Capacity Markets Going Forward

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These remarks briefly address questions to be discussed in the final panel of the FERC Technical Conference on Capacity Markets held on 25 September 2013. I discuss the challenges of capacity markets, both today and in the future. I also discuss key features of capacity markets needed to meet these challenges.

Challenges of capacity markets today and in the future

The main challenge of capacity markets today is largely the same as it always has been: to provide investment incentives for generation resources to reliably meet demand at least cost. To achieve this goal, the capacity market must be built within a sound market framework that provides: (1) a predictable and stable regulatory setting, and (2) effective market rules that support the efficient medium and short-term operation of existing resources. Embedded within a sound framework, a capacity market can unfold its complementary benefits of coordinated efficient investment, reduced investment risk, and improved operation during periods of scarcity.

However, to be successful, the capacity market must have certain key features that support the goal of promoting efficient investment.

First, capacity should be procured several years in advance to enable new entry to participate and investments to be made. Spot capacity markets are unable to determine a reliable capacity price that properly motivates long-term investments. In contrast, a forward capacity market allows projects to compete before the investments are sunk, and thereby be reflected in the capacity price. To further improve pricing, a downward sloping demand curve should be used that reflects the incremental value of additional capacity.

Second, the capacity product should clearly and simply be defined in a way that is consistent with the market's objective: *capacity is the ability to supply energy and reserves during a reserve shortage*. This definition of capacity makes clear that capacity is a reliability product. Resources are rewarded based on their ability to reduce shortages during scarcity conditions.

Third, strong performance incentives should come from supply obligations during shortages. Each supplier is obligated to provide its proportionate share of demand (load plus reserves) during reserve

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shortages. Deviations from obligations are priced at a high shortage price. Thus, each supplier is highly motivated to supply energy and reserves during scarcity events. Those that provide more than their share are rewarded; those that provide less than their share are penalized.

To date, every capacity market in the US and elsewhere has suffered from performance incentives that are too weak. This is not surprising. It is natural for suppliers to argue for weak performance incentives. Doing so reduces performance risk and makes the capacity product seemingly more attractive. However, it also degrades the product and undermines the reliability objective by favoring unreliable resources.

Pleas to weaken performance incentives are often listened to given that a key motivation of the capacity market is to reduce investor risk, which it does by substituting a constant capacity payment for highly uncertain scarcity rents. However, strong performance incentives are critical to the market. Performance risk must be borne by someone and this risk is best held by the party best apt to manage it: the capacity resource.

There are many investments that a resource owner can make to mitigate performance risk, such as firm fuel supply and improved maintenance. A well-maintained resource together with a firm fuel supply provides a physical hedge for performance risk. Intermittent resources face greater performance risk, but this appropriately recognizes the contribution of the resource to reliability.

The weakening of performance incentives often comes from including a myriad of exceptions to a firm obligation. Resources identify their chief vulnerability and then lobby for an exception. For example slow resources that are rarely on lobby for advanced notice of scarcity events so they have time to ramp up; resources behind a transmission constraint lobby for an exception in the event transmission prevents delivery. The rule of “no exceptions” is the best here. Such a rule simplifies the market and properly rewards a resource for its contribution to reliability.

The need for stronger performance incentives is especially great looking forward. Tomorrow’s market will have an increasing share of intermittent resources, such as wind and solar, and a greater dependence on gas during scarcity conditions. The reliability of the system may be increasingly vulnerable to disruptions in the gas supply. Investments in dual-fuel technologies and improved gas delivery can improve reliability, but weak performance incentives discourage these investments.

Strong performance incentives bring an important additional benefit. By putting suppliers in a roughly balanced position during times of scarcity, they make the spot market work better. Suppliers are motivated to supply as much as possible, rather than to withhold supply to achieve a high price. In addition, load is fully hedged from the high scarcity prices. This protection makes it easier to establish high scarcity prices. The high prices properly motivate behavior, yet only a small quantity is transacted at the high prices, so the amount of money changing hands is limited.

Should capacity markets include specific operational requirements?

One challenge of capacity markets is complexity. Too often the market rules grow complex with specific needs, requirements, and exceptions. A successful market manages this complexity with a simple

underlying structure, the key component of which is the simple product definition above: the ability to supply energy or reserves during reserve shortages. Of course the capacity market must recognize operational constraints, such as the limits of the transmission grid, but the market should permit substitution wherever it is possible. For example, absent transmission constraints, capacity prices should not differ by location.

Another form of substitution is generation technology. To the extent possible, capacity markets should be technology neutral. All resources, regardless of technology, should compete to supply capacity on an equal basis. Of course, "equal basis" recognizes the different contributions each resource makes to the reliability objective.

The system operator rates each resource based on its expected performance in supplying energy and reserves during reserve shortages. The rating determines the amount of capacity that the resource can offer to the market. A new gas turbine may be rated at 94% of nameplate capacity, whereas a wind resource may be rated at 30% of nameplate. Demand response is also rated based on its expected contribution to reliability. Resource ratings are revised based on experience so that they do reflect the long-run expected performance during reserve shortages. In general, resource ratings depend on the composition of resources in the market. For example, if the quantity of wind resources increased substantially as is anticipated in the UK and Germany, the shortage event is more apt to be caused by a lack of wind, and therefore the ratings of wind resources would be reduced.

A technology neutral capacity market is both simpler and more efficient than alternatives that attempt to specify particular technological needs and thereby limit substitution. Maximizing substitution across technologies has the additional benefit that the capacity market is less fragmented. This promotes competition.

Many European countries have opted to procure renewable resources with feed-in tariffs and specific quantity targets. Were this to be done in the US, then the simplest solution is to procure these resources separately and effectively remove them from the capacity market. However, a better approach is to establish a carbon price, through cap-and-trade or a carbon tax, which would appropriately favor renewables in a technology neutral way and allow full and equal participation in the capacity market.

Should the goals of capacity markets change in the future?

The goal of capacity markets should remain the same. Capacity markets should be designed to induce efficient investment in generating resources, both quantity and mix, to meet the reliability standard. A well-designed capacity market coordinates investment, reduces investment risk, and improves spot market performance in times of scarcity.

Rather than change the goal of capacity markets, what is needed is an improvement of existing market designs. Capacity markets should adopt a simple product definition based on the reliability objective and include strong performance incentives. Common adoption of successful features will also reduce seams across markets, further improving the reliability of the US electricity markets.

References

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