# Synapse Comments on FAST Proposals in ERCOT

How to harness the full capabilities of the current proposals and maximize participation

**Prepared for Sierra Club, Lone Star Chapter**

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# 1. INTRODUCTION

These comments from Synapse Energy Economics, Inc. (Synapse) on behalf of the Lone Star Chapter of the Sierra Club address ancillary services proposals as developed through a series of ERCOT working groups that met in 2013 and 2014. The comments focus on two general categories of ancillary services: (1) the very fast, short-term regulation services that maintain system frequency and a stable balance between generation resources and electric loads, and (2) slightly longer-term resources that are needed within 10 to 30 minutes to support other resources that are following dispatch instructions.

For the first category of very fast ancillary services, we recommend that ERCOT explicitly design the services with an open architecture that can be modified to accommodate new technologies and allows third-party providers to compete with traditional providers of these regulation and short-term balancing services. We have identified examples of specific demand-side resources that may be able to provide regulation services in our comments. However, new approaches and new techniques are constantly emerging and it is critically important that the designs and rules adopted by ERCOT do not create barriers to participation by new providers.

For the second category of 10 to 30 minute resources, we recommend that ERCOT design the services to accommodate a variety of resources that have demonstrated their ability to meet the system performance requirements that ERCOT needs. This would include provisions for demand response (DR) resources that can perform during critical peak load periods, but may not be available over a 24-hour run time or all days of the year. Other regions, as well as ERCOT, have benefitted from peak load resources that are available on short notice and can effectively reduce system demand in situations where longer term resources are being dispatched or variable resources (mostly wind, hydropower, and solar) experience fluctuations in production. In our comments, we include examples of program designs that accommodate these different performance abilities.

The goal in designing these ancillary services should be one of balancing the different performance characteristics of a wide variety of resources, traditional and non-traditional, in order to maintain a reliable system without sacrificing overall cost, economic efficiency and policy goals. As such, these ancillary services should not require all resources to perform like a fast ramping gas unit. Instead, the services should be technology-neutral, and open to a wide variety of resources that can perform the necessary services, albeit in slightly different ways or over different time intervals.

# 2. FUTURE ANCILLARY SERVICES PROPOSALS IN ERCOT

In late 2013, ERCOT's Future Ancillary Services Team (FAST) proposed a mix of current and future ancillary services that would improve reliability in ERCOT in the face of changing operational requirements. The initial report, *ERCOT Concept Paper: Future Ancillary Services in ERCOT*, describes five fast-responding services to implement in the long run, and one transitional service providing slower-responding resources. The first five services focus primarily on frequency regulation and stabilization, in large part to enable greater integration of non-synchronous generation sources, such as wind. The transitional service, on the other hand, would largely focus on procuring capacity resources in response to shortfalls due to load or capacity forecasting.

It is worth noting that the two longest speeds of response in the ERCOT ancillary services proposals are 30 minutes for the transitional Supplemental Reserve Service and 10 minutes for the Contingency Reserve Service; the other ancillary services are much shorter response times. The required short response times will be a challenge for demand response that seeks to function as an ancillary service, as DR resources will have to respond much faster than within the current framework for Emergency Response Service (ERS) resources in order to participate in frequency regulation services. This is especially true once the transitional period is over if, as ERCOT has indicated it expects, the Supplemental Reserve Service will become unnecessary. While we can not predict the future, experience teaches us that this transition may last longer than expected and we believe that ERCOT may want to design an even more flexible Supplemental Reserve Service which could allow for DR services that need 60 minutes to react.

A more significant change from current resource requirements, however, is that under the FAST proposals, demand response resources would be required to bid in capacity reductions during every hour of the day. This requirement for resources to be available during all hours would pose a significant barrier to DR participation.

The descriptions of services provided below are based on two different documents. The first, the November 2013 ERCOT Concept Paper *Future Ancillary Services in ERCOT, Draft Version 1.1*, provided an initial look at the six proposed services. The May 2014 "Blackline document", *ERCOT Consolidated Working Document (5-6-14)*, expanded upon these initial proposals, amending the recommendations for four of the six services, as detailed below.

