 R’s Paper”)
 - Since this paper has been issued, there has been a change in the federal administration and a revisiting of key policies both at the federal and state levels that warrant updating this paper to the present policy context.

Recommendation #2

Consider Other Paths

Options	Path D: BYONC to Connect	Path E: Mandatory Connect & Manage
Large Load Interconnection Queue	Data centers await to interconnect until both generation and transmission infrastructure are ready to meet their needs.	Data centers can interconnect but are subject to federal and/or state mandatory connect and manage rules, including being curtailed before pre-emergency. BYONC is an option with locational requirement.
Large Load Registry	Yes	Yes
Long-term bilateral contracts between data centers and suppliers	Yes	Yes
Removal of Connect & Manage Load from the RPM/BRA	Excluded until generation and transmission are available	Yes
Transmission Cost Allocation to Large Loads of Transmission Upgrades	Yes	Yes
Curtailment of Data Centers before Residential Ratepayers	Yes	Yes
Other Capacity Market Reforms	Yes	Yes
Enhanced Market Power Monitoring and Mitigation	Yes	Yes

Conclusion

- Thank you again to PJM for initiating this process.
- The focusing should be on reliability and affordability for consumers.
- Properly framing the problem opens up additional Paths that address the root cause of resource inadequacy in PJM.

References

Jaffe, Adam B., and Frank A. Felder. "Should electricity markets have a capacity requirement? If so, how should it be priced? ." *The electricity journal* 9.10 (1996): 52-60.

Capacity is a positive externality; markets, particularly with high fix costs, frequently do not clear; if fairness is a consideration may exacerbate the problem.

Penney, Emmet, The Rise and Fall of the American Electrical Grid, American Affairs, August 20, 2022, <https://americanaffairsjournal.org/2022/08/the-rise-and-fall-of-the-american-electrical-grid/>.

"Perhaps they [utilities] could have adapted had demand not galloped so far ahead of their capacity. But at it was, the boom in electricity consumption wreaked havoc on the grid; shortages and unreliability came in bursts."

PJM, Powering Reliability Through Market Design: Addressing Rising Demand and Constrained Supply, Stimulating Investment To Support Durable Reliability, May 6, 2026, <https://www.pjm.com/-/media/DotCom/library/reports-notice/special-reports/2026/20260506-powering-reliability-through-market-design.pdf>.

Resources for the Future. "Behind the Energy Crisis." Resources, No. 36 (January 1, 1971). <https://www.resources.org/archives/behind-the-energy-crisis/>.

"Electric power is quantitatively a significant element within total energy, and its contribution to private comfort and industrial activity is indispensable. What caused the electric-power supply interruptions of the 1970 summer was not scarcity of fuel needed to generate electricity (that is a more recent problem), but, rather, a shortfall in generating capacity to meet peak demand."

Marilyn A Brown et al, High energy burden and low-income energy affordability: Conclusions from a literature review. Progress in Energy, 2 042003, <https://iopscience.iop.org/article/10.1088/2516-1083/abb954/pdf>

Literature review on energy affordability.

Robertson, M. (2022). Electricity Affordability 101. Washington, DC: Resources for the Future. <https://www.rff.org/publications/explainers/electricity-affordability-101/>.

Energy costs are regressive.