EDITORIAL

Symposium on 'Capacity Markets'

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"Revenue adequacy" has emerged as a problem in many organized wholesale electricity markets and has been of growing concern in liberalized electricity markets in the U.S. and Europe. The revenue adequacy or "missing money" problem arises when the expected net revenues from sales of energy and ancillary services at market prices provide inadequate incentives for merchant investors in new generating capacity or equivalent demand-side resources to invest in sufficient new capacity to match administrative reliability criteria at the system and individual load serving entity levels. These administrative reliability criteria in turn are established by regulators or system operators and typically have been carried over from the old regime of regulated vertically integrated utilities. The economic rationale for establishing these criteria are at best mysterious. Administrative reliability criteria are then often transformed into reserve margin targets at times of expected peak demand, recognizing that future demand, generating capacity, and availability are uncertain. The problem then is that "energy-only" markets (actually, net revenues from sales of energy and ancillary services) do not produce enough expected life-cycle net revenues to provide incentives to invest in enough generating capacity to meet these reserve margin targets.

There are many reasons why "energy-only" markets often do not provide adequate incentives to invest in sufficient capacity to meet administrative reliability requirements (Joskow, 2008). These include price caps that suppress prices below market clearing levels during scarcity conditions, imperfections on the demand side, out-of-market actions by system operators, and inconsistencies between administrative reliability criteria and consumer preferences for reliability. System reliability also has certain public goods attributes and, as a result, decentralized market solutions are challenging to design and implement (Joskow and Tirole, 2007). The expansion of subsidized intermittent generation and other subsidized generating investments have exacerbated and complicated the problem.

There have been a number of actions taken to ameliorate the revenue adequacy problem. These include increases in the level of price caps on energy and ancillary services, the creation of additional electricity products that better match system operator needs for maintaining reliability without resorting to out-of market actions, and (or in addition to) the creation of capacity markets. The implementation of many of these solutions to the revenue adequacy problem also reflect concerns about market power emerging during very tight supply situations and the mitigation of market power is typically a key design feature. Three of the papers in this symposium focus on capacity market design and performance issues. One examines an alternative approach to the revenue adequacy problem.

Capacity markets do not exist in isolation from reliability criteria, operating reserve markets, and the broad goal of facilitating competitive wholesale and retail electricity markets. The logic of capacity markets starts with administrative reliability criteria and the associated requirement that all load serving entities on the system maintain compatible generating capacity reserve margins, taking operationally equivalent demand-side actions into account. Capacity markets then become a mechanism through which load serving entities can contract

with generators for rights to rely on their capacity to meet their capacity to supply obligations at different times of the day and year. Load serving entities may in principle acquire the necessary capacity to meet their reserve margin obligations by contracting for generating capacity through bilateral contracts, purchasing capacity in organized capacity markets, or building their own generating capacity where the market rules permit load-serving entities to own generating capacity.

The basic concept and rationale for a capacity market are fairly simple to articulate. However, capacity market design and implementation has been much more complicated than first meets the eye and not without problems in practice. Because implementation of capacity markets has often between challenging, alternative approaches to solving the revenue adequacy problem are always of interest.

The paper by Kathleen Spees, Samuel Newell and Johannes Pfeifenberger provides an overview of the experience with several different capacity markets in the U.S. and the lessons learned from this experience over the last decade. The paper by Peter Cramton, Axel Ockenfels and Steven Stoft discusses important aspects of the appropriate design of capacity markets, implications for market power and risk, and several alternative approaches to the revenue adequacy problem. The paper by Joseph Bowring focuses in on the evolution of capacity markets in the PJM RTO, their performance attributes and remaining design and implementation challenges. Finally, the paper by William Hogan reminds us that the fundamental challenge for dealing with the revenue adequacy problem is to achieve appropriate scarcity pricing. He proposes an alternative to capacity markets that builds on existing markets for operating reserves by introducing new operating reserve demand curves as an alternative to forward capacity obligations and associated capacity markets.

We hope that our readers find these four papers interesting and that they enhance their understanding of the underlying rationale for capacity markets, their strengths, weaknesses and challenges, current policy debates and the possibility of turning to alternative approaches.

References

Joskow, P.L. (2008). "Capacity Payments in Imperfect Electricity Markets: Need and Design," *Utilities Policy*, 16(3): 159-70. http://dx.doi.org/10.1016/j.jup.2007.10.003.

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