RPM Technical Conference

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PJM Long-Term Capacity Issues Symposium

An Equity Analyst's Perspective

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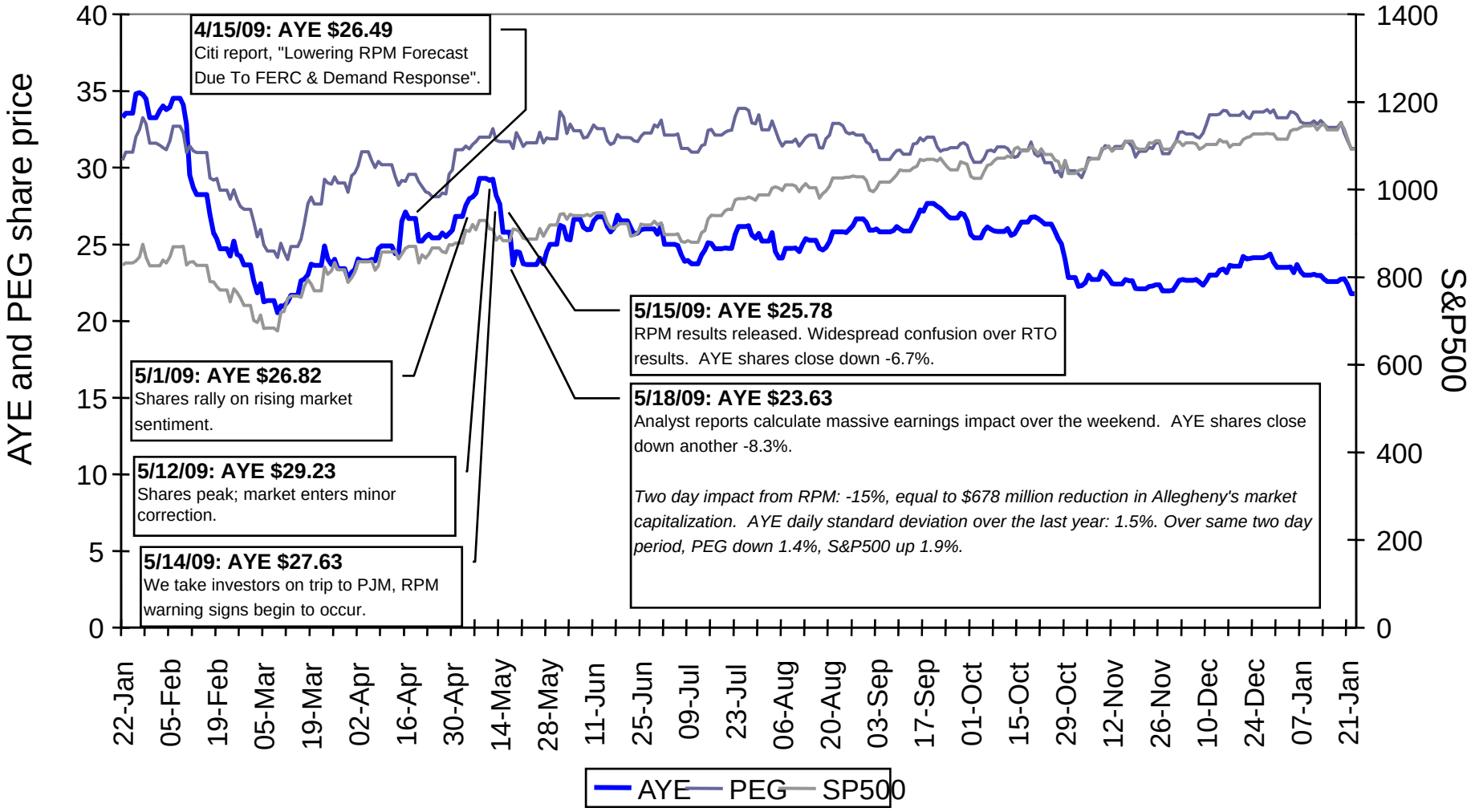
What Do Equity Investors Want From Capacity Markets?

