Reliability and Electricity Market Design

Powering Reliability Through Market Design Workshop
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Introduction

- PJM has produced an excellent paper on the "issue" of adequate capacity…I offer no criticisms, only potential additions.
  - The issue is not new – but the urgency is.
  - "For two decades, the PJM region managed its electricity system in an era of relative stability. The Reliability Pricing Model, PJM's capacity market, was built for that environment: a system with predictable, gradually changing load; a coal-to-gas fuel transition that could be managed over a years-long horizon; and a generation development timeline that aligned with the market's three-year forward horizon. In that environment, the market worked. It provided a transparent, competitive coordination and revenue-recovery mechanism through which the retirement of more than 50 GW of aging coal and other legacy generation, and the entry of new gas-fired and other resources, could be managed and priced.
  - Those conditions have fundamentally changed. The PJM region is now navigating a convergence of three structural. forces that have pushed the system into disequilibrium: an unprecedented surge in demand driven by the rapid. expansion of large-load data centers and broader economy-wide electrification; the accelerated retirement of dispatchable generation due to environmental policy and economics; and significant supply chain and permitting frictions that have extended the time required to bring new resources online. The result is a transition from an era of managing surplus to an era of managing scarcity – one that is anticipated to persist for some time based on current projections, because new generation simply cannot be built fast enough to offset the combined effect of retiring supply and surging demand."
- There are two "additions" that I believe are worth thinking about and including in the analysis and subsequent recommendations:
  - What is the problem…investment, not market design.
  - What is the end-state?

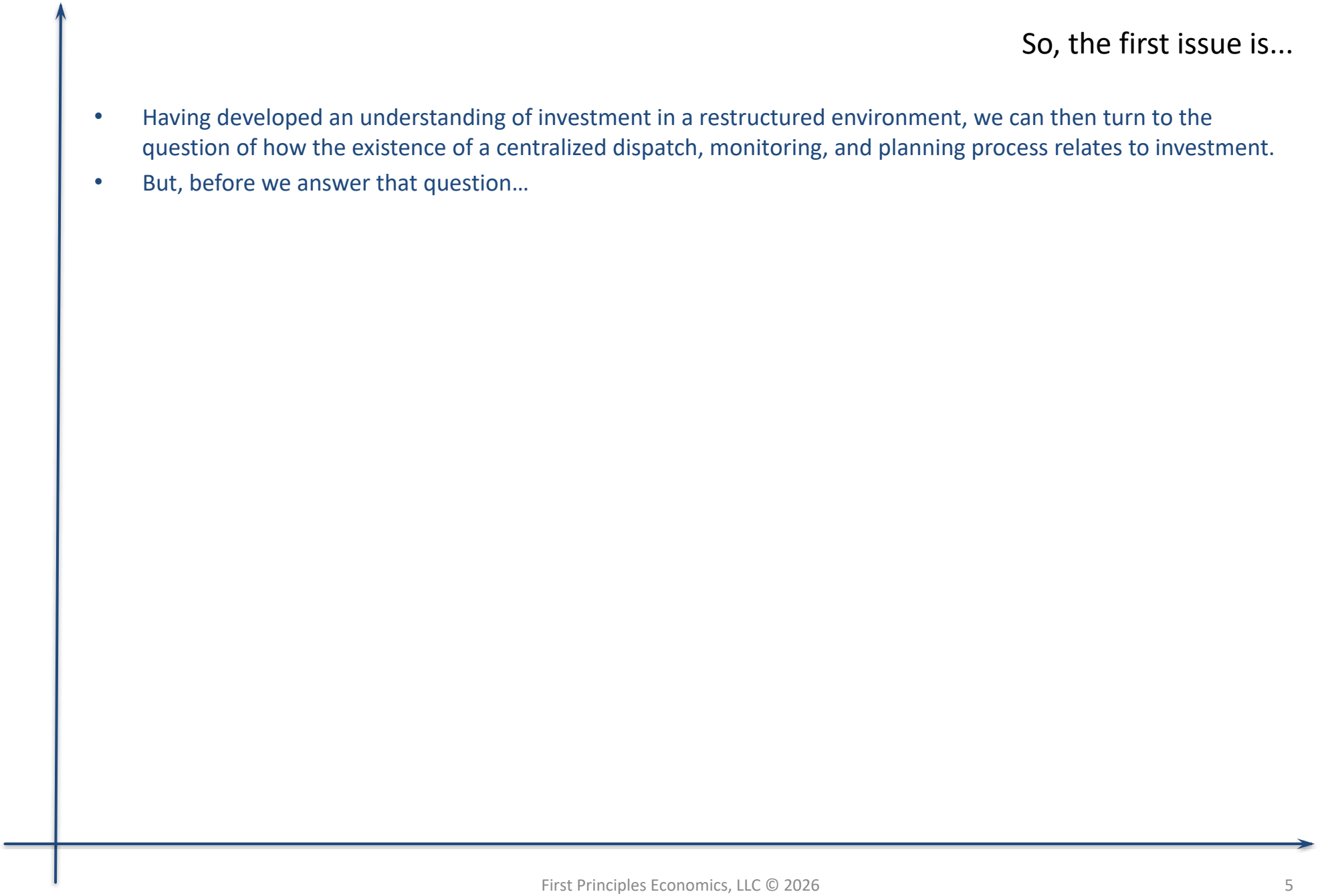
- I propose that the issue of adequate capacity is not — in the first instance – an electricity market issue. Rather it is an investment issue/problem.
  - **The fundamental question is, "why isn't the market engaging in adequate investment in capacity?**
- Reliable and efficient operation of the electrical system requires, among other things, adequate capacity at the right location.
- In many ways the restructuring of the electricity sector resulted in enhanced but marginal changes, i.e., dispatch, planning, etc. But in other ways it caused a fundamental structural change - especially in regard to investment.
  - There are two fundamental "problems:"
    - Electricity producers buy long but sell short.
    - The lack of a stable counterparty for reliability.
  - Regulation in all its forms (IOU, government ownership, etc) provided a solution for both of these problems.
    - In effect electricity providers through regulations were granted the taxing authority.
- For the most part, initial efforts to implement electricity restructuring here in the US but also elsewhere around the world focused almost exclusively on separating transmission from generation.
  - The "excess" capacity built into the system largely allowed the issue of capacity to be avoided.
- Electricity restructuring fundamentally changed the investment process.

