

U.S. DEPARTMENT OF ENERGY, QUADRENNIAL ENERGY REVIEW

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NRG ENERGY, INC.

APRIL 15, 2016

Thank you for this opportunity to participate, on behalf of NRG, in this very important discussion on issues surrounding the design and operation of the Eastern wholesale electric markets, and their effectiveness in providing economic and reliable electricity capacity. NRG is the leading integrated power company in the U.S., built on the strength of the nation's largest and most diverse competitive electric generation portfolio and leading retail electricity platform.

A Fortune 200 company, NRG creates value through best in class operations, reliable and efficient electric generation, and a retail platform serving residential and commercial businesses. Working with electricity customers, large and small, we continually innovate, embrace and implement sustainable solutions for producing and managing energy.

We aim to be pioneers in developing smarter energy choices and delivering exceptional service as our retail electricity providers serve almost 3 million residential and commercial customers throughout the country.

NRG owns and operates a diverse portfolio of generating capacity composed of oil, coal, natural gas, nuclear, wind and solar totaling approximately 48,000 MW with close to 25,000MW of that generating capacity located within the three eastern ISO/RTO markets. NRG strives to provide creative and competitively priced solutions to meet the energy needs of consumers and the energy and capacity requirements of the markets in which we operate.

Market Overview -NRG's view is the capacity markets in ISO-NE, NYISO and PJM have been largely successful to date. These markets have met their resource adequacy requirements to date through competitive market structures to provide price signals necessary to attract new investment, support continued operation of existing investment, and efficient exit for uneconomic resources.

The regional capacity market structures are procuring a broad mix of resources from conventional thermal generation, peaking generation, demand response, energy efficiency, off-shore and on-shore wind, and solar resources. The markets are working. They are attracting investment dollars and providing competitively priced resources to meet each region's resource adequacy needs. In New England over the last three capacity auctions (FCA7-FCA10) over 10,000 MW of new capacity, been procured through the forward capacity markets fulfilling the resource adequacy needs driven by load growth and capacity resource retirements. Over 3000 MW of that capacity is efficient fast ramping gas and dual-fuel fired resources. Similarly since PJM's the implementation of its Reliability Pricing Model (RPM) Base Residual Auction over 39, 377 MW of new capacity has been procured through the market with over 29,000 MW of that new capacity being CT/GT and Combined Cycle generation.

Strengths

ISO-NE, NYISO and PJM markets each utilize a sloped demand curve to reflect the value of capacity at various levels of resource adequacy, while providing appropriate protections against the exercise of market power.

The PJM and ISO-NE market design further utilize a forward view of capacity commitments to permit efficient entry and exit. Capacity markets with a forward procurement requirement, approximately 3 year in advance of the delivery year, and transparent resource retirement information provide important market signals to developers of new resources. These forward-looking markets, combined with consistent performance requirements, drive efficient resource investment.

Capacity markets with strong performance obligations, like those in PJM and ISO-NE, provide a clear signal to resource developers and owners of the desired resource performance attributes and incentives for performance. Strong capacity performance requirements combined with energy market and ancillary market price formation structures, such a fast start resource pricing and regulation markets, reward fast ramping and flexibility resource attributes which further contributed to system reliability and support of intermittent resource penetration.

ISO-NE's capacity market price lock design, which allows a new capacity resource to receive the instant capacity auction clearing price for up to seven years, provides revenue certainty to resource developers allowing for competitive financing options and a hedge against regulatory uncertainty over the price lock period.

The forward nature of the PJM and ISO-NE markets, capacity performance requirements and price-lock, in the case of ISO-NE, has positioned these markets to manage market entry and exit well while meeting resource adequacy requirements in an efficient manner through a competitive market structure.

Across the markets strong mitigation, both on the seller-side and the buyer-side permit further confidence in market outcomes. These safeguards against market manipulation support price formation and economically efficient and rational resource selection. It is worth noting that we are seeing increased need for appropriate buyer-side mitigation rules to ensure efficient outcomes in lieu of efforts that may otherwise harm the market.

