Evaluation of the New York ISO Capacity Market: Summary of Draft Report

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Today's Topics

- Evaluation of Selected Features of Current New York ISO Capacity Market Design
- Evaluation of the Impact of Differences in Capacity Market Design across New York, ISO New England, and PJM on the Portability of Capacity
- Evaluation of the Desirability of Implementing a Forward Capacity Market in New York

Overview

Evaluation of selected features of current New York ISO capacity market design

- Methodology for Anchoring Demand Curves
- Adjustment for Net Energy Revenues
- Buyer-Side Market Power Mitigation
- Demand Curve Slope
- Methodology for Creating New Zones

Methodology used to Anchor Demand Curves

The methodology used to define the cost of new entry (CONE) for the purpose of anchoring the demand curve can at best provide a rough approximation of the capacity price at which new supply would be offered.

- The assumptions used to develop the capacity price, while plausible, are not based on actual market assessments of these costs.
- The generalized CONE calculation applies a simplified model that cannot reflect the heterogeneous nature of different capacity resources.
- The type of unit that would provide capacity at the lowest net cost is not a given, even in Zones J and K; it depends on expected gas prices and the shape of the energy market supply curve given the existing stock of generation.

Methodology used to Anchor Demand Curves

- Most new units that have come on line since 2005 east of Central East have been combined cycles. This outcome in part reflects the level of gas prices at the time commitments were made to construct this generation, and the current low gas prices may shift construction back to gas turbines.

- The key consideration with respect to the value of CONE used to anchor the demand curve is to recognize that it may be either higher or lower than the actual cost of new capacity.

- Hence, the capacity market design should permit competition to drive capacity prices to the efficient level, even when estimated CONE is not accurate.

Methodology used to Anchor Demand Curves

Recommendations:

- Either a combined cycle or a combustion turbine may be the least cost source of incremental capacity in future New York capacity market auctions.
- If a combined cycle is used to set CONE, it will be important to more accurately estimate prospective energy margins and to account for the scale impact of entry.
- The cost of providing incremental demand response would not provide a workable basis for setting net CONE:
  - Demand response is inherently consumer specific; there is no generic cost of forgoing power consumption that can be benchmarked.
  - Demand response reduces the amount of generation need to meet firm load, it cannot be used to meet firm load.

Adjustment for Net Energy Revenues

Projecting expected future net energy and ancillary service revenues is difficult and all approaches have limitations.

- In calibrating any method against actual prices it is important to focus on comparing actual and projected prices during the hours in which actual or projected prices would produce net revenues for the hypothetical unit used to set CONE.
- Comparisons assessing goodness of fit based on the logarithm of actual and projected prices can mask large errors in predicted prices in the hours that matter for net energy revenues.
- While data for all hours can be used to estimate the model, assessment of whether the model provides a reasonable projection of prices for use in predicting net energy revenues, needs to be based on how well the model predicts prices in the high priced hours.

Assessment of Adjustment for Net Energy Revenues Cont.

- The specification used for the simulation or statistical analysis should be tested to make sure it will produce sensible results if historical values are replaced with projected future values. Projecting outcomes that are outside the range of the data used to estimate a statistical model or calibrate a simulation model, can result in predictions that are much less accurate than suggested by conventional goodness of fit measures.
- It is difficult to assess the accuracy of the methodologies that have been used to project net energy revenues in recent years, because part of the difference between the projected net revenues and estimated current net revenues, is a result of changes in power demand and capital costs following the financial crisis, and the tariff requirement that these revenues be calculated for the target level of capacity.

Assessment of Adjustment for Net Energy Revenues

- If the estimated levelized net CONE is used to set offer floors for buyer-side market power mitigation, estimates of the energy and ancillary service margin reflecting the long-run expected value of these revenues are preferable to a forecast limited to the three years of the demand curve reset.

Assessment of Adjustment for Net Energy Revenues

Recommendations:

- Place greater reliance on energy market and ancillary service revenues to support needed capacity resources and capabilities by reflecting system requirements in energy and ancillary service markets and setting shortage prices at appropriate values.
- Examples would be:
  - NYCA 30 minute reserve shortage values verses demand response activation costs
  - South of UPNY-SENY Transmission Security requirements

Tests for Application of Buyer-Side Mitigation

Application of buyer-side mitigation in a manner that deters or prevents the exercise of buyer market power in the capacity market is complicated by a number of considerations:

- The estimated value of net CONE used to anchor the demand curve does not necessarily provide an accurate measure of the competitive cost of new capacity;
- The lumpiness of new capacity investment, and the large size of an efficiently-sized unit relative to the market in Zone J, particularly a combined cycle unit, means that even efficient entry may materially depress capacity prices around the time of entry.

Tests for Application of Buyer-Side Mitigation Cont.

- Changes in expected market conditions between the time a project's construction is determined and the time it is first offered in a capacity market auction can make a project's development look uneconomic in hind sight.
- By the time a new resource is first offered in a capacity market auction, the bulk of its costs are sunk and the competitive offer price will be very low.
- It is difficult to determine a set of rules that can be applied to generating units with potentially very different costs and capacities.