**Table 1. Summary of Proposed Ancillary Services**

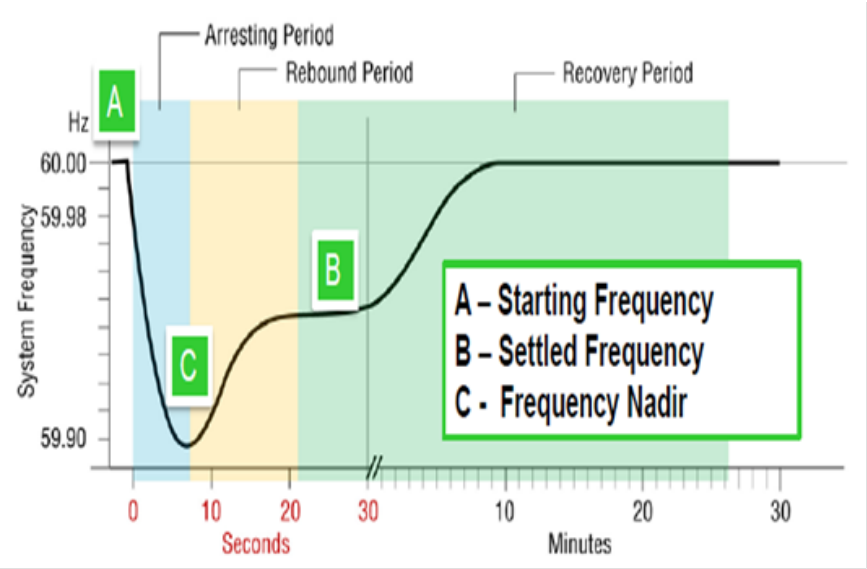
| Name | Purpose | Response Speed | Duration | Other Requirements |
|---|---|---|---|---|
| SIR (Synchronous Inertial Response Service) | Slow the RoCoF during power imbalances. | Instantaneous | Less than 10 seconds | |
| FFR (Fast Frequency Response) | Augments the SIR by increasing the time to reach the frequency nadir. | Within 0.5 seconds (30 cycles) | FFR1: 10 minutes, with 10 minute recovery<br><br>FFR2: As long as needed, with 90 minute recovery | FFR1 will respond at a higher frequency trigger |
| PFR (Primary Frequency Response) | Arrest frequency decay and respond proportionally. | Under 16 seconds | 1 hour | Response is due to Governor or Governor-like action |
| RRS (Up and Down Regulating Reserve Service) | Bridge gap between SCED intervals (which dispatches in 5-min intervals) | RRS: 5 seconds<br><br>FRRS: 1 second | 10 minutes | Must be capable of recording system frequency within one mHz |
| CRS (Contingency Reserve Service) | Respond to single largest contingency | 10 minutes | 1 hour minimum | Must be bid in to the market day-ahead for every hour of every day |
| SRS (Supplemental Reserve Service) | Transitional service to compensate for forecast error, unavailable units, or other abnormal situations, such as severe weather conditions | 30 minutes | 1 hour minimum | Must be bid in to the market day-ahead for every hour of every day |

## 2.1. Frequency Regulating Services

The two main purposes of the ancillary services proposals are to regulate the system frequency as participation of intermittent resources on the ERCOT grid continues to grow, and to meet NERC BAL-003 standards. The requirements for meeting the dip in frequency from intermittency is based on ERCOT's highest wind penetration as a percent of instantaneous load, demonstrated in Figure 1, whereas the NERC standard is based on a minimum Frequency Response Obligation, which is a contingency planning mechanism that models the instantaneous loss of the two largest units (which, in this case, would be 2,750 MW). ERCOT proposes to adjust frequency by a number of different mechanisms that can respond at different speeds to create a comprehensive, overlapping mix of services, as seen in Figure 2, page 8.

As ERCOT continues to revise the program design characteristics of the proposed ancillary services, it is important to allow the participation of a wide range of technologies in the frequency regulating services by ensuring that participation requirements are not overly onerous. Where appropriate, load or storage technologies may be able to provide the required services at a lower cost than traditional resources. These alternative resources have contributed to frequency support in other regions; some examples are noted throughout the descriptions of these proposed services below.

**Figure 1: Typical Frequency response following a generator trip**




*Source: Figure 2 in: ERCOT (2013)* ERCOT Concept Paper: Future Ancillary Services in ERCOT, Draft Version 1.1, Revised November 1, 2013. Available at: http://www.ercot.com/committees/other/fast/index.html

## Synchronous Inertial Response Service (SIR)

The first ancillary service to respond to a dip in frequency in ERCOT is the SIR. The SIR primarily functions as a means to govern, and slow, the rate of change of frequency (RoCoF) during power imbalances. With increasing non-synchronous generation such as wind, the system frequency declines, and there is a need for immediate stabilization before Primary Frequency Response deploys. SIR fills this void, acting to arrest the RoCoF by responding instantaneously to system need.

