



## Essential Elements of Forward Capacity Markets

All participants in the power industry today face a daunting challenge – to continue to provide reliable, efficient and clean electricity, consistent with domestic and global economic conditions. This challenge comes in the face of environmental concerns, uncertainty over demand forecasts, an aging infrastructure, differing retail regulatory structures and substantial increases in the cost of operating existing power plants and building new ones. Political reactions to rising prices do not change the reality of underlying market fundamentals that have resulted in increasing costs and a continued need for innovative and efficient approaches to reliable electric generation, delivery and investment.

Well-functioning forward capacity markets are a critical component of organized wholesale competitive electricity markets in many parts of the country. These markets provide the capacity needed for the continued reliable operation of the grid through the commitment of existing supply, investment in new generation when needed and participation by consumers to manage their demand (demand response). The Electric Power Supply Association (EPSA) developed this paper to provide a broad overview of these capacity markets by focusing on four of their essential elements necessary to ensure regional reliability for customers:

- Providing the right long-term price signal;
- Cost of new entry (CONE);
- Benefits of a location-specific price signal; and
- Comparability of supply and demand resources.

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The uncertainties in today’s economy are well known. Yet, with investments being made to continue

to provide reliable electricity supplies, market structures that support the continued operation of supply, incent demand response and provide the signal for new resources are critical. As noted by an independent analysis in the PJM market, the impacts the forward capacity market “has had on new and existing resources show that capacity price signals are important for facilitating the most cost-effective entry, investment and retirement decisions. [These] capacity prices have also been important for stimulating demand-side investments that can effectively compete with supply-side resources.”<sup>1</sup>

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While it is often most difficult to pursue stable

policies in a challenging time and politically-charged environment, it is at such times that policy leadership is most necessary to achieve the nation’s energy and environmental goals.

<sup>1</sup> Review of PJM’s Reliability Pricing Model (RPM), Conducted by the Brattle Group for the PJM Interconnection, LLC, June 30, 2008. <http://www.brattle.com/documents/UploadLibrary/Upload696.pdf>

## Capacity Markets in Organized Wholesale Electricity Markets

In independently-administered wholesale electricity markets, prices are set competitively among power suppliers who provide power at market-based prices and demand response customers who reduce their use of energy when electricity prices are high. These participants compete to serve consumers in utility- or state-run competitive procurements as well as in Regional Transmission Organization or Independent System Operator (RTO/ISO) spot or day-ahead markets by submitting bids for their services. Because of regulations that mitigate, or limit prices for electric energy, the market prices do not always provide a fair opportunity for full recovery of costs and a reasonable return on investment. In an open competitive market without such mitigation (i.e. without bid caps), market participants would bid their determined market value, causing prices to rise and fall depending on underlying supply and demand for electricity as occurs with other goods and services.

Preventing prices from reflecting the true value of supply at any given time contributes to underinvestment in new and existing generation, particularly for peaking resources, and provides no incentive to conserve or curtail consumption. Both underinvestment in generation and inefficient peak consumption have serious impacts on reliability, particularly during periods approaching or during operational shortages. Allowing for a genuine market – one that allows price signals to reflect supply and demand conditions at a given time – is the optimum construct to achieve a reliable system at the lowest risk and best price for consumers. Political and practical realities exist today, however, that prohibit the true reflection of market values in electricity prices.

Forward capacity markets have therefore become necessary as a mechanism to assure sufficient supply and demand resources are available to keep the lights on. These markets have also become necessary because electric markets, unlike most other commodities, must

meet federal reliability standards that require there always be an amount of electric supply held in reserve at all times. Capacity markets reflect the value of this electricity supply that is necessary to meet forecasted demand and reserves on a sufficiently-forward planning horizon. They also provide a forecasted price signal to show the value and expected revenues that help to support financing for capital-intensive projects.

### The Right Sustainable Price Signals are Needed

In this uncertain time, with a variety of challenges for the electricity sector, it is important that stable, predictable long-term policies that support a competitive environment for the development of future resources be implemented and preserved.

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While it may be tempting to allow for policies that

suppress prices to keep electricity rates artificially low, such policies have proven unsustainable. First, artificially suppressing price signals will ultimately lead to reliability problems, as they will send the signal that investment is not needed when we know this may not be true. Second, such price suppression will stymie efforts to move to a cleaner economy – a move that will take major investments over a long time horizon. The innovators and entrepreneurs who are working today to move in such a direction and provide the necessary future resources must have confidence that they will have a fair opportunity to recover their true costs in a reasonable manner.

Research by those responsible for overseeing these markets has shown that the need for capacity markets is real. For example, an analysis by the PJM Independent Market Monitor has shown that generators have generally not earned sufficient revenues to recover the fixed costs of building new plants.<sup>2</sup> This situation harmed reliability in the PJM region by not allowing for revenues to sustain existing generation or the development of new needed supplies and was a primary driver for PJM’s request in 2005 to change to what ultimately became the Reliability Pricing

<sup>2</sup> Testimony of Joseph E. Bowring, Independent Market Monitor for PJM, Pennsylvania PUC, Hearing on the Current and Future Wholesale Electricity Markets, October 23, 2008, pgs. 7-11.

