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Item Number: 28

Addendum StartPage: 0

PROJECT NO. 47199

PROJECT TO ASSESS PRICE-
FORMATION RULES IN ERCOT'S
ENERGY-ONLY MARKET

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PUBLIC UTILITY COMMISSION
OF TEXAS

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I. Introduction

SPEER appreciates the opportunity to provide these comments. SPEER is a regional energy efficiency organization created to accelerate the adoption of advanced building systems and energy efficient products and services in Texas and Oklahoma. SPEER is a membership organization representing over 55 member institutions, and companies engaged in relevant activities including the manufacture of lighting, insulation and advanced materials and appliances, finance, and energy efficiency or energy management services and software.

This project is an effort to identify and possibly address inefficiencies or other shortcomings in the current design of the ERCOT wholesale market. The project resulted from the filing of a paper by Dr. William Hogan and Dr. Susan Pope, funded by NRG Energy and Calpine. The paper identified several areas for improvement of the market design. The Commission, in requesting comments, has opened the door to other suggestions for improvements to the market design. SPEER's position is that:

- One of the major shortcomings of the existing wholesale market is the inability of loads of all sizes to effectively participate in the energy market independent, and particularly to do so independent of their retail electric provider (REP). The Commission should address this shortcoming through market reforms that would eliminate significant barriers to loads directly participating in the real-time energy market with the assistance of a demand response service provider.
- Market reforms that would facilitate loads' independent participation in the energy market should be evaluated alongside other reforms that are proposed by commenters in this project using the same assumptions.

28

- Reforms to address some of the barriers to load participation in the energy market have been proposed and examined at ERCOT through a combination of stakeholder discussions and ERCOT staff analyses. There are issues related to these potential reforms that have not been discussed in a Commission forum. This project may be an appropriate forum for further discussion and Commission direction with respect to these proposed reforms and the policy issues they raise. In addition, the Commission should examine the potential for creating cost-saving synergies by implementing several reforms at the same time.

II. The Commission Should Consider Reforms to Permit Loads to More Effectively Participate in the ERCOT Market

It is widely recognized that the integration of dispatchable load into wholesale electric markets can be expected to provide both reliability and economic efficiency benefits. The Hogan-Pope paper includes lack of demand response (DR) in the Security Constrained Economic Dispatch (SCED) process among the market design details that collectively suppress market prices when supplies are scarce.¹ Currently, the real-time energy market in ERCOT is not open to direct customer participation or to independent competitive energy management companies that specialize in providing demand response. Customers may participate in the real-time market through their REPs, but even here impediments exist to their doing so effectively.

Germane to the context of this proceeding, dispatchable load resources have the potential to significantly contribute to efficient price-formation. If load were competing with conventional generation in the real-time market, load would sometimes set the price and sometimes generation would set the price. In order for this to happen, the impediments to loads' participation in the real-time market must be removed, including opening the energy market to competition from competitive demand response providers.

The integration of load participation into the energy-only market through third-party (non-REP) demand response providers and the removal of other impediments to loads' direct participation in the market should be included within the scope of potential reforms under consideration to address price-formation in ERCOT. SPEER submits that the expansion of the energy market to allow and encourage greater competition from loads, including loads

¹ *Priorities for the Evolution of an Energy-Only Market Design in ERCOT*, William Hogan and Susan Pope, at 13 (May 2017) (cited as Hogan-Pope).

participating independently or through demand response providers could be undertaken *in addition* to other changes adopted to support efficient price-formation in the energy-only market.

III. Load Response is a Large Potential Resource that Affects Prices but Does Not Set Prices

Texas has enormous energy reserves in the form of residential and small commercial load, as well as industrial demand response potential. However, the market design does not include features to support broad participation of load resource aggregations in the real-time market and thus fails to harness this potential in a way that supports the long-term viability of the energy-only market design in ERCOT. The nature of the competitive retail market is such that, for most customers, retail prices have not reflected scarcity pricing events in the wholesale market. However, this paradigm is changing. REPs are increasingly finding ways to send at least crude price signals to customers in their retail products. The latest REP reporting to ERCOT regarding customers on retail products shows a steep increase from 180,000 customers in 2013 to over 900,000 in 2016 that are on pricing plans with an element of price variability that reflects wholesale market conditions.² (In comparison, in PJM, more than 2 million customers participate in demand response programs - 2,500 MW of which is eligible for dispatch in the real-time market.) However, active participation in SCED, particularly with the assistance of the emerging energy management technology and demand response aggregators, could significantly expand this price response, while contributing appropriately to price formation.