At the moment, the current level of SIR in ERCOT exceeds the level necessary to respond to the RoCoF associated with the highest instantaneous level of wind penetration achieved in ERCOT. It is likely that there will be sufficient SIR for an even greater level of wind integration. As such, the creation of a market for SIR procurement is currently a low priority, and the SIR is not currently included in the Blackline document for comment. Nevertheless, as more and more non-synchronous generation (i.e., wind and solar) becomes available, the RoCoF will necessarily increase, and there may eventually be a need to procure extra SIR, making it an important service to keep in mind moving forward. Additionally, a similar service known as EIR may be able to augment or replace the SIR service.

## Fast Frequency Response Service (FFR)

Although SIR deploys immediately, it does not act for long, leaving a gap between the arresting period and the recovery period (the blue and green sections in Figure 1, respectively). As such, ERCOT proposes a Fast Frequency Response Service to act in a "rebound period". In addition to augmenting the SIR's efforts to mitigate the RoCoF, the FFR's most important contribution will be to "increase the time to reach the frequency nadir."[1] Although no current FFR service or construct exists, 1,400 MW of Load Resources currently available through the Responsive Reserve Service (RRS) meet the FFR requirements, as presently defined.

The FFR is different than, but highly interdependent with, the Primary Frequency Response Service. As such, ERCOT has proposed to procure both services together. Nevertheless, the FFR has different service requirements: resources must be able to deploy within no more than 30 cycles (under ten seconds), and be sustained for at most 10 minutes before being re-deployable following a recovery time of 90 minutes. ERCOT is considering multi-stage deployments of FFR at different frequency levels as well as establishing minimum procurement requirements for each operating hour.

### *Recent alterations to FFR proposal*

The Blackline document breaks the FFR service into two, more targeted services: one service for resources with quick restoration times (FFR1) and one for resources with the ability to deploy for a longer period of time (FFR2). Though both will still be required to respond within thirty cycles, the quick-turnaround FFR1 will be triggered at a higher frequency than the FFR2, resulting in more events for the shorter acting services. As suggested by some of the DR providers, increasing the recovery time to include resources that need 180 minutes to recover (in addition to the 10 minute and 90 minute services) will expand the pool of resources that can provide this service.

## Primary Frequency Response Service (PFR)

PFR is defined as "the instantaneous proportional increase or decrease in real power output provided by a Resource in response to system frequency deviations." As such, the two main characteristics required of PFR resources are the ability to arrest frequency decay and to respond proportionally to frequency deviation.

Resources qualifying for PFR must be able to respond within 16 seconds, and will be judged, procured and compensated based on performance ramping within that window. Procurement levels for PFR and FFR are aggregated and based on meeting the NERC Standard referenced above, which requires a combined quantity of frequency response sufficient to cover the loss of the two largest nuclear units,

[1] Unless otherwise noted, all quotations and figures in Section 2 are based on: ERCOT (2013) *ERCOT Concept Paper: Future Ancillary Services in ERCOT, Draft Version 1.1, Revised Nov. 1, 2013. Available at:* http://www.ercot.com/committees/other/fast/index.html

which combine for 2,750 MW of capacity. This is the same as the level at which RRS is currently procured.

### Up and Down Regulating Reserve Service (RRS)

The Regulating Reserve Service fills a different void in grid stability. Given that generation is dispatched through Security Constrained Economic Dispatch (SCED) in five-minute intervals, a power imbalance arises between intervals, which can result in frequency deviation. RRS seeks to fill that gap by deploying frequency control resources for no more than 10 minutes – enough to bridge the gap between SCED intervals.

As implied by the name of the proposed service, these resources will be required to regulate frequency in both directions. As such, there will be resource-specific deployment. Consequently, individual resources will have to follow the load frequency control signal in ERCOT, and will be compensated based on performance.

#### *Recent alterations to RRS proposal*

Recognizing the need for regulating reserves capable of responding more quickly to grid needs, ERCOT amended the original RRS proposal to create both up and down Fast Responding Regulation Services (FRRS). Whereas the original RRS services are able to respond to ERCOT signals within five seconds, these new resources will respond to frequency fluctuations on the system within one second, and will rely both on internal triggers and ERCOT dispatch instructions. Additionally, the Blackline document discusses the participation of load resources under another subset of regulation services titled "Load Frequency Control."

