Counterpoint

A New England Capacity Market That Works

Two authors beg to differ with Goldman Sachs' Larry Kellerman on what needs mending in the Northeast.

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The "food fight in the New England Power Pool"—recently cited as emblematic of "our broken capacity markets" (*Larry Kellerman, "Mending Our Broken Capacity Markets," Public Utilities Fortnightly, June 2006, p. 58*)—appears to have been quelled.

New England's innovative approach, dubbed the Forward Capacity Market (FCM) in the *Devon Power* settlement (*FERC Docket No. ER03-563-055, approved June 16, 2006*), was probably unavailable when Larry Kellerman made his observations in these pages, but it promises to confer new vitality on competitive markets. When fully implemented, the FCM should ensure the right amount of capacity at the right time and the right place, without instituting Kellerman's proposal for a "planned, organized, long-term capacity acquisition model," which sounds suspiciously like a return to the traditional regulatory model.

Although much work remains before all its benefits will be realized, the FCM satisfies the criteria for a capacity system that works, while avoiding the need for the centralized planning and control that Kellerman appears to advocate.

Samuel Insull's 1902 investment in a large, unproven General Electric steam turbine—the jumping-off point for Kellerman's thesis on the high cost of power created by economic exposure to risky investments—certainly entailed a degree of technological and financial risk. In that era, there was no "regulatory bargain" that ensured the fledgling Chicago Edison an uninterrupted return on its capital or protection from competition. Indeed, this was the short-lived reign of "distributed generation," when central stations still were proving their worth. Precisely because he faced actual or potential competition, however, Insull managed that risk without the help of a centralized planning apparatus to dictate new capacity additions or price. Indeed, despite the risks, Insull found ways to match supply to demand, increase generators' capacity factors, and lower costs from 20 cents/kW-hour in 1892 to 2.5 cents by 1909.

New England continues to place confidence in the innovation of generators seeking to maximize their profits within a reasonably contestable market, thereby producing the lowest cost for electricity customers. Adopting the crucial characteristics of Bidwell's "reliability options" (*see "Reliability Options: A Market-Oriented Approach to Long-Term Adequacy," The Electricity Journal, June 2005*), the FCM will pay for only the amount of capacity necessary to ensure reliability. Its three-year-forward auction, coupled with a five-year commitment period for new or substantially refurbished capacity, will permit new entrants to compete effectively with existing generation. The declining clock auction should set stable capacity prices at the long-term net cost of new entry, thus providing sufficient certainty to attract capital at relatively low cost. By paying the net cost of new entry—capital and operating costs less energy and ancillary services revenues—the FCM will encourage an efficient mix of resources, *i.e.*, demand response, peaking, intermediate, and base-load units.

Because the FCM ties capacity payments directly to performance during periods of system stress and deducts revenues from energy price spikes, generators will be rewarded or penalized based on their actual contributions to reliability.

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A Competitive Price

Kellerman correctly focuses on the mismatch between the short-term price signals of most capacity payment schemes and the long-term planning horizon for capacity suppliers. A major flaw in current "demand curve" approaches, like the one adopted by New York's Independent System Operator (ISO), has been the extreme short-term price signal—usually a matter of only months, not years. Kellerman's analysis goes awry, however, when he concludes that the best solution is "long-dated, contractually based capacity payment streams." A viable market should certainly facilitate bilateral contracts, thereby permitting parties to fix their

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relationship over a longer term, but such contracts need not displace or override the market. Indeed, bilateral arrangements should flow from a stable market structure that encourages long-term planning and commitments.

The FCM goes a long way toward matching price signals with the planning decisions of potential suppliers, thereby facilitating effective competition. The FCM's primary capacity auction occurs three years before required performance. Thus, although prospective new entrants will have to begin planning and preparation before the auction, they will know three years in advance what their capacity payments will be once they begin operations, and they need not make major capital commitments without that assurance. Moreover, such new entrants can lock in those capacity payments for up to five years, ensuring a predictable revenue stream for their initial operations. Inefficient existing generators can take advantage of this same opportunity for certainty and stability if they undertake substantial upgrades that qualify them as "new" for auction purposes.