The Hogan-Pope paper discusses customer response to 4-CP transmission pricing: “Inevitably, the 4-CP transmission cost allocation rule operates as an outside-the-market effect that suppresses peak and near-peak energy scarcity prices.”³ Summer peak demand reductions by commercial customers subject to 4-CP billing of transmission charges,⁴ illustrates how out-of-market demand response can negatively influence efficient scarcity-price formation. ERCOT staff recently reported that a back-cast analysis on the impact of 4-CP response on real-time prices

² According to the 2016 Retail Demand Response Survey, 516,000 customers are on Peak Rebate products, 14,000 are on Block and Index products and 10,000 are on Real-Time Pricing products.

<http://www.ercot.com/calendar/2017/2/16/117218-DSWG>, See key document entitled DSWG Retail Demand Response Survey Participant Headcounts 2016. (Cited as 2016 Demand Response Survey.)

³ Hogan-Pope, at 76.

⁴ Customers with a peak demand of at least 700 kW or those served at transmission voltage (69 kV) are subject to 4-CP charges.

showed a “significant and highly volatile impact on real-time prices in 2015 and 2016 for ten days (59 intervals).”⁵ About 1,700 customers⁶ currently exhibit a 4-CP response and since 2010, the maximum total response has averaged over 1100 MW, peaking at over 1600 MW in 2011 and reaching 1400 MW in 2014 and 2016.⁷ Just like customers responding to 4-CP pricing, customers that respond to REPs’ pricing programs that reflect wholesale market conditions are simply reducing consumption and thus market demand. They are not participating in the market so as to contribute to setting prices.

IV. Limited ERCOT Efforts to Facilitate Participation of Loads in the Real-Time Market Have Not Been Successful

A minimal reform to allow load participation in ERCOT was adopted in 2013 but has been unsuccessful. This limited reform, referred to as Loads in SCED⁸ Version 1 was adopted by a protocol amendment in 2013. It permitted loads to be aggregated for participation in the real-time market. This version of dispatchable load participation, was limited to loads served by demand-response providers that are also the load’s retail electric provider (REP), electric cooperative or municipal utility. However, despite the 2013 reforms, there has been no load participation by REPs or other load-serving entities (LSEs) in the energy market to date, because of other barriers we discuss in section V, below.

The revised protocols did not address the major impediment for demand response providers that are not LSEs: the lack of a settlement mechanism that would allow them to be compensated for load reductions. If third-party demand response providers (that is, providers that are not also the load’s designated LSE) were allowed to participate in the energy market and the other impediments confronting small or aggregated load resources wishing to participate in the market were addressed, they could provide a reliable resource for ERCOT dispatch – sometimes setting the marginal price for energy, rather than simply reducing demand on the system during scarcity pricing events.

⁵ <http://www.ercot.com/calendar/2017/9/6/108837-WMS>. See key document 05. 4CP Impact on Real Time Prices for WMS Raish. See slide 29.

⁶ Electric Service Identifiers (ESIIDs)

⁷ <http://www.ercot.com/calendar/2017/9/6/108837-WMS>. See key document 05. 4CP Impact on Real Time Prices for WMS Raish. See slide 8.

⁸ SCED is security constrained economic dispatch.

ERCOT stakeholders have invested significant time and energy in recent years to identify a feasible mechanism for independent third-party DR providers to be settled in the energy market, in other words, to truly enable “Loads in SCED.” A mechanism was developed and presented to the Technical Advisory Committee in November 2015, but the solution was complicated and costly. The Loads in SCEDv2 Subgroup of the Demand Side Working Group outlined this settlement approach and the challenges it presented in a whitepaper dated Nov. 4, 2015.⁹ Recently, SPEER presented a different approach to expand Loads in SCED. Although not without its own complications, this approach appears to be simpler to implement.¹⁰

Although these two different proposals have been identified for opening the energy market to competition from demand response providers, existing stakeholders have declined to pursue adoption of either approach. Direction from the Commission may be necessary to encourage the market participants to take a more accommodating look at the current market barriers. Providing a mechanism for settling third-party DR providers is a key task in opening the real-time market to direct participation by loads through DR providers, but there are other impediments that need to be addressed, including response-time to dispatch instructions, telemetry requirements, and tracking the relationship between a DR provider and its customer. These issues are discussed below.

V. Technical Challenges For All Load Participation

Achieving the advantages of a wholesale market in which demand is responsive to price and can set market prices will require adjustments to technical requirements and systems that are based on operating characteristics of and experience with traditional resources.