Although the Blackline document points out that the RRS "will not substantially change from where it is today," it also broaches the possibility of running Security Constrained Economic Dispatch every three minutes as opposed to every five. Alternatively, the Blackline document suggests running SCED automatically when at least 70% of regulation is deployed.

## 2.2. Generation and Load Response Services

The remaining two proposed ancillary services focus primarily on filling any gaps that may exist in meeting demand. On the one hand, the Contingency Reserve Service focuses on responding quickly to the single largest contingency on the ERCOT grid. The transitional Supplemental Reserve Service acts to restore power imbalances more slowly but for a longer period of time.

Importantly, these are the two services where demand response is most likely to participate. However, as currently proposed, and as will be discussed in Section 3, below, these two services pose many barriers to the participation of demand resources.

## Contingency Reserve Service (CRS)

The Contingency Reserve Service is necessary to comply with the NERC standard listed above. Its sole purpose is to be able to respond to the most severe single largest contingency (in this case 1,375 MW) within five minutes, in order to restore frequency within 15 minutes. As pointed out in the Blackline document, the CRS is required to provide both frequency and load/generation stabilization due to the fact that RRS resources may already be deployed at the time of a generator trip. This service is most similar to the current 15-minute Emergency Reserve Service, and will be procured on the day-ahead market. CRS resources can be either generating resources or load resources.

### *Recent alterations to CRS proposal*

In order to allow for greater participation of load resources, the Blackline document breaks the CRS requirements into two separate services: CR1, which is provided by loads available in Security Constrained Economic Dispatch (SCED); and CR2, which consists of loads unavailable in SCED, which are characterized as "non-controllable 'blocky' Resources." Those resources with CR1 responsibilities will be dispatched by SCED after frequency drops to a certain trigger. Since CR2 resources cannot be dispatched by SCED, they will be manually called should the deployment of CR1 and Supplemental Reserve Service resources (described below) be insufficient. Resources within both services must ramp to full capacity within ten minutes and stay online for as long as needed.

## Supplemental Reserve Service (SRS) (transitional service only)

The Supplemental Reserve Service most closely resembles the current 30-minute ERS system, focusing on both generating and load resources capable of larger capacity capabilities over a longer period of time, but with slower start times than the purely frequency-centric alternative ancillary services. Although these resources are necessary in the short term to, "compensate for net load forecast error and/or forecast uncertainty on days in which large amounts of reserve are not available online," ERCOT believes that ultimately the service will not be required once the other ancillary services are fully operational. However, as described in further detail in Section 3, by altering the participation requirements and program design for the SRS, ERCOT could procure demand resources at a lower cost, making the SRS an important ancillary service even past the end of the transitional period.

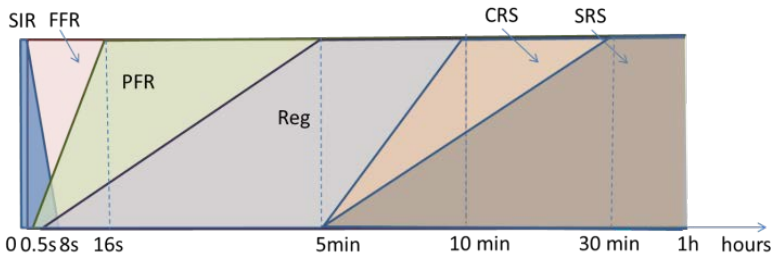
SRS resources will be required to deploy within 30 minutes, and run for at least an hour at a time. During the transitional period, SRS resources will be procured day-ahead.

### *Recent alterations to SRS proposal*

Similar to the alterations to the Contingency Reserve Service, the SRS is modified in the Blackline document to be two different resources: SR1, which is controllable loads dispatchable in SCED; and SR2, non-controllable, "blocky" loads unavailable in SCED. As with the previous service definitions, both SR1 and SR2 resources must be able to reach full capacity within 30 minutes. SR2 resources would be dispatched prior to FFR2 or CR2 resources. Additionally, SR2 is the only service that explicitly allows for the participation of aggregated loads.

Finally, although ERCOT still believes that the supplemental reserve services will ultimately be unnecessary, the Blackline document explains that it is prudent to begin to define the product and create a framework for the service now, regardless of future system needs. We agree that it is difficult to know with certainty whether this service will be transitional or be a key, long-term component of the ERCOT ancillary service market.