- **I. How Equity Investors Currently View RPM**
  - The most recent experience: AYE share price during the 2009 BRA
  - Our observation: Investors can model demand, but have difficulty modeling supply
- **II. A Modeling Illustration: A Lookback At May 2009**
  - How we forecasted the last auction - shows the depth (shallowness?) of our understanding
  - What we got right and wrong
- **III. Suggestions To Improve Transparency**

I. How Equity Investors Currently View RPM

Capacity Market Roils AYE Investors In May 2009



I. How Equity Investors Currently View RPM

- What most utility equity investors understand
  - Capacity has value separate from energy production
  - The value of capacity increases with scarcity or resources
  - There is an auction that determines the price, three years in advance
  - Generation competes with non-traditional resources in the auction
  - There are multiple auctions for different parts of PJM
  - PJM East is tighter than PJM West

- What some utility equity investors understand
  - There is an administratively determined demand curve
  - Cost of New Entry somehow affects the demand curve
  - "Constraints" determine which regions are eligible for auctions

I. How Equity Investors Currently View RPM

- What few utility equity investors understand
  - How bids are assembled into supply curves
  - How demand response & generation are treated differently/same
  - Bidding rules for new entrants

- What NO utility equity investors seem to understand
  - Why did the price in RTO fluctuate so much?
  - Why does every auction seem to have a different number of sub auctions?
  - If RPM and BGS/procurement auctions are different structures, why do the results seem to correlate?
  - Just how much demand response is out there?
  - What is mitigation and how does it affect the price?

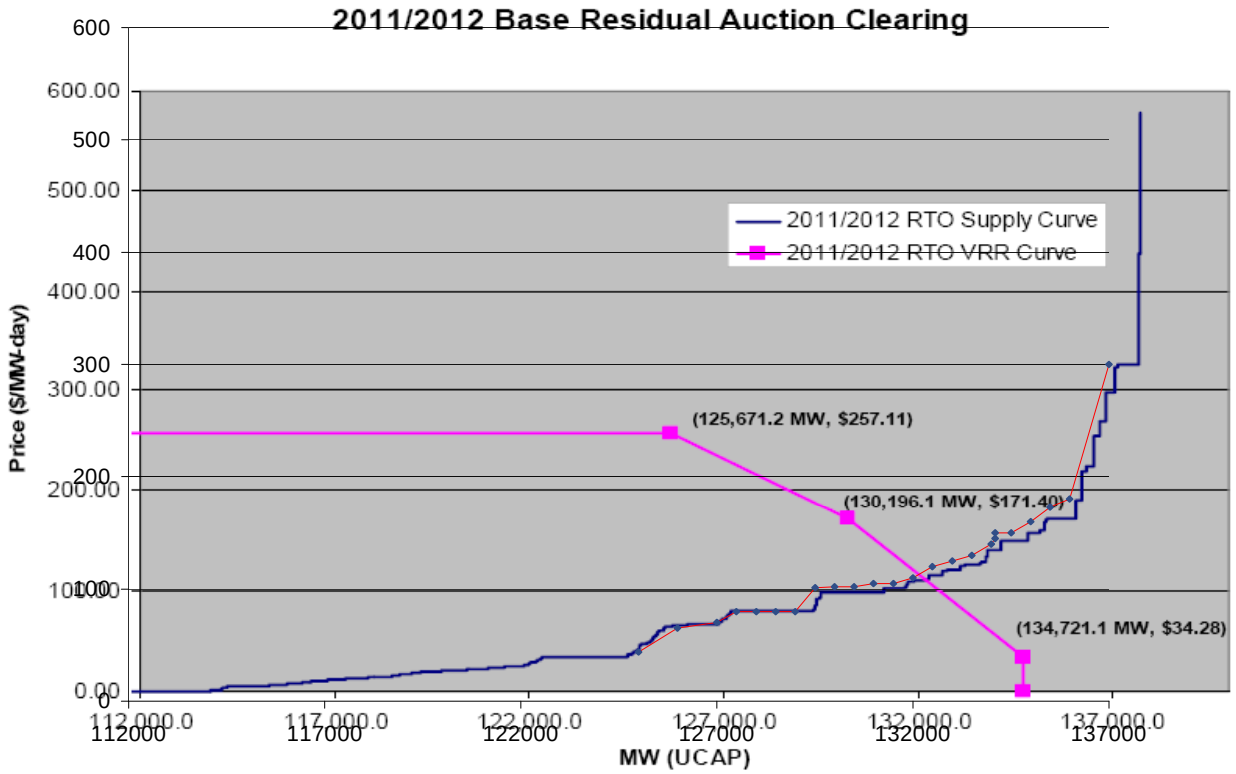
I. How Equity Investors Currently View RPM