Weaknesses/Concerns

Now and looking forward capacity markets and market operators need to assure both resources participating directly in the market and those accounted for via load forecasting adjustments have clear and comparable performance requirements. Forecasted expectation of out-of-market resource performance, like resources which are not subject to the performance requirements of the capacity market, may place undue risk on regions in meeting resource adequacy, creating additional scarcity pricing risk on market resources and consumers and can undermine market fundamentals. This may be exacerbated by the changing capacity resource mix used to satisfy the resource adequacy requirements of the bulk power system and the desire to implement state policies and initiatives. Thoughtful consideration should be given to how such out-of-market resources and implementation of state policies and initiatives impact the procurement requirement for market-based resources needed to meet resource adequacy for each of the regions and how such strategies disrupt market fundamentals.

Clear and consistent performance requirements, as provided for under ISO-NE's two settlement Pay-For-Performance and PJM's Capacity Performance market structure, place significant delivery obligations on capacity resources shaping the performance attributes of resource entering the capacity markets, driving investment for certain of the existing resources, and leading to resource exit when the risk of meeting the new capacity performance obligations are too great. Capacity markets with strict performance requirements incent economic fast ramping or peaking resources with readily available fuel supplies, such as gas fired combined cycle or NRG's Canal 3 peaking unit, to enter the market. The entry of such resources is critical for supporting greater market penetration of intermittent wind, hydro, and solar resources. An effective capacity market must apply strong performance incentives over a level playing field, i.e. all resources are fulfilling a common or single product description, to assure resource adequacy is met.

As previously discussed ISO-NE and PJM both have forward capacity market constructs that include strong performance incentives. NYISO, on the other hand, does not have a forward capacity market and has relied more on its energy markets for performance incentives. With low energy prices, and low (or no) load growth projected, NRG has concerns for NYISO's ability to attract new entry and retain existing resources within its existing capacity market construct.

Capacity Market Revenue Requirements are directly linked to Energy and Ancillary Revenues

A capacity markets ability to economically procure resources needed to meet and maintain resource adequacy must recognize the linkage between energy and ancillary market revenues and capacity market revenues as expressed in the Net Cost Of New Entry. As New England, and many other areas of the U.S., experience record low energy (see figure 1 below) and ancillary service prices from a combination of low commodity prices and increased penetration of renewable resources, significant financial pressure will be placed on traditional resources such as nuclear, coal, oil and older gas. The cost of attracting new entry and maintain existing capacity resources must reflect the linkage between capacity, energy and ancillary service markets. As energy and ancillary services prices fall capacity market prices must rise to make up the difference in resource revenue requirements. As the resource mix of the marketplace evolves it is imperative that the full cost of new entry for capacity resources respects the linkage between capacity market revenues and energy and ancillary service market revenues.

10 Lowest Average Monthly Power Prices since March 2003

Rank	Month and Year	Wholesale electricity (\$/MWh)	Natural gas (\$/MMBtu)
1	June 2015	\$19.61	\$1.68
2	December 2015	\$21.35	\$2.19
3	March 2012	\$25.39	\$2.82
4	July 2015	\$25.40	\$1.96
5	April 2012	\$25.41	\$2.39
6	April 2015	\$25.88	\$3.18
7	November 2015	\$26.12	\$3.31
8	May 2015	\$26.12	\$1.85
9	February 2016	\$27.39	\$3.78
10	May 2012	\$27.99	\$2.63

Figure1. 10 Lowest Average Monthly Power Prices in New England since March 2003.

Source: http://www.iso-ne.com/static-assets/documents/2016/03/20160329_prelim_2015_prices_release.pdf

Looking Ahead

Decarbonizing the production of energy is an important step in the future of our society. As the power industry continues to dramatically reduce carbon emissions, it is critical that other sectors like transportation and building start to do more. Focusing on the evolution of resources that will be used to power our devices, homes and industries in a secure and reliable fashion we must approach the transition in a thoughtful and deliberate fashion. A rush to implement a heavy reliance on intermittent renewable resources would have unintended consequences for new thermal resources entering the market to replace retiring resources and provide resources adequacy. These long life assets could be stranded, forced to exit the market prematurely or—in the worst of all worlds—require out-of-market subsidies if the rate of change is not managed correctly. Allowing competitive procurement of intermittent resources would provide a reasoned rate of change in the resource mix supporting energy and capacity needs. A heavily subsidized entry of intermittent renewable resources or out-of-market resources, that change the resource adequacy procurement requirements, disturbs the fundamentals of the markets, chills investor confidence and could undermine reliability.