Tests for Application of Buyer-Side Mitigation

The New York ISO's buyer-side mitigation design attempts to reasonably account for these considerations, but will inherently do so imperfectly.

- Test A to determine the application of buyer-side mitigation appropriately recognizes that the entry of lumpy new resources will depress capacity market prices, and compares forecasts of the post-entry price to 75% of Mitigation net CONE (75% of net CONE), also called Default Net CONE), rather than to 100% of Mitigation net CONE.
- The decision about whether or not to mitigate offers from new supply is based on estimates of post-entry prices made at the time of the investment decision, not based on capacity prices after entry has occurred.

Tests for Application of Buyer-Side Mitigation

- Differences between Test A and Test B potentially accommodate differing cost characteristics of different generating technologies.
  - Larger units are less likely than small units to pass the tests. A new supplier also will be most likely to pass the tests if the its unit net CONE is significantly less than Mitigation net CONE, demand is growing, and/or the level of capacity in the market is close to the target level.
  - Test B, which is based on all three years of the mitigation study period, rather than only the first year used for Test A, might be passed by a unit that expects to clear in the market, on average, over this longer time period and that might have a unit net CONE less than Default net CONE, either because of lower unit costs or the expectation of higher energy and ancillary services revenues given its specific location and characteristics.

Tests for Application of Buyer-Side Mitigation

- The Clearing Rule to determine when new suppliers will be exempt from mitigation takes into account changes in capacity market conditions relative to the time at which the investment was made. The rule ~~test~~ exempts new supply from mitigation as it clears in the capacity market when offered at the offer floor, without imposing a specified minimum or maximum period of mitigation.
- The Clearing Rule to determine when new mitigated suppliers will be exempt from the offer takes into account the impact of lumpy investment decisions on capacity market prices by allowing the new capacity to become exempt from mitigation over time, megawatt by megawatt, as more megawatts clear in the capacity market for the specified number of months.

Tests for Application of Buyer-Side Mitigation

The New York ISO's buyer-side mitigation design has elements that are inherently imperfect because CONE can at best provide a rough approximation of the capacity price at which new supply would be offered.

- Inherently imperfect assumptions will inevitably at times overstate (or understate) both Mitigated net CONE and net CONE for particular new units. This will tend to deter efficient entry and inflate capacity prices (or permit the exercise of buyer side market power through inefficient entry and depressed capacity prices).

Tests for Application of Buyer-Side Mitigation

Recommendations:

- Consider implementation of an Alternative Price Rule (APR) that would allow new resources to clear in the market, but not allow entry identified as uneconomic, or supported by uneconomic contracts to impact the clearing price paid to existing resources.
- Exempt resources not associated with or under contract to any entity possessing buyer-side market power from the application of buyer-side offer price mitigation.

Demand Curve Slope

The slope of the demand curve should reflect the reliability value of incremental capacity committed to serve NYCA load through the capacity market.

- Such an approach provides elasticity to the demand curve reflecting the value of capacity while avoiding large inefficiencies when the cost of new entry used to anchor the demand curve is over or understated.
- Based on an analysis we carried out jointly with the New York ISO, the current New York ISO demand curves are generally consistent with this criterion, particularly for capacity in excess of the target.
- The demand curves for Zone K and NYCA appear to be slightly steeper than warranted by the reliability value of incremental generating capacity in excess of the target, while the demand curve for Zone J appears to be slightly too flat.
- All three demand curves are too flat for shortfalls in capacity relative to the target.

Demand Curve Slope

Recommendations:

- The slope of the demand curves in the range of capacity shortfalls relative to the target level ought to be better aligned with the reliability value of incremental capacity.
- If the criterion of a reliability value based demand curve is adopted, the New York ISO and its stakeholders should consider ways to define the lower bound of the local demand curves in a manner that is more consistent with the way the local capacity requirement is calculated, i.e. shifting capacity between regions while holding total NYCA capacity constant.

Methodology for Creating New Capacity Zones

The New York ISO's proposed process for defining new capacity zones will operate to support efficiency and reliability if the New York ISO is forward looking in defining zones that could bind, and letting the capacity market auctions determine whether the zonal constraints do bind.

- The introduction of a new zone or zones is needed from the standpoint of both economic efficiency and reliability;
- The introduction of a new zone is needed to support efficient entry and exit in western New York; to avoid the need to rely on non-market mechanisms to prevent the shut-down of capacity in the lower Hudson Valley that is needed to maintain reliability; and to reduce the potential for inefficient substitution of high cost Zone J capacity for lower cost Hudson Valley capacity through the operation of the local capacity requirement.