1. The Requirement for Loads to Follow Five-minute SCED Dispatch Instructions Should be Examined

⁹ Loads in SCED Version 2 and a Proposal for the Implementation of LMP Minus G, www.ercot.com/calendar/2015/11/19/31849-TAC. See WMS Report, Item: LOADS_IN_SCED_111115_SubgroupRev.pdf.

¹⁰ A document and a PowerPoint presentation outlining this approach are available at <http://www.ercot.com/calendar/2017/6/16/117232-DSWG>.

One of the challenges to load participation is the technical requirement for load resources to be able to ramp up or down immediately in response to a new dispatch instruction by ERCOT every five minutes. This is a requirement for generating units under current protocols, and unless different rules were established for DR, these rules also apply to DR participation in the real-time energy market. This assumption should be examined to determine if this is a necessary requirement for an efficient market that includes load participation or merely an historical feature that was necessary when only traditional resources operated in the market.

SPEER suggests that other solutions warrant fuller consideration in the context of improved price-formation policy. For example, quick-start generators are permitted up to ten minutes to respond to certain ERCOT dispatch instructions, indicating that there are options that could potentially be adopted to enable a market in which qualifying loads could feasibly operate and be available to ERCOT operators in a way that would support, and not depress, scarcity pricing.

ERCOT and market stakeholders have acknowledged this fact and directed significant resources into developing a solution, known as the multi-interval real-time market or “MIRTM”, which would have allowed load resources the flexibility to participate in the real-time energy market within requirements that are consistent with their actual physical capabilities. It allowed a resource bid to include a multi-interval dimension, so that it might have up to 30 minutes to respond and would be able to set a minimum and maximum period of time that it would remain deployed, within certain limits.

It was in response to a request by the Commission that ERCOT performed an in-depth analysis of MIRTM in 2016 and filed a report and recommendation on the concept in early 2017. After conducting several back-casted simulations and hosting stakeholder discussions on the results, ERCOT reported that the estimated cost (\$20M) outweighs the estimated potential benefits to the market at this time.¹¹ ERCOT staff filed a recommendation to the PUCT not to proceed with MIRTM at this time and the PUCT accepted the recommendation, informally.¹² In its comments in this proceeding, the Independent Market Monitor has endorsed modifications to ERCOT market software to better commit load and 30-minute generators.¹³

¹¹ Electric Reliability Counsel of Texas, Inc.’s Report on the Multi-interval Real-time Market Feasibility Study, Project No. 41837 (Apr. 6, 2017)

¹² A discussion of the ERCOT report occurred during the April 13, 2017 Commission Open Meeting. A video clip is available at www.texasadmin.com/tx/puct/open_meeting/20170413/.

¹³ Comments of Potomac Economics, Project No. 47199, p. 2 (Sep. 15, 2017). This recommendation is addressed at greater length in the 2016 State of the Market Report, Potomac Economics, p. xxiii (May 2017).

In requesting the analysis on MIRTM by ERCOT staff, the Commission signaled its recognition of the importance of broadening the field of resources available for participation in the real-time market. SPEER suggests that it would be prudent for the Commission to again consider load resource participation in SCED within the context of other proposed reforms being evaluated in this project. We note that MIRTM contained a make-whole provision for resources committed by ERCOT in the event that the projected real-time price did not actually materialize in real-time, which would be paid for by an uplift to the market. SPEER's alternative proposal to enable Loads in SCED would also require an uplift charge but this should not disqualify the proposal from consideration to receive a fair cost/benefit analysis alongside other proposals in this project. Our previous evaluations of the market data suggest that the benefits, including infra-marginal savings, are likely to outstrip the required uplift.¹⁴

2. Load Resources are Limited Duration Products

Load resources can often be available flexibly, but for a limited duration. That is, a resource like demand response, or energy storage, might be available during most hours of the following day, but for no more than three consecutive hours. Yet a bid in the real-time market might, as structured today, lead to an energy obligation the resource could not meet. The MIRTM solution provided a mechanism that would allow a resource to manage its temporal obligation. This is a second rationale for implementing MIRTM.

3. Blocky Load Resources

Some load resources are only controllable in fixed quantities at a time, while generation facilities are typically expected to change their output levels incrementally in response to ERCOT dispatch signals. While some load resources, such as aggregations, may be able to make small changes in their output level, others are not. For example, an industrial load may have the capability to turn off completely, but not to reduce or increase its output gradually. Again, MIRTM would have addressed this limitation by allowing a load to assign a fixed quantity to its resource. This is an issue that the simplified loads in SCED solution does not currently address. If MIRTM is not adopted, an alternative solution needs to be developed that allows large binary loads to

¹⁴ <https://eepartnership.org/wp-content/uploads/2015/12/The-Debate-About-Demand-Response-Final-12.02.2015.pdf>

participate in the market, while meeting ERCOT's needs for reliable service and an efficient market.

