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PUC PROCEEDING RELATING TO RESOURCE ADEQUACY AND RESERVE ADEQUACY AND SHORTAGE PRICING	))))))	PUC PROJECT NO. 40000

COMMENTS OF OPOWER, INC. IN RESPONSE TO QUESTIONS FROM CHAIRMAN NELSON AND COMMISSIONER ANDERSON

OPOWER, Inc. ("Opower") appreciates the opportunity to submit its comments in accordance with the Commission's "Public Notice of Workshop and Request for Comments" issued in project number 40000 on November 22, 2013. In addition to these comments, Opower joins in the comments of the Texas Reliability Assurance Market ("TRAM") Advocates in this same proceeding.

A. Introduction and Summary

Opower delivers behavioral energy efficiency, demand response, and customer engagement services to over eighty electric and gas utilities across thirty U.S. states—including Texas—and seven countries. To date, these programs have saved over three terawatt-hours of energy.[1] This year, Opower will deliver personalized energy usage insights to more than 22 million residential customers through paper mail, email, websites, smart phones, and text messages. This summer, Opower delivered millions of event-driven, personalized communications as part of implementing one of the largest peak-time rebate programs in the United States. Opower estimates that its behavioral energy efficiency and demand response

[1] Three terawatt hours is enough energy to power all homes in a city of 600,000 people for a year.

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platform has the potential to cost-effectively deliver over 200 MW of residential peak demand reduction within the ERCOT footprint.[2]

Opower does business in Texas because retail competition has created a market in which power companies can use multiple resources – including Opower's behavioral efficiency and demand response products – to deliver value to consumers. There are countless companies like ours that are drawn to Texas's free-market, pro-business system, investing real money and driving innovation in the state. The Commission can build on this record by advancing market-based solutions that allow a broad range of technologies to help solve the state's reliability challenges.

The ERCOT energy-only market design has failed to attract sufficient investment in new generation and demand-side resources to maintain the reserve margins necessary to ensure adequate power system reliability.[3] As a result of this underinvestment, the homes and businesses of 23 million Texans within ERCOT territory are vulnerable to service interruptions caused by extreme weather and other contingency events. A report by Charles River Associates estimates that unless ERCOT reforms its energy-only market, the economic cost of forced outages will reach $17.1 billion by 2028.[4] Since the energy-only market cannot ensure reliability for the Texas grid, it puts the continued economic prosperity of Texas at risk.

A capacity market with a mandatory reserve margin is the best policy option to address ERCOT's resource adequacy problem because it will:

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[2] Figure refers to achievable savings potential. These results and a detailed estimation methodology are available here: http://opower.com/beepotential/. These estimates are conservative because they only include estimated demand reductions from one Opower product - Home Energy Reports. Significant incremental impacts could be achieved from behavioral DR and Opower-enabled smart thermostats.

[3] A report by the Brattle Group warns that the current energy-only market will fail to attract sufficient investment in new capacity to support the 15.25% reserve margin needed to achieve ERCOT reliability targets. Newell, Samuel, et al., June 2012, "ERCOT Investment Incentives and Resource Adequacy," *Prepared for ERCOT by the Brattle Group*, p. 3.

[4] Plewes, Jeff and William Hieronymus. "Economic Impact of Inadequate Generation in ERCOT – Comparison of Resource Adequacy Scenarios." *Prepared for NRG Energy, Inc., by Charles River Associates*, p. 32.

(i) Ensure reliable electricity service to all Texans;

(ii) Broaden low-cost resource participation;

(iii) Align resource value with market compensation;

(iv) Increase regulatory certainty; and

(v) Reduce system cost.[5]

Texas has an opportunity to once-again lead the country in competitive power market structure. A well-designed capacity market can provide the long-term price certainty necessary to attract new cost-effective investment in supply- and demand-side resources. Importantly, capacity markets can allow energy efficiency and demand response to compete directly with generation resources through the capacity auction mechanism. Competition between supply- and demand-side resources will enable Texas to attain system reliability requirements at the lowest cost while accommodating the greatest diversity of resources and encouraging innovation. Opower strongly recommends that the Commission adopt a capacity market and mandatory reserve margin for the ERCOT system.

In these comments, Opower will draw on its experience as a provider of behavioral energy efficiency and behavioral demand response to respond to questions raised by Chairman Nelson and Commissioner Anderson.

