ISO New England PI Capacity Market Proposal

Scott Harvey
Member: California Market Surveillance Committee
Folsom, California
March 11, 2014

TOPICS

ISO New England PI Capacity Market Design

- Overview
- Problems
- Day-Ahead Markets
- Flexible Generation
- Market Power Mitigation
- Energy Market Design Changes

A Road Not Taken

- Capacity Market Design
- Energy Market Design

OVERVIEW

The ISO New England PI capacity market proposal seeks to improve the performance of capacity market resources in the ISO New England energy market by trying in some respects to replicate the marginal incentives provided by an energy only market in which resources that are not available in real-time during shortage conditions lose or forgo earning the real-time price.

- The design seeks to achieve this by at the margin shifting capacity payments from capacity market suppliers whose resources have a lower than average availability to those with a higher than average availability during real-time reserve shortage conditions.
- By paying or charging $5455 at the margin per megawatt of incremental capacity that is available or unavailable during shortage conditions, it creates very strong incentives for capacity to be on line and available during these conditions.

OVERVIEW

Some elements of this design are problematic:

- The PI design does not address the fundamental problems in the ISO New England energy market that cause generation needed to meet real-time load to not be available.
- It creates a dual pricing system in real-time that will at times lead to inefficient incentives.
- It effectively shifts the recovery of some energy market costs into the capacity market.
- It systematically shifts capacity market payments from flexible cycling capacity to inflexible base load capacity.
- It will make it near impossible to apply any kind of rational seller market power mitigation policy in capacity market auctions.

CORE PROBLEMS:

1. The PI design only attempts to replicate the incentives of an energy only market for suppliers, not for load serving entities. An important element of an energy only market design are the incentives provided to power buyers, which support the incentives provided to suppliers.
2. The dual set of real-time prices the PI design creates for suppliers would create inefficient incentives when the two pricing systems conflict;
3. The PI design does not send appropriate incentives for non-capacity resources scheduling output in the day-ahead market, such as import supply.

CORE PROBLEMS

4. The design in which even small reserve shortages produce incremental capacity market incentive prices of $5455 a megawatt is not consistent with the incentives provided by an energy only market, and would incent capacity market resources to incur substantial costs that have little reliability value.
5. The first four problems with of the PI design would combine to cause flexible resources participating in the capacity market to incur additional energy market costs and a reduced share of capacity market payments which would be reflected in their capacity market offer prices.
6. The combination of continued under bidding by load serving entities in the day-ahead market and the performance incentives for flexible resources created by the PI design has the potential to create chaos in gas markets.

CORE PROBLEMS

7. The capacity market incentive prices of the PI design will incent performance by capacity market demand response resources (even in response to tiny resources shortages) but will not provide any incentive for power conservation by consumers not participating in the capacity market.
8. Performance incentive costs incurred during the winter months would potentially inflate the cost of capacity needed to meet the summer peak but not needed to meet the winter peak.
9. The shifting of energy market costs in the capacity market and capacity market revenues between flexible and inflexible capacity will make the rational application of seller market power mitigation impossible.

CORE PROBLEMS

Three other incentive problems that are not as daunting are:

10. The dual pricing system would undermine the value of virtual demand bids in hedging outage risk and further reduce the value of the day-ahead market.
11. The capacity market incentives based on average shares of on line capacity has the potential to produce anomalous outcomes in which a supplier with base load capacity earns profits when its failure to cover its day-ahead schedules produce a reserve shortage.
12. The capacity market incentive structure during shortages of 10 minute reserves appears to penalize suppliers for ISO New England operator decisions for converting 30 minute reserves to 10 minute reserves.

CORE PROBLEMS

The design has many other significant elements that are not discussed in this overview:

- Monthly and annual stop loss rules;
- Collateral rules to cover losses of poorly performing resources;
- Minor changes in the pivotal supplier test for seller market power;
- Capacity performance bilaterals;
- Rules for allocation of surpluses or shortfalls in capacity incentive payments;
- Phase in rules

DAY-AHEAD MARKET

A fundamental performance problem in the ISO New England day-ahead market during cold weather events going back to the winter of 2004 has been underbidding by load serving entities.[1]

- The underbidding causes gas fired generation needed to meet load to not clear in the day-ahead market.
- These resources have no day-ahead market schedule to guide their day-ahead gas scheduling nor any compensation to cover the cost of scheduling gas that might not be burned.
- When these resources are committed in ISO New England's reserve adequacy assessment, they only know they will be compensated for buying gas to operate at minimum load.

[1] See Market Monitoring Unit, ISO New England Inc, "Final Report on Electricity Supply Conditions in New England during the January 14-16, 2004 'Cold Snap'," October 12, 2004 pp, 115-117, Tables 33, 34 and Figure 21; Vamsi Chadalavada, ISO New England, "NEPOOL Participants Committee Report," February 2011 pp. 6-8; and Vamsi Chadalavada, ISO New England, "NEPOOL Participants Committee Report," February 2013 p, 14

DAY-AHEAD MARKET

The ISO New England PI design provides no added incentives for load serving entities to schedule their load in the day-ahead market.

