

Capacity symposium

The panel discussion topic on which I have been asked to speak includes many components but I will focus on one of the identified areas albeit a very important one: how and to what extent do we need to take steps to accommodate differences in types of capacity resources.

New forms of capacity resources are appearing: EE, DR, Solar and Wind are prominent examples. Policies at both the state and federal levels will encourage the development of even more of these technologies in the future. Historically, however, transmission and reliability planning has centered around the operational characteristics of generating plants. As we see these new types of resources appearing in large scale, we need to ask ourselves whether the same planning and reliability evaluation criteria we used in the past need to be modified.

In fact, while there is certainly a place for the new types of resources it would be a serious mistake to treat them as fully interchangeable with traditional generation in all respects. Some of the characteristics of the new resources are inherently different and in some cases the role that will be played by the new types of technologies just cannot be determined yet because we lack experience. Because PJM has little history and experience to fully assess the limitations of these resources and predict the impact on system reliability care needs to be taken in integrating them into the system.

First, one difference that has to be recognized is performance testing. We test generators basically one time a year and, in the vast majority of cases, it is reasonable to assume that the results of that one test are reproducible. In other words, if we turn the generator on, it will run at about that level and further that generators will operate how ever many times they are dispatched. Demand response is somewhat different. It's not clear that a single test gives you reliable information about how much DR would respond after repeated events over a Summer period. I don't have a specific solution for this but it needs attention.

Second, we need to think about the impacts of how much DR we are carrying both on the system as whole and in specific locational delivery areas. Because DR levels were historically small, the rules around them treat them as surrogates for peaker capacity. At present, PJM only has the ability to call DR 10 times over a given Summer period. When some penetration point is reached, however, DR would need to be called like mid-merit generators. For PJM as a whole, this threshold level is about 10% of the total resources in the pool. We should anticipate the possibility that DR levels will get that high either by increasing or eliminating DR performance obligations over a Summer period or somehow limiting the amount of DR acquired in the RPM process to levels consistent with their operating characteristics.

Third, we need to recognize that DR, EE and renewable resources will eventually replace existing fossil generating units and be developed instead of some potential future fossil generating units. Displacing a significant amount of fossil generation has impacts:

- Reduction in system spinning reactive capability.
- Reduce system flexibility to resolve congestion.
- Reduce units available for blackstart

We need to start thinking now how to address those concerns.

Fourth, we need to think about how to address the risk of relying heavily on types of resources that may, at some point, withdraw from the market without advance notice. Generating resources are expensive long-lived facilities with high levels of sunk costs. They can be expected to be available until they have operational problems that cannot be repaired at a reasonable cost. The same cannot be said about DR. It has little or no sunk costs and could withdraw from the market anytime without any adverse consequences to the suppliers. This potential impact is not being addressed in the current reliability metrics.

Fifth, unlike traditional fossil generation that can be turned on under any weather conditions, solar and wind generation are vulnerable to sudden shifts in wind and cloud coverage. Events over which we have no control – the weather – thus may result in large imbalances between load and generation output in a very short time. This imbalance may exceed spinning reserve on the system. This risk needs to be addressed to avoid system blackouts. Improving existing tools for wind and solar forecasting would help reduce this risk.

Sixth, during light load conditions (min Generation run time), wind generation could result in turning off coal plants that may be needed on the following day and yet be unable to return to service in time. It may be necessary to increase the level of reserves or take other actions to cover this contingency.

Seventh, DR activation could result in phase imbalance.

Ambitious plans are put forth to promote and develop EE, DR, Solar and Wind in larger amounts than we have ever seen before. These new energy resources have different characteristic than the resources presently on the system. We need to fully understand and determine the potential impact that these new resources will have on the bulk power system and accordingly, PJM needs to revise its operating and planning processes in order to continue to enjoy the reliable system performance we have today. In short, we need to proceed with our eyes wide open.