B. Responses to the Questions of Chairman Donna L. Nelson

1. What resources should be allowed to participate in the market?

Generation, energy efficiency, and demand response should all participate directly in the centralized capacity market and receive equal compensation for the capacity services these

[5] For detailed discussion of these benefits, see *Comments of Opower, Inc. on Questions Proposed by the Commission During the Open Meeting on August 29, 2013*, OPOWER, Inc., 23 September 2013, in this same proceeding.

resources provide to the grid. A capacity market that accommodates a broad range of supply- and demand-side resources ensures the economic procurement of capacity, aligns resource value with market compensation, and sends transparent price signals for low-cost resources to enter the market to fill incremental demand. The inclusion of demand-side resources in capacity markets can also help alleviate regional transmission constraints and mitigate supply-side market power.

Capacity markets are uniquely designed to accommodate participation from a broad range of supply- and demand-side resources. For example, PJM's Reliability Pricing Model ("RPM") allows energy efficiency to participate, whereas energy-only markets have yet to directly include these resources.[6] In its most recent auction, the RPM cleared over 1,100 MW of capacity from energy efficiency.[7] By designing the capacity market with performance-based rules—rather than prescribing certain technologies or resource types—the RPM incentivizes investment in low-cost efficiency and demand response resources that work in concert with traditional generation to fulfill reliability requirements while minimizing system costs. The American Council for an Energy-Efficient Economy ("ACEEE") estimates that the value of energy efficiency in PJM exceeds $2.0 billion in Ohio alone.[8] A capacity market that compensates demand-side resources on par with supply-side resources will allow Texas to realize its full potential for energy efficiency and demand response and meet reliability requirements in the most cost-effective manner.

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[6] Though energy-only markets have yet to accommodate energy efficiency resource participation, certain thought leaders have suggested frameworks that may allow for the inclusion of efficiency. In Texas, for example, the South-central Partnership for Energy Efficiency as a Resources ("SPEER") recently published a white paper that outlines a mechanism through which efficiency could participate directly in energy markets. See, *Toward a More Efficiency Electric Market*, June 2013. The paper is available at http://eepartnership.files.wordpress.com/2013/06/toward-a-more-efficient-electric-market-june-2013.pdf.

[7] For results of this auction, see http://eepartnership.files.wordpress.com/2013/06/toward-a-more-efficient-electric-market-june-2013.pdf.

[8] Value of energy efficiency across four years. See Table ES-1 in Neubauer, Max, et al, *Ohio's Energy Efficiency Resource Standard: Impacts on the Ohio Wholesale Electricity Market and Benefits to the State."* ACEEE, 2013.

Demand-side resources are colocated at the point of demand, which reduces the operational constraints caused by transmission congestion and improves grid efficiency during peak events. This creates the short-term benefit of relieving congestion-induced price spikes, as well as the long-term benefit of deferring investment in transmission system upgrades. Locational marginal pricing creates investment signals for demand-side providers to target energy efficiency and demand response programs in regions most affected by transmission constraints.

The participation of demand-side resources in the capacity market acts as a deterrent to the exercise of supply-side market power. Energy efficiency and demand response increase the price-elasticity of demand—effectively "flattening" the demand curve—which mitigates the ability of generation to raise energy prices significantly above cost.[9] The value of demand-side resources for market-power mitigation is especially great during periods of supply scarcity, as is currently the case in the ERCOT market.

2. How far forward should the procurement occur? What are the trade-offs of different forward procurement times?

The length of a forward period should be set to facilitate market participation of multiple resource classes and balance the risk allocation between producers and suppliers. A three-year forward period is generally considered to be the average lead-time for building a new gas-fired combustion turbine and is an appropriate length for a forward period that will facilitate the participation of all types of supply- and demand-side capacity resources.[10]

Intermediate "adjustment" auctions should be conducted at intervals between the date of the initial forward capacity auction and the start of the commitment period. Intermediate auctions

[9] U.S. Department of Energy, *Benefits of Demand Response in Electricity Markets and Recommendations for Achieving Them*, February 2006.
[10] Pfeifenberger, Johannes, *Review of PJM's Reliability Pricing Model*, The Brattle Group, June 2008, p. 68.

would allow the system operator to adjust the capacity obligations of load-serving entities based on updated demand forecasts for the delivery period. If additional capacity resources are needed, they can be procured on a competitive basis through the adjustment auctions. Interim auctions also allow capacity entities to adjust their commitment levels to changing market and project conditions, and potentially unwind from untenable positions. For example, if a power plant developer that had initially committed to supply 450 MW of capacity through the forward auction realizes that only 400 MW of capacity will be deliverable during the commitment period, the developer may procure the remaining 50 MW of capacity through the intermediate adjustment auction. Demand-side resources, such as behavioral energy efficiency and behavioral demand response, are able to scale quickly and can contribute to the competitiveness and liquidity of interim auctions. The frequency and timing of adjustment auctions should be determined through a future rulemaking.