Investment Before And After

- With respect to electricity capacity, the investment decision prior to restructuring was almost entirely a regulatory exercise.
  - Regulatory approval was required for any investment. Once approval was granted, cost recovery was guaranteed.
  - The “counterparty” for investment decisions was legally guaranteed through the creation of a franchise.
  - There were risks, but they were largely political.
- With restructuring, the franchise was eliminated and with it so too was the legal taxing authority and the automatic counterparty.
  - This forced the investment process in electricity capacity to change from being a regulatory/legal exercise between the regulator and the franchisee to an economic/commercial exercise untethered to any specific location, customer or jurisdiction.
- In this environment we need to view investment in electricity capacity from the perspective of economic/commercial investment.
  - Define and understand all of the various forms of commercial risk.
  - Define (create?) the relevant/appropriate counterparties.
  - Define and understand the motivation/incentives of potential counterparties.
  - Define and understand the various risks arising from different counterparties.
  - Define and understand the future price risk faced in the market.
  - Define and understand the risk of rule changes in the electricity market.
  - Define and understand the risks presented by future policy changes.
  - Other…
- The risks of investment in a restructured environment are fundamentally different.

So, the first issue is...

- Having developed an understanding of investment in a restructured environment, we can then turn to the question of how the existence of a centralized dispatch, monitoring, and planning process relates to investment.
- But, before we answer that question…



What is the End State?

- In general, it is best to have an idea of where you want to end up before starting the journey.
  - Doesn't have to be exact or even where you finally end up.
- The exercise of describing the end state necessarily forces thinking about and articulating the overarching objectives – what is that we want the electricity market to do, to achieve.
  - This exercise provides not only the end state but also gives us a set of metrics to evaluate proposals.
    - How does this specific recommendation or proposal relate to the end state? Does it move us closer or further away from the end site?
- For example does the end state relay on more centralized decision-making or less?
- Or, does the end state discriminate on the basis of economics or are all potential technologies treated the same?
- Recognize that a property right, especially when it involves creating a revenue stream, once given is nearly impossible to take away.
- Following – even roughly or approximately – an agreed upon path, is especially beneficial in an industry with very long-lived assets. That is, the electricity industry is especially sensitive to path dependency.

Some Final Thoughts

- I believe it is helpful to view the "problem" of achieving the desired level of capacity:
  - Through the lens of investment and not electricity market design.
  - Understand how the electricity relates to the investment process
    - Proposals should identify and explain how a given recommendation or set of recommendations is/are expected to mitigate unfavorable condition(s) in the investment process.
      - Stick to your knitting, i.e., don't try to solve problems that are outside of your scope, purview or ability to do so.
  - Develop an agreed upon vision for the end state, i.e., what do you want the market to look like in 5, 10, 20, or more years from now.
    - Evaluate each proposal according to whether or not it is (1) consistent with this long run view, and (2) whether or not it advances the market toward that goal.
- Some ideas:
  - Decentralized is preferred over centralized – in virtually ever aspect of the market, including the provision of reliability.
  - Reliability becomes more dynamic/probabilistic and less static/deterministic (VAR?).
  - Continue to streamline and speed up the process of building new capacity.
  - Others…