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California Energy Commission
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Subject: Renewable Integration Costs, Requirements and Technologies

ENBALA Power Networks appreciates the opportunity to provide comments to the Commission regarding Renewable Integration Costs, Requirements and Technologies. ENBALA is noted as a leader in using loads to provide Regulation Service and for Renewable Integration. ENBALA was the first Curtailment Service Provider to use loads in the provision of Regulation Service to the PJM Wholesale Market and has been continually active as a full market participant since November 2011. We have participated in several pilot projects and are currently working with DoE and ORNL on a project that will identify the flexibility to participate in several ancillary services markets available from various categories of loads. ENBALA has also been selected to provide a wind integration platform that will utilize industrial and commercial loads in response to the variability of the renewable generation (in order to minimize the requirement to back up wind with steam turbines).

Given our experience and varied background we would like to provide the following comments the Commission.

LANDSCAPE OF ALTERNATIVE TECHNOLOGIES FOR “FASTER FORMS OF DR”

The landscape for alternative technologies to provide Regulation is diverse, although there are relatively few active “non-generation” participants in the Wholesale Markets.

1. ENBALA is supplying Regulation service to PJM.
2. ALCOA is also participating in MISO using their Warrick facility.
3. In ERCOT, loads have registered as Controllable Load Resources and are able to supply Regulation services but ERCOT reports indicate no ongoing activity in the Market.
4. Storage resources have also been active in the provision of regulation service in NYISO, ISO-NE and PJM although we believe that ALL of these projects required some form of subsidy. (Note that on the load side, there have been no subsidies, and yet these are active participants).

Other loads or storage resources have participated in various pilot projects and will continue to provide proof of concept. We are encouraged that many participants and system operators view alternative technologies as a viable source for Regulation service and Wind integration as this will provide a diversified portfolio to provide these Ancillary Services and a more robust Electric Grid.

CHALLENGES TO CONSIDER

When we consider using loads to provide services like Regulation and Renewables Integration, there are two very significant differences in how we will need the loads to respond:

- 1) Speed of response -- there will be a requirement to respond much faster than the hours of notice typically provided for traditional DR events.
- 2) Frequency of response -- DR events are typically called only a few times a year (and never more than 10-20 times). Renewables Integration will require loads to be able to respond hundreds or thousands of times per year -- and for reliability services such as Regulation, the requirement is to respond to a four second signal -- literally 7.88 million times per year.

We have noticed that much of the conversation around loads participating in “faster forms of DR” -- which would include both Regulation and Renewables Integration -- tend to revolve around the requirement to respond quickly to a signal. In fact, in our experience reviewing the capabilities of several hundred loads, it is *how frequently* a load must respond that is by far the more challenging requirement (rather than how fast it has to respond). The real challenge is to capture the flexibility available in a loads usage patterns in a way that is non-obtrusive enough to be available most of the time.

Speed of Response. Certainly “faster forms of DR” will require automated connectivity (such as that provided by AutoDR). It is worth noting though, that for the power system, there is a limit to how fast the response really needs to be. Certainly a resource that responds in 30 seconds provides a better service than one that takes 5 minutes but responding in less than 30 seconds tends to not provide incremental benefit. The data latency in the provision of Regulation is generally greater than 10 seconds. In other words, it takes at least 10 seconds for the system operator to calculate the required amount of movement in response the Area Control Error (ACE), send the signal to the resource(s), the resource to physically respond to the request and finally have the resource reply to the system operator with the MW value achieved. Having resources respond in fewer than 10 seconds may actually result in un-measurable verification or excessive movement while providing no incremental benefit to the system. In general, the good news is that there are readily available IT technologies that can provide the speed of response required for any of these more valuable services (such as Regulation and Renewables Integration).

Frequency of Response. ENBALA is of the strong opinion that the most significant barrier to load participation in the Regulation service market is the requirement that the load be nearly continuously available to vary output. Typical Demand Response programs require the end-use customer to curtail load a maximum of 10 - 20 times a year but the practical reality is the curtailment may only occur once or twice a year if at all. In contrast, a load participating in the Regulation market will have to continually modify their consumption in response to the control signal. Most end-use customers have some level of flexibility, but do not have capability to provide this level of service continuously over time.