In addition to forward periods, the Commission should consider the length of the commitment period for capacity resources. A commitment period is the period for which a capacity resource commits to provide capacity services to the grid. The commitment period should be at least one year in length because ERCOT calculates capacity obligations based on annual load forecasts. A one-year commitment period is appropriate for existing resources since investment costs for existing resources are sunk and therefore a longer commitment period will not have the effect of reducing investment costs.[11] New capacity resources that clear the auction should be allowed to "lock in" a capacity value for a multiple year commitment period, which would allow new resources to serve as a buffer against volatility in the capacity market. A multiple year commitment period reduces investment risk (and investment cost) for new

[11] Cramton, Peter and Axel Ockenfels. *Economics and design of capacity markets for the power sector*, May 2011. Available: http://www.cramton.umd.edu/papers2010-2014/cramton-ockenfels-economics-and-design-of-capacity-markets.pdf

resources, which will result in a lower overall cost to Texas consumers. The commitment period for new resources should be limited in duration (perhaps 3 years) and should be available to all types of new capacity resources, including generation, energy efficiency, and demand response.

3. **What qualification, performance requirements, and penalties should be in place for resources?**

Capacity resources must be available to deliver a specified volume of generation or load reduction to a specified location on the grid during specified performance hours during the entirety of the commitment period. If a resource fails to comply with these performance requirements, it should be assessed a deficiency penalty in proportion to its degree of variance. In subsequent capacity auctions, the capacity of a deficient resource should be de-rated to reflect its actual performance characteristics.

While other parts of the county have adopted such a "performance-based" approach to deciding which resources can participate in the market, Texas has an opportunity to lead the country by making sure that those resources perform as expected. Specifically, rigorous evaluation, measurement, and verification ("EM&V") protocols are necessary to ensure that all capacity resources adhere to the performance requirements. All EM&V protocols should measure the performance of capacity resources to a uniform degree of statistical accuracy and precision. To the extent possible, ERCOT should align EM&V protocols with industry best practices, including those developed by the State and Local Energy Efficiency Action Network ("SEE Action").[12] For example, SEE Action has developed an EM&V manual for behavioral energy efficiency programs, which allows evaluators to estimate peak demand reductions with a

[12] SEE Action is a state- and local-led effort facilitated by the U.S. Department of Energy and the U.S. Environmental Protection Agency to establish best practices for energy efficiency program design and regulatory treatment.

high degree of statistical confidence.[13] Standardization of EM&V requirements will reduce compliance costs for capacity resources participating in the market, which will ultimately lead to lower energy prices in Texas.

C. Responses to Questions of Commissioner Kenneth W. Anderson, Jr.

4. For a backstop procurement or in a capacity market, is it appropriate to price both capacity and energy based on a market clearing price?

The capacity market should be designed with a "pay-as-clear" auction mechanism where all resources receive payments based on the offer price of the marginal capacity resource to clear the auction. Under such a mechanism, each capacity resource earns a margin equal to the difference between the resource's cost to serve and the auction clearing price. This creates a strong incentive for capacity providers to keep capital costs low and to bid at their marginal cost to serve. When this profit-maximizing incentive is aggregated across all capacity suppliers, it creates the cumulative effect of pushing down auction clearing prices and reducing overall capacity market costs. Additionally, the participation of generation, demand response, and energy efficiency in a single auction with a single clearing price ensures that reliability requirements are satisfied at the lowest possible price while supporting resource diversity and program innovation.

D. Conclusion

A mandated reserve margin that is implemented using a forward capacity market would broaden resource participation, increase system reliability, align resource value with market

[13] Todd, Anika et al. *Evaluation, Measurement, and Verification (EM&V) of Residential Behavior-Based Energy Efficiency Programs: Issues and Recommendations.* SEE Action, May 2012.

compensation, and reduce costs. As recommended by the Brattle Group, a centralized capacity market is a proven and effective design for meeting resource adequacy requirements. Importantly, these markets can spur investment in demand-side resources and help Texas achieve its potential for reliable, low-cost energy efficiency and demand response.

In these comments, Opower has provided certain recommendations for a capacity market design that will facilitate the economic procurement of supply- and demand-side capacity resources. Opower appreciates the Commission's consideration of these comments and looks forward to continued participation in this proceeding.

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Respectfully submitted,

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