Such advance procurement that facilitates new entry should ensure effective competition that will discipline price. In most years, when new capacity is needed to serve load growth, new entrants will set the price based on competitive auction bids—a true market-driven price. During a capacity surplus, existing generators will set the price based on their average variable costs. The most expensive, least efficient generators will drop out of the descending clock auction when their average variable costs exceed the offered price, and they can retire. Over the long term, the capacity price should vary only slightly around the competitively derived net cost of new entry.

The Fallacy of Pay-As-Bid Capacity Pricing

Kellerman has fallen for the seductive allure of hoped-for lower capacity costs if customers only had to pay suppliers' bids—usually lower than the single market-clearing price. Why should bidders who are willing to supply capacity at $5.00/kW-month be paid the clearing price of $10.00/kW-month simply because the last increment of capacity needed could only be purchased at that price? Unfortunately, waving a wand cannot alter economic realities, and attempts to implement such sleight of hand almost certainly will backfire.

For more than 50 years (beginning with Marcel Boiteux in a seminal 1949 article on marginal cost-based peak-load pricing), economists have shown that a least-cost electricity system includes a mix of types of generating plants with varying capital and operating costs but the same incremental capacity cost. For example, although a gas-turbine peaking unit has lower capital costs than a base-load coal plant, it also has higher operating costs, and the residual cost of capacity for the two plants will be the same. Bidwell (the co-author of this article) explains and demonstrates this relationship. Thus, in a least-cost system, a single incremental capacity cost paid to all generators will provide each generator with the same prospective return on capital investment. When it would reduce system costs to build a particular type of plant, the expected return for that plant under a market-clearing price approach will be greater than the expected return for any other type plant, thus providing market incentives to optimize the system.

Moreover, the real world will not operate as Kellerman supposes. The lower-cost generator will not continue to bid $5.00/kW-month when others receive twice as much for the same commodity. Rather, it will alter its bidding strategies and attempt to guess the highest bid that must be accepted to supply sufficient capacity for reliability. If all bidders guess correctly, the resulting capacity cost for consumers will be the same, and nothing will be gained. With multiple suppliers, however, some likely will overestimate the market-clearing price, meaning that lower-marginal cost bids may be rejected in favor of higher-marginal cost suppliers. As Alfred Kahn showed (*"Uniform Pricing or Pay-as-Bid Pricing: A Dilemma for California and Beyond," The Electricity Journal, July 2001*), customers will bear the costs of such inefficiencies. The FCM, like all efficient commodity markets, pays all successful bidders the same price, and the Federal Energy Regulatory Commission (FERC) has promoted this market design uniformly (*see Commonwealth Edison Co., 113 FERC ¶ 61,278 [2005] at P 43; Midwest Independent Transmission System Operator, Inc., 102 FERC ¶ 61,196 [2003] at P 32*).

Purchase Only the Capacity Needed

Kellerman's plea for "delineation of who is responsible for capacity reliability" has some validity. Although FERC has asserted an ever-expanding role, it acknowledges that states have tradition-

ally been the guardians of capacity reliability. State political bodies are best positioned to weigh the costs of excess capacity against the reliability risk of running short. Nevertheless, FERC has tasked regional transmission organizations (RTOs) like ISO New England with at least initial responsibility for planning to meet capacity reliability commitments in each geographic area. RTOs cannot reasonably make those decisions in a vacuum, however, and states, particularly, should have the primary voice.

Most of the RTOs' capacity market proposals would require customers to pay for more reliability than required to meet the accepted loss-of-load expectation of one day in 10 years. Those approaches purport to justify buying more capacity than necessary because they expect wide price fluctuations that will lead to less capacity than needed in some years, followed by oversupply in other years. This predestined vacillation above and below the norm led some RTO market designers to err on the side of too much reliability and require customers to pay for as much as 5 percent more capacity than they need.