- Investors understand the concept of RPM
- They partially understand how the "demand" piece of the auction is structured
- They have very little understanding of how the "supply" piece of the auction is structured
- Prior auction results are difficult to explain, so forecasting is viewed as extremely hazardous
- There is no understanding of how RPM fits/correlates with other market structures (BGS, procurement auctions, etc.

End result: Investors "assume" the most recent auction results into perpetuity for valuation and investment analysis

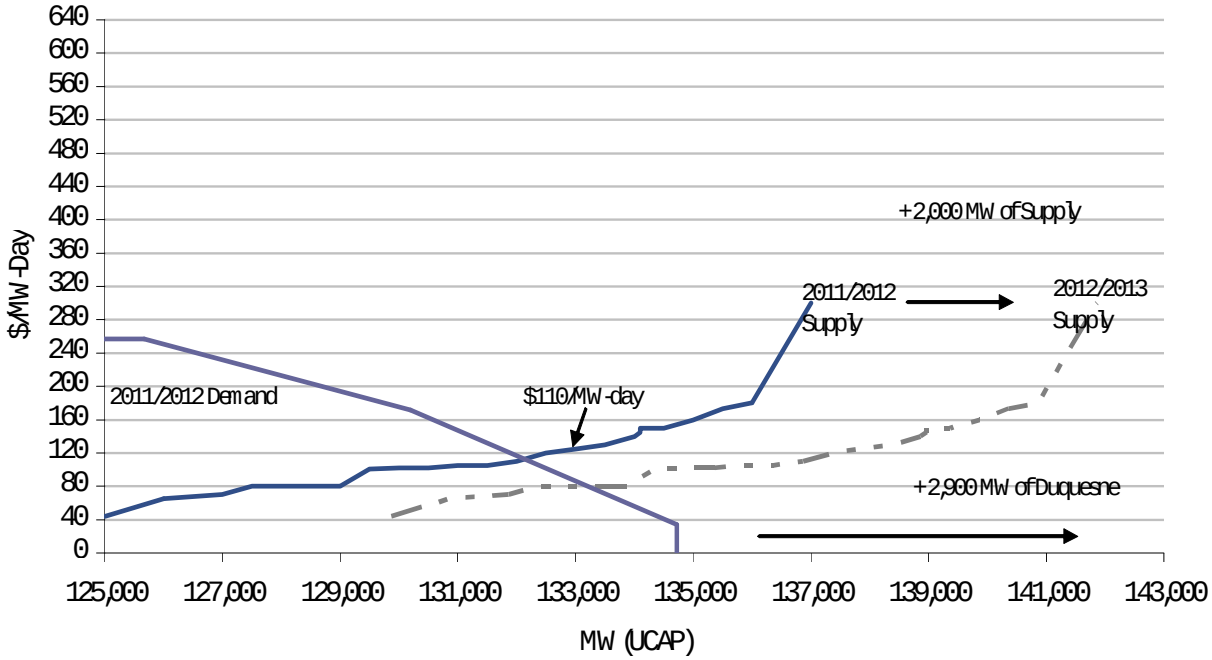
II. A Modeling Illustration

- **Case Study: How We Attempted To Forecast The Last Base Residual Auction & What We Missed**
  - **Step 1: Start by replicating last year's supply curve**
    - **Without a prior supply curve, we have little forecasting ability for a region**