**Figure 2: Summary of ancillary services proposals**




*Source: ERCOT (2013)* ERCOT Concept Paper: Future Ancillary Services in ERCOT, Draft Version 1.1, Revised November 1, 2013. Available at: http://www.ercot.com/committees/other/fast/index.html

# 3. PROPOSED ALTERATIONS TO THE FAST PROPOSALS

As seen in Figure 2 above, the proposed updates to the ancillary services in ERCOT are sufficient to cover any instantaneous changes in frequency or demand. However, the current proposals have unnecessary design barriers that limit participation from demand resources. In other regions, demand response has proven to have a significant impact on prices, helping to drive down overall costs to the grid.[2] Synapse therefore recommends, on behalf of Sierra Club, that ERCOT ensure that the design of the proposed ancillary services accommodate and allow for participation of all technologies capable of providing the given service, regardless of whether the service is provided by generation, load, or storage.

The participation of demand response in ancillary services markets (including regulation services) has undergone a long evolution in other jurisdictions, and this experience can inform the design of ERCOT's ancillary services to facilitate participation from a wide variety of resources. Our comments build upon the lessons learned from these jurisdictions to provide a number of recommendations for how best to improve the current ancillary services proposals.

## 3.1. Lessons from other jurisdictions

While demand response resources have provided reserve services in ERCOT for many years, there has been less experience with the ability of demand side resources to satisfy balancing and frequency regulation needs. Nevertheless, there are several technologies that have the potential to provide significant contributions to balancing services, provided that program design requirements are not unnecessarily burdensome.

For instance, large loads that consume energy in all hours (not just in peak hours) are particularly well suited for use as a frequency regulation resource. This is particularly true for those large loads that are coupled with some form of storage, allowing the load to both increase demand – to refill a storage reserve – or decrease demand – relying on storage –to respond to the system needs. In fact, many forms of storage, from thermal storage to compressed air, can respond within the required amount of time and ramp to full capacity fast enough to satisfy balancing reserve service requirements. Both large industrial and small residential consumers may be capable of providing balancing services through thermal storage resources, such as electric thermal heaters or industrial cold storage. Further, as electric vehicles are more widely adopted, they will, when aggregated, be capable of providing a substantial amount of storage to the grid and potentially be automatically dispatched to provide near-instantaneous regulation services.

[2] For instance, according to the market monitor in PJM, since DR has been permitted to participate in the synchronized reserve market, it has had a small impact on capacity, but a significant impact on prices. *See:* Monitoring Analytics, LLC (2012) "State of the Markets Report for PJM: January through September 2012."

## Barriers to participation in ancillary services

Program design is paramount to successful procurement of the least-cost resources for ancillary services. While certain aspects of ERCOT's proposed ancillary services market are conducive to participation of a wide variety of resources (such as the separation of regulation-up and regulation-down resources [3]), other requirements serve to unnecessarily discourage participation by distributed resources such as demand response. In particular, ERCOT must be careful that the requirements for minimum resource size, metering and visibility, market bidding, and load aggregation do not arbitrarily exclude resources.

**Timing of Bidding:** Requirements for day-ahead bidding may limit that amount of demand response resources that are able to participate in the market, as demand response resources may not know how much capacity to bid into a day-ahead market, but would be prepared to bid into a real time market.[4] For this reason, the New York Independent System Operator (NYISO) allows demand to participate in both the day-ahead and real-time markets.

As currently proposed, both ERCOT's Contingency Reserve Service and Supplemental Reserve Service require loads or generation to bid in to the market day-ahead for every hour of every day. While some resources are capable of bidding in the day ahead, this requirement likely excludes other low-cost resources that are less able to forecast resource availability in advance.

**Availability:** Another barrier imposed on DR by the market procurement structure is the requirement that the resource must be available during all hours. Many DR providers may be able to provide a significant reduction during peak hours of the day, but no reduction at all during off-peak hours. By requiring load resources to bid in to the day-ahead market similarly to generation resources, which in jurisdictions such as ISO-NE are required to submit non-zero energy bids for every hour of the day, ERCOT could substantially reduce the volume of demand response resources that qualify for a given ancillary service. (This is particularly true when resource aggregation is not permitted.) For this reason, these comments suggest that ERCOT also include a mechanism to allow for the participation of lower-cost DR resources that are capable of responding only during peak hours. This proposal is discussed more in the following section.