The FCM avoids this profligacy by procuring only the capacity actually required to meet technical reliability criteria. By requiring retiring generators to announce their intentions well in advance, purchasing replacement capacity three years ahead, and extracting enforceable performance commitments from suppliers, the RTO-administered auction can buy 100 percent of installed capacity requirements for the region, and no more. Small deficiencies due to underestimation of load growth, or suppliers that default, can be made up in annual reconfiguration auctions (where suppliers can also adjust their positions). Reliability is ensured, but customers are not compelled to over-buy based on a purely administrative determination.

Customers Get What They Pay For

Kellerman properly faults existing capacity procurement approaches for failing to deliver on their promise to stimulate new capacity. High prices appear to be sending strong signals to

build new capacity, but no one responds. This brush off from capacity investors is not surprising when market signals are short-term and likely will be ephemeral once an unwary supplier comes on line, thereby lowering the capacity price. By locking in capacity suppliers three years before their commitment, with material penalties for non-performance, the FCM ensures that capacity payments actually produce the intended level of reliability.

The FCM goes a step further, however, and pays only those generators that show up when the ISO calls on them. Capacity payments that are not tied directly to performance are money down the drain. Under the FCM, poor performers will be docked and good performers rewarded in two respects. First, generators that are unavailable for any reason during capacity shortage periods will forfeit a significant part of their capacity payments. To add insult to injury, the forfeited capacity payments will be distributed among the good performers—*i.e.*, to the unavailable generator's competitors. Second, capacity payments will be reduced for all resources when energy revenues exceed a relatively high strike price. Resources that miss the spike prices when capacity is scarce still will have their capacity payments cut, but cannot offset that reduction with earned energy revenues. These provisions create strong financial incentives for suppliers to improve reliability and availability, consequently reducing the need for new capacity to cover peak loads. The FCM accomplishes on a system-wide basis what would be difficult to achieve through bilateral contracting alone: improved reliability performance for the entire market.

Why Settle For Second, Or Third, Best?

No other capacity procurement model provides the benefits of the FCM. First, unlike a rigid, centrally controlled capacity procurement approach that must specially accommodate nontraditional applications, the FCM stimulates innovative participation from all potential capacity resources. Demand, distributed, intermittent, and import resources all fit neatly within the FCM auctions and can be rewarded or penalized like central-station generation. These resources soon should satisfy a growing proportion of capacity requirements, and the FCM permits seamless integration as viable competitors that will help dampen cost increases.

Second, more than other capacity-payment schemes, the FCM promotes bilateral contracting and self-supply. This market should produce stable, predictable pricing over the long term, making bilateral contracts attractive for both parties. To the extent that municipal utilities or other load-serving entities wish to self-supply, that option fully is available without disrupting the competitive market. Within limits, states even may exercise self-help by contracting for capacity resources to alleviate localized constraints that would otherwise drive up the auction price. The FCM provides an inherent flexibility that permits load to satisfy its reliability obligations through a variety of means.

Third, unlike any other capacity procurement approach, the FCM provides a logical transition to an energy-only market. Such a market is not feasible so long as the demand curve remains inelastic and political realities make uncapped price spikes unacceptable. Just as Insull developed two-tiered pricing in the 1890s using Arthur Wright's demand meter, however, innovators inevitably will refashion technology to permit real-time metering on a broad scale. By injecting elasticity into the demand curve, real-time metering should make all capacity markets atrophy and eventually wither away. When demand can respond instantly to price spikes, customers will be able to express with their dollars exactly how much an additional increment of reliability is worth, and suppliers will be rewarded through the energy market for satisfying that demand. As the demand curve becomes more elastic and more generators can thrive on energy revenues alone, capacity prices in the FCM auction will fall until they approach zero. The FCM provides a straightforward bridge to an even more optimal energy-only market.

Not Your Father's Capacity Market

A broad consensus of New England stakeholders has designed a capacity market that fully addresses the universally acknowledged objectives for such markets: (1) a reliable electric grid; (2) lowest-cost reliability; and (3) an efficient mix of resources. To the extent that earlier markets were broken, they have been mended in New England, and the FCM solution is superior to any other approach now being touted. Other regions would be well served to consider New England's FCM model as a means to ensure reliable capacity within a market-based, competitive environment. F

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