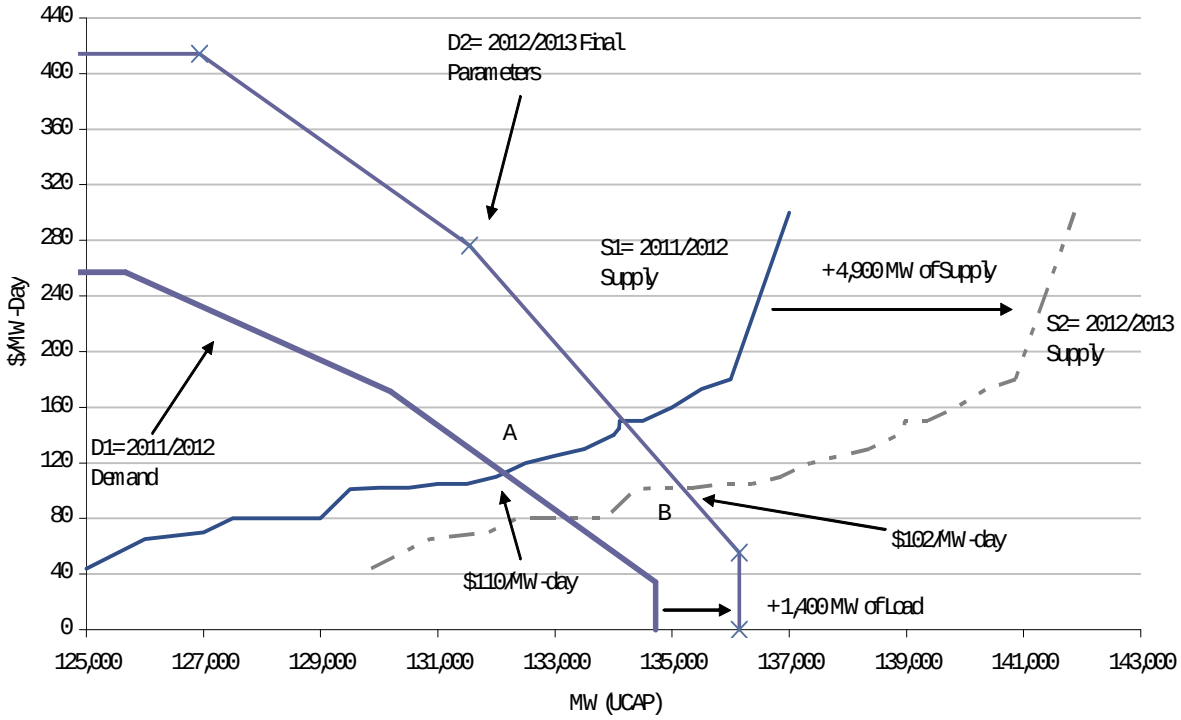
II. A Modeling Illustration

- **Case Study: How We Attempted To Forecast The Last Base Residual Auction & What We Missed**
  - **Step 2: Make adjustments to supply for 1 extra year. Things we were debating:**
    - **Plant additions and retirements (pitfalls of oversimplification)**
    - **Duquesne impact**
    - **Brattle Group report & demand response impact**



II. A Modeling Illustration

- **Case Study: How We Attempted To Forecast The Last Base Residual Auction & What We Missed**
  - **Step 3: Overlay demand curve parameters. Things we were debating:**
    - **CONE Adjustment**



"A lower capacity price, potentially even a double digit, sub-$100 price, could serve as a headline shock…"

"We expect some portion of the 3,600 megawatts from the now-eliminated ILR provision will now likely bid into the next base residual auction."