- The ISO New England PI design also provides no additional mechanism to guide the gas scheduling decisions of generation not scheduled in the day-ahead market.
- The PI design simply presumes that suppliers will somehow divine how much gas to schedule despite not being scheduled in the day-ahead market.
- There is no way for individual generators to guess the extent to which they will be needed to operate in excess of their day-ahead schedule. This depends on factors known to ISO New England but not to them, and on the fuel procurement guesses of other individual generators.

DAY-AHEAD MARKET

The apparent premise of the ISO New England PI design is that all generators should be prepared to operate at full load all the time and all demand response resources should be prepared to curtail at all times, but this premise makes no sense from the standpoint of the economics of power grid, environmental emissions or the efficiency of the gas market.

- Additional self-commitment of generation not scheduled in the day-ahead market will occasionally avoid reserves shortages due to underbidding, outages, load forecast error or other factors but it is an extremely inefficient way to achieve this goal relative to using the day-ahead market to guide these decisions.

DAY-AHEAD MARKET

- Gas fired generators making individual decisions to schedule gas to cover undefined operation in excess of their day-ahead market schedules will crowd other non-core gas customers out of the gas market on cold winter days, then fail to burn the gas when their output is not needed in real-time.
- The incentives created by the PI design will likely depress real-time prices through self-scheduling outside the day-ahead market, contribute to additional under scheduling in the day-ahead market, and further aggravate the problems of generators lacking day-ahead market schedules to guide their fuel procurement and staffing decisions.

IMPACT ON FLEXIBLE GENERATION

While the ISO New England PI design would reward flexible generation that comes on line during a reserve shortage, the bulk of the incentive payments would flow to inflexible base load generation that was on-line because it was scheduled in the day-ahead market.

- The bulk of the incentive payments would be made by flexible generation that was not on line because it was not scheduled in the day-ahead market.
- On average the PI design would shift capacity market payments from flexible generation to inflexible generation and require flexible generation to incur higher energy market costs (coming on line without a day-ahead market schedule when they guess they might be needed, scheduling gas in excess of their day-ahead market schedule, etc).

IMPACT ON FLEXIBLE GENERATION

Overall, the PI design would reduce the net payments to flexible resources and raise their energy market costs, leading to higher offer prices by flexible resources in the capacity market.

- Higher clearing prices in the capacity market would be required to elicit supply of flexible resources.
- Higher capacity market prices would benefit the inflexible base load units who benefit from the design not because they help avoid reserve shortages but because they are disproportionately on line simply because they are scheduled in the day-ahead market.

MARKET POWER MITIGATION

The PI design for market power mitigation does not appear to take account of the higher energy market costs and reduced energy market margins that flexible capacity resources would incur in order to reduce capacity market penalties.

- If ISO New England does not allow flexible resources to recover the excess energy market costs associated with the capacity market design in the capacity market through higher offer prices, new flexible capacity would not enter and existing flexible capacity would exit.
- This problem would not be easy to fix because it is not apparent that there is any good way for the market monitor to estimate these effects, particularly since they are likely to be resource specific.

ENERGY MARKET CHANGES

ISO New England has made changes in their energy market design that will help correct past problems:

- Timing of day-ahead market has been moved up to better enable resources scheduled in the day-ahead market to buy and schedule gas (ER13-895-000). Resources committed in reserve adequacy assessment will receive notification before, rather than long after, the last cycle for scheduling gas for the morning hours.
- Resources will be able to offer different prices from hour to hour and adjust them during the operating day (ER13-1877-000).
- Raise reserve shortage prices for 30 minute reserves (ER12-1314-000).
- Allow resources to change fuels without prior approval by market monitoring (ER13-1851-000).

A ROAD NOT TAKEN

Another way to address problems with the ISO New England market would be to focus capacity market incentives around the day-ahead market.

- Base capacity market payments on the proportion of capacity that is offered in the day-ahead market on critical days identified by the ISO and on availability in real-time if scheduled in the day-ahead market on these days.
- Define capacity obligation on a monthly basis so that resources would not have to offer capacity in months in which they could not perform on critical days.
- Set capacity market requirement based on seasonal capacity needs, taking account of planned and forced outage rates on critical days.

A ROAD NOT TAKEN

Additional changes in the energy market could have been made to strengthen the day-ahead market and address other issues:

- Increase shortage prices for high levels of reserve shortages to deter scheduling of import supply that cannot flow in real-time and discourage under bidding by load serving entities.
- Calculate reference prices for day-ahead offer price mitigation based on resource supplied fuel cost, subject to after the fact verification (no lag gas prices used for mitigation).
- Adjust real-time market power mitigation to allow energy limited resources, including those with limited oil stocks, to adjust their offer prices during the operating day to maintain their availability.
- Allow cost based offer prices to exceed the $1000 per megawatt hour offer price cap.

Scott Harvey scott.harvey@fticonsulting.com 617-747-1864