Again, the good news is that there are available technologies that can provide solutions. One of those approaches is to aggregate multiple loads together, and carefully coordinate their response -- so that no one load has to respond to all signals, but as a network they supply high quality regulation. The true value of the network is that each load can identify their specific constraints around participation, providing only as much flexibility as they are comfortable. The *network* will provide an aggregated response to the system operator that is robust, reliable and resilient.

ENBALA does believe, given the more challenging nature of “higher-frequency” demand response products that allowing (and even encouraging) aggregation will be key to the success of these programs. This is true not only from an education perspective, but also from an implementation and performance perspective.

THOUGHTS ON MEASUREMENT & VERIFICATION

Regulation Service, in particular, is a reliability product and therefore the system operator must be assured the quantity requested is the quantity delivered or the service provided lacks quality. We think it is important that loads meet these same telemetry, metering and verification standards in order to achieve broad acceptance. On the other hand, other “fast DR” services such as Renewables Integration, is not a reliability product and so it may not require the same level of telemetry, metering and verification. It is crucial that the telemetry and M&V should be considered and evaluated separately for each product or service being provided.

INCREASING CUSTOMER INTEREST IN DR

The commission had requested feedback on “what do we do to make DR more valuable to the customers”. It is difficult to address DR with a single response as DR spans multiple products and each product is priced uniquely. Participation in the energy markets is the secondary role for loads as they consume energy to create a product or provide a service therefore the engagement level of end-use customers varies tremendously. Loads that invest time and money to participate in the Energy or Ancillary Services markets are not necessarily guaranteed revenues as the price for these products vary significantly hourly, daily, seasonally and yearly. One approach, might be to allow loads to enter into longer term supply contracts, so they can feel their investment in engineering and systems to provide flexibility will be rewarded. Clearly these would be to make economic sense relative to alternatives, but it does seem logical to allow a portion of the market to make long term supply commitments. Ultimately the DR participation in the Energy and Ancillary Services must be a cost effective solution for not just the market but also the end-use customer.

BARRIERS TO MORE EXPANSIVE PARTICIPATION

In our experience in other jurisdictions, the concept of demand side participation in Regulation Service is generally viewed as positive by most market participants. The barriers, we have found, are typically very detailed and are of administrative nature. But that doesn’t mean they aren’t very real barriers.

For example, in PJM, we found the following barriers to participation. Note that all of these are quite detailed, and require a deep and specific understanding of existing market rules and even how the ISO operates the system.

- Size of load registering (500kw to 100kw) -- this is because when starting out, smaller loads may well want to ‘test the waters’ before committing to larger amounts. This also encourages broader participation from many entrants.
- Allowing multiple Curtailment Service Providers (CSP) to participate with the same client. Crucial -- because many loads that may want to participate already do other products through a CSP, that may not also offer Regulation services.

- Simpler aggregation rules. This also is crucial, because not that many loads have the flexibility to participate in Regulation Services, and so aggregation rules must be as simple as possible to encourage the most cost effective participation.
- Submetering. Crucial to allow portions of large loads to participate in Regulation Services markets.

PJM worked with stakeholders to identify the necessary rule changes, implement them in their tariff and recently had these tariff revisions approved by FERC. *It will be crucial for any ISO desiring to see significant load based participation in Regulation markets to follow a similar process.*

ENBALA believes new products such as the Flexible Ramping Products currently being stakeholdered at CAISO must clearly define the specific performance requirements and let the industry develop the best solution(s). These solutions might come from generators, demand side or storage but it is imperative there not be administrative hurdles for any of the technologies participating in the product.

One approach to ensuring that barriers to participation by loads are eliminated would be to require a portion of these defined products (Regulation, Flexible Ramping Product, "Renewables Integration") must be provided by non-generation resources. Note this is not intended to be a subsidy or preferential treatment. Rather, the intent is that by ensuring emerging technologies are in the market, then the barriers to participation must be removed.

Our final observation is there must be a relentless drive to remove all barriers to demand side participation. Many of these are very detailed and are of administrative nature, but that doesn't mean they aren't important. There are certainly learnings from other jurisdictions, but California will need to determine what the barriers are in the California markets. For example, WECC's prohibition on demand side participation in the provision of some Ancillary Services is an administrative barrier that will need to be addressed. ENBALA would be willing to assist with this, if requested.

Respectfully submitted,

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