**Metering and Visibility:** Although DR resources are often capable of providing very accurate instantaneous response information, ERCOT should be careful not to impose impossibly strict metering and visibility requirements, unless such information is absolutely necessary. While the grid operators may benefit from resolution as precise as possible, the requirements for

[3] MacDonald, Jason, et al. (2012) "Demand Response Providing Ancillary Services: A Comparison of Opportunities and Challenges in the US Wholesale Markets" *Lawrence Berkeley National Laboratory*.
[4] *Id.*

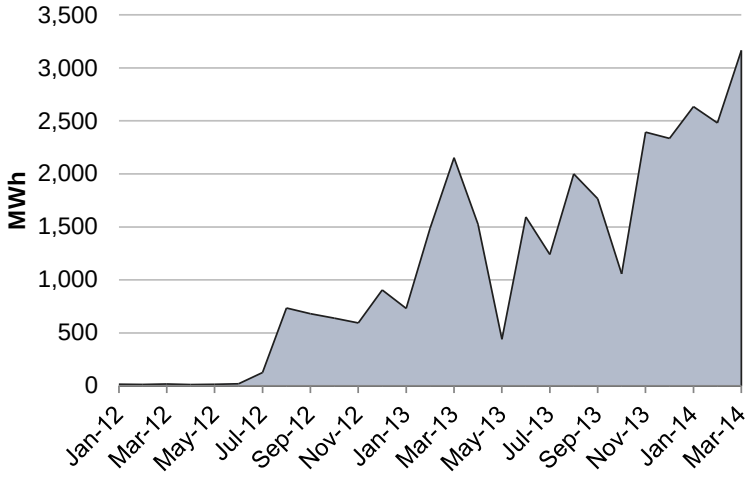
resources providing balancing services should keep in mind the costs that such requirements impose on non-generation resources.[5]

**Lead Time:** Across the proposed ancillary services, there is a wide range of lead time requirements for participating resources. Nevertheless, the proposed lead time requirements, which govern the amount of time that a resource receives to respond to a dispatch call, may create a barrier for some demand response resources. This may be particularly true for the 10- and 30-minute CRS and SRS products given that DR resources are traditionally accustomed to responding in 60 minutes in other jurisdictions.

**Minimum Size Requirements and Resource Aggregation:** Reducing minimum resource capacity requirements and allowing for the aggregation of loads will encourage greater participation from load resources. PJM's experience highlights the importance of program design in this area.

Demand response resources were approved to provide frequency regulation services in 2008, but did not actually clear PJM's market until 2011 because the market rules, including a 1 MW minimum offer requirement, made participation impractical. The minimum size restriction acted as a barrier to entry for new demand response aggregators, particularly aggregators of small residential loads. Following a rule change in November 2011 that removed several barriers, demand response participation in the regulation market skyrocketed. The figure below shows the monthly megawatt-hours of regulation provided by demand response in PJM since January 2012.

**Figure 3. Monthly Regulation Services Provided by Demand Response in PJM**




*Source: PJM Demand Response Operations Market Activity Reports*

[5] *See* MacDonald et al. (2012) for a more detailed discussion.

In order to illustrate the ability of demand response to provide fast frequency regulation, we provide a case study from PJM below.

### Case study of demand response participating in ancillary services in PJM

A company active in the PJM territory, known as VCharge, aggregates thermal storage heaters to provide low-cost heating and regulations services to PJM. VCharge's fleet of heaters is able to respond to area control error signals in 2 seconds, well within the requirements of the RRS proposal in ERCOT.[6]

Importantly, VCharge and other third-party demand response providers are able to participate in PJM's market due to market rules that accommodate a wide variety of resources. For one, PJM allows for aggregated loads to supply ancillary services. This is of particular importance when examining areas in which ERCOT can improve the current ancillary service resource requirements, as only one proposed service (SR2) allows for the aggregation of loads in the current proposals.

Further, the VCharge program, and other demand response resources similar to it, were only able to participate in the balancing reserve service after PJM lowered the minimum size requirement for resources from 1 MW to 0.1 MW. Although ERCOT has not yet specified minimum resource size requirements for those resources participating in the balancing services – FFR, PFR, and RRS – if the proposals ultimately do include a size requirement, it should be no larger than 100 kW.