Model (RPM) three-year forward capacity market. Despite this empirical evidence, opponents of forward capacity markets have argued that customers are paying excessive amounts for capacity and have questioned whether capacity prices are just and reasonable. These critics also allege that capacity markets are not sending the signals to incent new investment even though more than 9,300 MW of new capacity (with more than 2,000 MW of that total demand resources) have been made available in PJM since the implementation of RPM. In addition, 16,747 MW of resources that would have been otherwise uneconomic have been made available.<sup>3</sup>

It is important to note that in some cases capacity markets may not result in new investment. This is simply a rational and cost efficient result, indicative that additional resources are not necessary at the time. The forward capacity markets are just as important in these times, however, as they ensure that needed existing resources continue to be maintained for reliable operation.

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### **Cost of New Entry or “CONE”**

Within the forward capacity market debate, the most critical element being discussed by stakeholders today is an update to the Cost of New Entry (CONE). CONE refers to the price at which a peaking power plant can recover its fixed costs in the marketplace. This price is set as a benchmark based on the cost of building a peaking unit. When the market needs new resources to meet reliability, the capacity price would rise above CONE to incent generation. When there are sufficient resources to meet reliability needs the price would fall below CONE to show that no new generation is needed.

Even though CONE is a central element in capacity markets, some current CONE values are based on data developed as far back as 2004. To ensure that this value reflects prevailing market conditions and economic

realities, CONE must be kept up to date with existing and projected global economic conditions.

As many have noted, construction costs have risen sharply over the last several years due to global demand. While some costs may be modestly declining today, the fact remains that costs associated with power plant construction have increased significantly in recent years and should be properly reflected in CONE values to promote accurate, appropriate pricing in capacity markets. For example, a recent power plant construction index, which tracks the costs of building a variety of different types of power plants, indicates that costs have increased 124 percent since 2000. In other words, a power plant that cost \$1 billion in 2000 would, on average, have cost \$2.24 billion in early 2009.<sup>4</sup>

makes it imperative to the long-term sustainability of these markets that this value is properly representative of up-to-date costs. If CONE is underestimated, there is increased risk that generation and demand response will be insufficient, and reliability threatened. It is for these reasons that updating and reviewing CONE on a periodic basis is appropriate – and essential – to send accurate price signals to the market to ensure future investment, promote reliability, and provide stability that ultimately benefits consumers.

### **Location-Specific Price Signals**

A location-specific (“locational”) price signal is an important element of forward capacity markets. Such a mechanism serves to identify specific areas in a region where new resources are necessary. The transparency of this locational price signal is critical to accurately identifying needs and focusing infrastructure development, transmission planning and investment.

<sup>3</sup> PJM 2011/2012 RPM Base Residual Auction Results, May 15, 2008

<sup>4</sup> IHS CERA Press Release issued December 17, 2008 is available at: [http://press.ihs.com/article\\_display.cfm?article\\_id=3953](http://press.ihs.com/article_display.cfm?article_id=3953)

In addition, locational pricing may point to transmission constraints in certain regions, and their impact on reliability. By identifying the specific geographic areas where the resources and transmission capability into the area cannot meet reliability standards, rational investment decisions can be made with respect to the supply, demand and transmission planning options to meet those local needs. When these options are exercised, the location-specific price signal for that region will disappear. This result benefits consumers by allowing those in areas that have adequate resources to meet projected demand to avoid paying for boosting resource adequacy in other areas that lack adequate resources. Without a locational signal, more generation may be procured in an area than is necessary and no signal would be sent to help those locations truly in need of additional capacity.

## Putting Supply and Demand Resources Together

The participation by *all* qualified resources in forward capacity markets is essential. Well functioning forward capacity markets provide tools for consumers to react to the market and participate through “demand response” programs.

Increased demand response can play an integral role in (1) removing barriers to entry, (2) improving market efficiency and (3) producing more efficient price signals for plant operation, new investment and managing consumption. For example, ISO New England’s forward capacity market attracts significant demand resources. Its second forward capacity auction held in December 2008 cleared more than 2,900 MW of demand-side resources for the 2011-2012 timeframe.<sup>5</sup> The increase in participation by non-traditional resources – such as demand response – is one of the great values produced by the forward capacity markets. While this is a testament to the significant consumer benefits that are derived from a competitive market, at the same time, there must be assurances – through clear and comparable requirements – that all demand-side resources are strictly accountable and will be available to perform at the time

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committed to ensure reliability, just as these requirements apply to cleared generation resources. Verification is needed for all resources and penalties should be applied to any market participant who fails to perform. Doing otherwise would cause serious reliability consequences.

## Conclusion

The present electricity infrastructure investment climate is undoubtedly one of the most tumultuous in recent memory. The challenges in the financial and capital markets are well known, as is the uncertainty as to the form and timing of federal climate change regulation. These elements are compounded by price increases in the key input construction materials for new generation resources, as well as the changing electricity demand picture.<sup>6</sup> Added to this are the uncertainties for the existing electricity system due to the promising development of plug-in hybrid electric vehicles, increased energy efficiency, continued expansion of intermittent renewables and more widespread demand response. These combined factors create a staggering set of challenges for electricity infrastructure investment.

electricity markets, provides the most choice, the greatest opportunity for innovation and the most cost-effective resources at the lowest risk for consumers now and in the future. In the absence of an energy market that allows for electricity prices based on actual supply and demand – and the volatility that would accompany it – the forward capacity markets are critical to the long-term reliability and efficiency of electricity supply throughout much of the country.

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<sup>5</sup> ISO-NE Forward Capacity Auction Results Filing at 2, Docket No. ER09-467-000 (December 23, 2008).

<sup>6</sup> After years of forecasting steadily rising demand, current data points to a significant slowing and even decreasing demand in some areas.