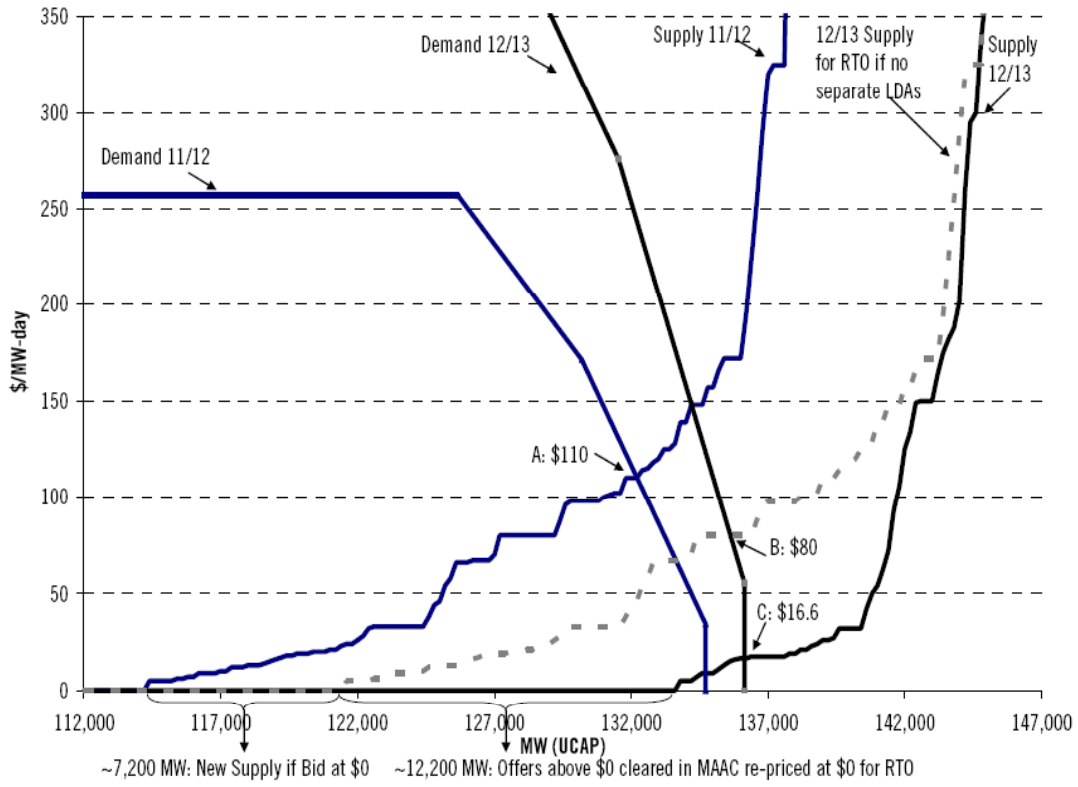
"Our Estimate Is Down To $100/MW-Day from $120/MW-Day"

– Citi Research, 4/15/09

Consensus estimate was $120/MW-day

II. A Modeling Illustration

- **Case Study: How We Attempted To Forecast The Last Base Residual Auction & What We Missed**
  - **Comparing Our Estimate Versus Actual Results**



What We Missed

- The magnitude of demand response growth and influx from ILR removal
- PJM's optimization program affected the *convexity/concavity* of the supply curve
- The effect of multiple LDA auctions on the RTO curve

Where The Street Is At For May 2010

- Waiting for parameters on 2/1/10
- FirstEnergy entry (margin effect and net supply/demand are question marks)
- Largely assume flat year over year prices in PJM East, slightly higher prices in RTO due to DR bidding rule changes
- *We are concerned about DR growth; we are worried about a fall in PJM East prices*

II. A Modeling Illustration

- **Case Study: How We Attempted To Forecast The Last Base Residual Auction & What We Missed**
  - **Any explanations that do not affect how to model supply and demand curve intersections are meaningless.**
  - **Takeaways: The key weakness in our analysis is how we model *supply*. Examples:**
    - We know that there are new rules allowing more flexibility to new entrants. But we do not know how new entrants affected the shapes of prior curves. So, knowing about the new rules is not helpful.
    - We know FirstEnergy's addition carries a net demand for capacity. But we do not know how to estimate what FirstEnergy's plant mix will do to the shape of the RTO supply curve. If we knew the prices that various plant types have bid at in the past, we might be able to use this to estimate the shape of supply in First Energy's ATSI grid.
    - We know demand response now has more flexible bid rules. But we do not know where demand response showed up on prior supply curves, except at a very aggregate (and superficial) level.
    - We know PJM's optimization program and the Market Monitor's mitigation process "spits out" the supply curves. But this process is a black box that hinders the market's transparency.

III. Suggestions To Improve Transparency

- **Our "Wish List" consists of:**
  - **A supply curve graph/table that shows, by bid, the fuel type of plant/type of resource, bid price, auctions for which that bid qualified, and age of unit**
  - **A better understanding of how the auction structure (not the bids themselves) can affect the convexity/concavity of the supply curves**
  - **If rule changes are made, then it would be helpful to illustrate just how those rule changes *would have affected the last auction's results, with illustrated supply and demand curves***
  - **A better balance between the need for bid confidentiality and transparency**