

PJM's VRR Curve Analysis: Model vs. Reality

The model used by PJM's expert to evaluate various VRR curves, and to justify the RPM model itself, is only useful to the extent that it reflects the actual market conditions and incentives faced by potential investors in new capacity in PJM. The Coalition of Consumers for Reliability (CCR) concludes that it reflects these realities poorly. Below is a summary of some of our concerns with this model; these and other concerns must be fully addressed before this model serves as the basis for PJM's locational capacity market:

1. The model addresses only cash flow aspects of generation investment decisions, ignoring significant non-financial obstacles such as transmission access, available sites, fuel lines, and capital

In reality it is structural concerns, at least as much as forecasted cash flows, that will determine where and when needed generation is built.

2. The model evaluates each potential capacity investment without consideration of any other assets the investor may own in the market, as if potential investors were never market participants

In reality, generation owners will seek to maximize the value of their portfolio of assets, including existing base load generation, and would often stand to benefit more from shortage than from capacity investments.

3. The model addresses only PJM as a whole, not LDAs, and thus can rely only on generation solutions

In reality, transmission solutions are often the most economical approach to resolving local reliability concerns, at a fraction of the cost of the capacity payments under RPM.

4. The underlying mathematics of the model are inconsistent with the description in the affidavit of Professor Benjamin Hobbs, and are not a realistic representation of market economics. In particular, the calculation of energy revenues for a hypothetical peaker is based solely on hours when the price hits the price cap as predicted according to a simplified formula embedded in the model

In reality, prices in PJM exceeded the model's "peaker cost" of \$79 about 25% of the time in 2005, but just about never reached the price cap. Thus the model is unlikely to accurately predict generator revenues.

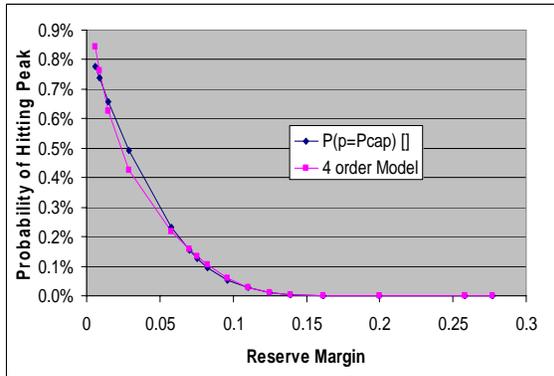
- In the model, the probability of hitting the price cap is a smooth, exponential function of the reserve margin, with the specifics of the function derived from another model which has not been made available for review. This function is used both for calculations within the model (determining new entry) and for calculating results (energy revenues, costs to consumers)

In reality, energy revenues are a complex function of load shape, fuel prices, demand response, transmission availability, and many other variables that are not represented in the model. Thus the model is further compromised in its ability to accurately represent generator revenues.

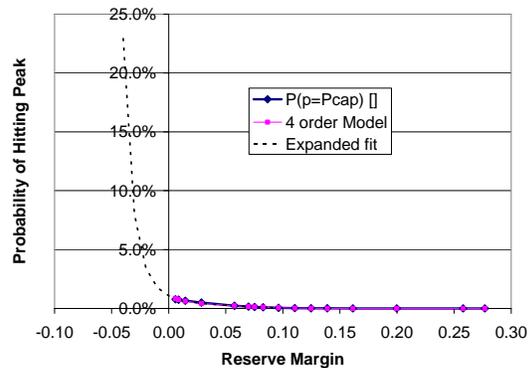
- In the model, an exponential/polynomial function is used to calculate the energy revenues, and this function is supposed to replicate the output of another probabilistic LOLP model.

In reality, the exponential function is an extremely poor proxy for the source model over important parts of the range of reserve margins in the model, as shown in the graph below. The model is likely to over-predict loss of load probability in this range and exaggerate generator revenues even by its own paradigm.

Calibration range:



Reserve margin range in model:



- The model supports the conclusion that “curve four”, the VRR curve proposed for use by PJM, has the lowest generator margins and the lowest customer payments, both lower by far than the current system.

In reality, generators have overwhelmingly endorsed this curve while consumer advocates and load have overwhelmingly opposed it. If the model is to be believed, these positions are difficult to reconcile with the interests of these stakeholder groups!

PJM stakeholders have had a very limited opportunity to review, audit, verify or validate this model, the underlying data, or the underlying probabilistic model on which the revenue calculations are based. What we see so far does not give us confidence that it is a reasonable or accurate representation of the factors which govern capacity additions, generator revenues or consumer payments. Unless and until these concerns are adequately resolved, this model should not be relied upon in support of PJM’s capacity market design.

For more information on this analysis, please contact Ezra Hausman at Synapse Energy Economics, at ehausman@synapse-energy.com.