Methodology for Creating New Capacity Zones

Recommendations

- The evaluation of the need for additional capacity market zones should be forward looking, identifying new zones prior to the time they are needed;
- The evaluation of the new zones should take account of all existing generation and all generation within the interconnection queue that would come online within the forward looking time frame and seeks to participate in the capacity market;
- The capacity market should be used for the objective of supporting the target level of capacity by replacing the "missing money" arising from the failure to appropriately price reserve shortage conditions, not to procure capacity with the particular characteristics needed to meet narrow reliability requirements (such as regulating capability or ramping capability).

Methodology for Creating New Capacity Zones Cont.

- The process of implementing of one or more new capacity zones should include a careful consideration of the process that will be used in the MARS model to define local capacity requirements for the new zones, in combination with Zones J and K, to reduce the potential for anomalous outcomes from the entry or exit of capacity in the Lower Hudson Valley.
- The process of implementing one or more new local capacity zones should include a consideration of the relationship between the way the MARS model determines local capacity requirements, holding NYCA capacity constant, and the way the lower bound of the local demand curves are defined.

Evaluation of Differences in Capacity Market Design

The New York ISO's monthly current year capacity market auction design allows capacity suppliers to shift capacity between New York and PJM and between ISO New England and New York despite the differing capability year definitions.

- This portability would be more difficult to sustain if the New York ISO were to shift to a forward capacity procurement auction design, which might entail establishing an annual capacity obligation.

Evaluation of Differences in Capacity Market Design

While differences in capacity year definitions do not impede shifting capacity between New York and PJM or New England, or vice versa, the difference between the forward capacity procurement in PJM and New England and current year procurement in New York can delay adjustments to unexpected conditions.

- Capacity exports from New York in response to unexpectedly low prices in New York will be delayed by the forward procurement designs in PJM and New England.
- Capacity imports into New York or reductions in exports in response to higher than expected capacity prices in New York will also be delayed by the forward procurement designs in PJM and New England.
- Seller market power mitigation mechanisms in adjacent capacity market regions can make it difficult to sell new capacity into New York.

Evaluation of Differences in Capacity Market Design

The New York ISO's capacity market currently does not explicitly model the impact of energy efficiency investments in the capacity market, while the forward capacity markets of PJM and ISO New England do.

We do not recommend any change to the New York ISO design relating to energy efficiency:

- Reductions in peak load attributable to energy efficiency are reflected in the capacity market peak load once the impact is demonstrated;
- Grossing up the New York ISO load forecast to account for the impact of past energy efficiency investments would not be complex for the New York ISO, but similar adjustments would need to be made throughout the entire process of allocating capacity costs to consumers, for no apparent benefit.

Evaluation of a Forward Capacity Market

A forward capacity procurement process would:

- Provide greater visibility to the expected cost of keeping existing generation in a time frame in which replacement generation or transmission upgrades could more readily come on line.
- Tend to somewhat stabilize capacity prices, by reducing the impact of short-run demand shocks, thereby shifting risk from suppliers to power consumers and correspondingly somewhat reducing the equilibrium level of capacity prices.
- Have a potential for the planning process used to determine capacity targets under a forward procurement process to systematically increase the amount of capacity procured relative to current process. This outcome could perhaps be avoided through an appropriately structured planning process for developing these forward capacity targets, but is a risk.

Evaluation of a Forward Capacity Market

- Lead to a longer time period between the point in time at which the capacity price is fixed and remaining business costs are incurred, which would increase the regulatory risk associated with unfavorable changes in costs which might somewhat raise the equilibrium capacity price.
- Potentially require shifting to measuring capacity on an annual basis, reducing flexibility provided to demand response and other suppliers by the current capability period monthly design.

Evaluation of a Forward Capacity Market

A forward capacity procurement process would not:

- Reduce the uncertainty regarding the timing or implementation of federal regulations impacting staying in business costs;
- Change the current practice of contracting for generating capacity at most six months at a time to more than at most one year at a time.

Evaluation of a Forward Capacity Market

Recommendation:

There are no compelling benefits to implementing a forward capacity market at this time.

- A planning based forward procurement has the potential to systematically increase the amount of capacity procured relative to the current design, increasing the cost of power out of proportion to the increase in reliability.
  - Forecasting errors will also create arbitrage opportunities that will need to be managed by the New York ISO.
  - Managing these arbitrage opportunities will likely raise the cost the NYISO incurs to administer its capacity markets.
- A forward procurement would need to be more complex, and expensive, to implement than those of PJM and ISO New England in order to maintain the ability of resources to participate in the New York ISO capacity market on a seasonal basis.

Evaluation of a Forward Capacity Market Cont.

- Implementation would take too long for the change to be useful in addressing near term uncertainties related to shut down of coal fired generation;
- An underlying issue is whether there is inadequate forward hedging by load serving entities in the capacity market that requires the New York ISO to procure capacity forward on their behalf.
  - Whether this is a problem and how it should be addressed should be explicitly considered before the New York ISO incurs the costs to implement a forward capacity market.
  - Unlike PJM and ISO New England, the New York ISO is a single state ISO and problems that arise from the design of the retail access program do not have to be addressed by the New York ISO if that is not the best approach.

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