VI. System Changes Required to Allow Independent (Not LSE Sponsored) Load Participation

1. Tracking the Relationship Between a DR Provider and its Customers

A customer who is under contract with its REP to receive bill credits or incentives for responding to a curtailment request should not simultaneously be eligible to receive credit from a third-party DR provider for the same service. The most thorough solution to avoid double payment would be to modify the Texas Standard Electronic Transactions (TX SET) or create a new registration process that would track each customer's Demand Response Provider of Record, just as the Retail Electric Provider (REP) of Record is tracked today. This solution was proposed as a part of the Loads in SCED Version 2 proposal presented to TAC in 2015. This would, however, be a very costly solution and would be unappealing to many market participants. Alternative low-cost solutions are clearly possible. For example, REPs are currently required to report to ERCOT which of their customers are enrolled on some type of retail product that provides an incentive for the customer to reduce or shift their usage from higher-cost to lower-cost time periods (for example, peak-time rebates, time-of-use, real-time pricing, etc.). This reporting could be leveraged to create a process for REP DR providers to register customers they are already granting credit for demand response, so ERCOT could prevent a third-party demand response provider from registering the same resource. Such a process could provide the necessary safeguard at a low cost.

2. Achieving LMP Minus G

Stakeholders in ERCOT strongly support compensating demand response at a value equal to what has come to be known "LMP minus G." One way to say this is, a load reduction saves a load the energy cost it would have paid for what it would have consumed. It should not, therefore, be paid to release energy it never bought. In SPEER's view, the most precise settlement approach to enable third-party loads to participate in SCED was the one outlined in 2015 by the Loads in SCED subgroup of the Demand Side Working Group at ERCOT. This proposal would have funded the real-time energy payments to DR providers by increasing the load obligation of the DR customers' LSE to balance the load reduction made by the third-party provider. However, this

would also require changes to ERCOT's settlement system, to begin charging REPs for a load amount different than the simple sum of the REP's customers' metered consumption. This approach, in the view of some market participants, also raised issues under certain customer protection rules that might need to be addressed by the Commission. As already mentioned, this element would be costly for every LSE interacting with Texas SET, whether its customers participated in demand response or not. In light of these daunting hurdles, market participants were not motivated to pursue adoption of the reforms as presented to TAC in 2015.

In response, SPEER has proposed a simplified proposed approach, which seeks to avoid the system changes required to TX SET and ERCOT settlement systems, and also to avoid potential conflicts with Commission rules. This solution would compensate third-party DR providers for load reductions in SCED at LMP minus G, but it would not require that the load reduction be added to the REP's load responsibility, and the system changes that would imply. Rather, this solution would require an uplift charge to be assigned to loads (presumably on a load-ratio-share basis), to cover the cost of payments to third-party DR providers. SPEER suggests that although uplift charges are generally undesirable, system savings and efficiency should more than make up for this allocation.¹⁵ The importance of enabling direct customer or third-party load participation in the market is important enough to price-formation in ERCOT to warrant serious consideration of this proposal at this time.

3. Real-Time Telemetry Requirements are Inappropriate for Smaller Load Resources

During summer peak demand in ERCOT, residential load represents about 50% of total system load with small commercial loads representing another 25%. Affordable technology exists today to aggregate residential and small commercial load for demand response. Customers are themselves investing in smart technologies to achieve greater control, comfort, health, safety and convenience in addition to cost savings. However, this abundant, low-cost resource is unavailable to help to serve total load and set prices in ERCOT, partly due to the current requirements for real-time telemetry. While it makes sense for a generator or large industrial load resource to be outfitted with technology that continuously communicates to ERCOT, it would be cost-prohibitive to outfit each residential or small commercial premise to provide real-time telemetry to ERCOT.

¹⁵ <https://eepartnership.org/wp-content/uploads/2015/12/The-Debate-About-Demand-Response-Final-12.02.2015.pdf>

The Loads in SCED Version 1 reform included revised telemetry requirements that were intended to facilitate participation in the market by a DR aggregation. Because this effort has not attracted any LSE DR aggregator participation in the real-time market, we can only conclude that additional adjustments may need to be considered.