## 3.2. Potential Additional Reserve Services

In other regions, Synapse has found that resource availability requirements are a critical variable in determining the performance and participation of demand response resources. As such, Synapse proposes on behalf of Sierra Club that ERCOT create two additional services based on the CRS and SRS that would facilitate the participation of load resources capable of responding only during peak hours.

In other regions throughout the country, demand response is playing an important role in reducing peak load and the need for new power plants, resulting in significant savings for ratepayers and the grid as a whole. However, the majority of these load reducing resources are only capable of responding during peak hours of the day. For instance, a large industrial company that provides demand response by curtailing production, dimming lights, or cycling air conditioning units is most useful during the middle of the day when demand is high, and much less capable of responding once employees have returned home in the evening. Participation of such Peak Demand Response (Peak DR) resources is severely limited by the requirement to bid into the market for every hour of every day.

The two additional proposals center on procuring precisely this demand response product – Peak DR. According to LBNL, "the market clearing prices for ancillary services display clear daily patterns in some

[6] For more information on the VCharge program, other DR resources capable of providing ancillary services, and DR in general, see: Hurley, D., P. Peterson, and M. Whited (2013) "Demand Response as a Power System Resource" *Prepared for the Regulatory Assistance Project*. Available at: www.synapse-energy.com.

markets," creating an ideal scenario for participation of Peak DR.[7] Importantly, as opposed to requiring a resource to bid in for every hour of every day, these two new services, CRS Peak and SRS Peak, would only require bids on non-holiday weekdays during the four- or six-hour blocks of peak energy usage during each season. They would only offer as CR2 and SR2 resources since they would not be bidding for 24 hours and would not be dispatchable through SCED.

Although the greatest stress is placed on the grid during peak hours, there is also a need to procure reserve resources capable of responding during all hours of the year to ensure grid stability if, for instance, a generator were to trip during the middle of the night. To satisfy the need for resources capable of responding during both peak and non-peak hours, we recommend that the two new reserve services, CRS Peak and SRS Peak, be procured in pre-set quantities as determined by overall system needs. ERCOT would establish a maximum limit of CRS Peak and SRS Peak resources. Demand response that is capable of providing a reserve service in all hours would participate in the traditional CRS and SRS categories, while Peak DR would participate in the CRS Peak and SRS Peak programs. These products and their procurement would be analogous to the manner in which PJM procures Limited Demand Response and Annual Demand Response.

If demand response resources capable of responding during all hours offered service at lower cost than Peak DR, then all of the system needs could be satisfied with the standard CRS and SRS programs. Conversely, if Peak DR resources offered at lower cost than those in the standard programs, then ERCOT would purchase Peak DR up to the pre-set quantity (perhaps 60% of the total CR2 or SR2 need) and the remainder of the resources purchased would be demand response available during all hours. A comparison of the product characteristics of the various CRS and SRS programs is provided in Table 2.

**Table 2: Product Characteristics of Proposed Reserve Services**

| | Availability | Bid Timing | Dispatch Method | Aggregation Allowed |
|---|---|---|---|---|
| CR1 | Every hour | Day-ahead | In SCED | No |
| CR2 | Every hour | Unclear | Manual | No |
| CRS Peak | Peak hours | Real-time | Manual | Yes |
| SR1 | Every hour | Day-ahead | In SCED | No |
| SR2 | Every hour | Unclear | Manual | Yes |
| SRS Peak | Peak hours | Real-time | Manual | Yes |

[7] MacDonald, Jason, et al. (2012) "Demand Response Providing Ancillary Services: A Comparison of Opportunities and Challenges in the US Wholesale Markets" *Lawrence Berkeley National Laboratory*.

# 4. CONCLUSION

Synapse appreciates the opportunity to provide these comments on the ERCOT FAST proposals. Overall, we are supportive of ERCOT's efforts to design specific services that can ensure reliable operations and be procured through market mechanisms. We have concerns that the requirements for the regulation and balancing services may create unanticipated barriers for new technologies and services offered by third-party entities. We recommend explicit language in these proposals that the intent is to provide participation opportunities for new technologies and new service providers. For the 15 minute and 30 minute services, we recommend that the quantities of resources not subject to SCED include opportunities for participation by Peak DR resources as well as the resources already included in the Blackline proposals.

We anticipate that Sierra Club will be participating, along with other interested parties, in the follow-up workshops and processes that will be planned after all the comments have been reviewed.