While the system operators may desire relatively rapid feedback about the movement of substantial, even aggregated, distributed resources, this needn't be done exclusively with on-site telemetry to ERCOT. In fact, it should first be recognized that monitoring the contribution of a demand response resource is determination of a "counterfactual" event to begin with. That is, telemetry would only tell the system operator what the remaining load's demand was at the moment, not what its load response was relative to what it would have been in the absence of intentional control. Determining a load response, especially from an aggregated, weather-sensitive load resource like residential air-conditioning controls, is a statistical evaluation problem.

It is also true, however, that serious load response aggregators, or demand response providers, have developed the means to monitor and predict the response of their resource to control signals. And, their own systems can be based upon real-world feedback in some form or another. For example, a residential demand response provider will have relatively real-time communication with thousands of thermostats or switches, to know whether HVAC systems are currently running or not, and they know from experience the potential load response this represents. Such a provider could provide continuous "virtual telemetry" based on its own controls dashboard and analytics. The provider could work with ERCOT to prove up the accuracy of its own monitoring and control algorithms, as a means to confirm its capability to perform predictably and accurately, sufficiently to participate in SCED successfully. The NYISO is exploring this option currently. The 2013 Loads in SCED reform also allowed a form of this "virtual telemetry" approach. The Commission should evaluate the efforts of ERCOT and LSEs to use this approach and any obstacles they encountered, to facilitate a future discussion of telemetry modifications that would allow the participation of aggregated loads in the market.

VII. Evaluation of Alternatives

The Hogan-Pope paper proposed market reforms to improve the efficiency and reliability of the ERCOT wholesale market. Other commenters may propose different reform measures that warrant further evaluation. It is SPEER's view that all plausible improvements that are proposed

in this project should be evaluated in the same manner and the same timeframe. In particular, any cost-benefit analysis of proposed reforms should be conducted, using the same assumptions for all of the proposals. The market monitor has implicitly recommended that the Commission forgo a cost-benefit analysis of certain market enhancements that it recommends, including improving the commitment of loads and 30-minute generators, urging that “the Commission and ERCOT move forward on these changes as expeditiously as possible.”¹⁶ SPEER believes that the MIRT approach should be included in the list of any preferred options that the Commission adopts without a cost-benefit analysis.

The Commission should also consider the likelihood that a major market reform in one area would create an opportunity to reduce the cost of implementing reforms in other areas. In other words, there may be cost-saving synergies that would arise by implementing several reforms at the same time. This possibility should be considered in any analysis of the costs of the various reform proposals.

In SPEER’s view, the Commission should investigate the two Loads in SCEDv2 proposals and consider the cost, policy, and efficiency considerations of each. Adopting reforms to allow third-party DR providers to participate in the market would bring to the market companies that have the focus, technical capability, and customer relationships to make load participation in the market a reality. It may be that other reforms contemplated could be consolidated with measures to implement Loads in SCEDv2 in a manner to reduce its overall cost.

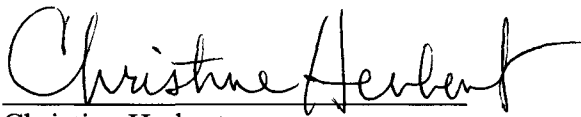
VIII. Conclusion

One of the major shortcomings of the existing wholesale market is the inability of loads either directly or through an independent third-party aggregator, to effectively participate in the market. The Commission should make a commitment to incorporate load participation into the energy-only market, because doing so would provide significant efficiency benefits to ERCOT. Market reforms that would eliminate these barriers and facilitate loads’ participation in the market should be evaluated alongside other reforms that are proposed by commenters in this project. In particular, if a cost-benefit analysis of proposed reforms is conducted, the same assumptions should be used in the evaluation of all proposals. In addition, the potential for cost-saving synergies arising by implementing more than one reform at the same time should be examined.

¹⁶ Comments of Potomac Economics, Project No. 47199, p. 2 (Sep. 15, 2017).

Some reforms to address barriers to load participation in the market have been proposed and examined at ERCOT through a combination of stakeholder discussions and ERCOT staff analyses. There are issues related to these proposed reforms that have not been discussed in a Commission forum. This project may be an appropriate forum for further discussion and Commission direction with respect to these proposed reforms. The most recent proposal offered by SPEER, as a result of many discussions with a variety of stakeholders, provides the most practical approach to incorporating third-party load participation in SCED. And, by incorporating the needed changes into the larger project to improve price formation, perhaps other strategic cost savings can be realized.

Respectfully Submitted;
Southcentral Partnership for Energy Efficiency as a Resource (SPEER)

A handwritten signature in black ink that reads "Christine Herbert". The signature is written in a cursive style with a horizontal line underneath the name.

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