

Greater Participation of Small and Midsize Loads in ERCOT Markets:

Opportunities and Barriers

Jay Zarnikau

Frontier Associates

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Background

- We have achieved considerable success in integrating large industrial loads in ERCOT's market for Responsive Reserves.
- The stakeholder Demand Side Working Group of ERCOT has an objective of encouraging greater participation by “small and midsize loads” in ERCOT's markets for energy and ancillary services.
- As a first step, we are trying to better understand the problem. *What are the barriers to broader participation in ERCOT's markets by smaller loads?*
- I will present our current understanding of the barriers and opportunities. Over the course of the next couple days, we hope to learn a lot more!



Ancillary Services

- Since Paul has already discussed the steps contemplated to integrate smaller loads into the real-time energy market via the Security-Constrained Economic Dispatch Model (SCED), I will focus on opportunities to participate in ancillary services markets.
- Ancillary services markets include:
 - Responsive Reserves
 - Non-Spinning Reserves
 - Regulation





What is Going On?

- In some other markets, there have been pilot programs (prompted by FERC Order 719) designed to explore how aggregations of smaller loads could provide non-spinning reserves.
- In Texas, the ARRA-funded Discovery at Spring Trails (CCET) and Pecan Street projects (Austin) are exploring how new technologies might be used to better control smaller loads.
- Pilot programs are underway by BlueBonnet Electric Coop, Pedernales Electric Coop, and CPS using Consert's metering and control technology.
- *We understand there is a lot of interest in this opportunity. But, we are not yet seeing participation by smaller loads in markets for ancillary services on a “commercial scale.”*



Current Market Requirements

- Registration with ERCOT as a Resource Entity.
- Representation in the ERCOT markets by a Qualified Scheduling Entity (QSE).

The potentially-troublesome ones:

- Assignment by the Load's Transmission & Distribution Service Provider (TDSP) to a single Resource Node on the ERCOT Network Operations Model.
- A minimum of 100 kW of available demand response at the Resource Node level.
- Full-time telemetry to ERCOT, through the QSE, via ICCC across the ERCOT Wide-Area Network.



Current Telemetry Rules are an Impediment

- Telemetry signals include a number of data points communicating the status of the Load Resource and are fed into the ERCOT Ancillary Services Monitor in real-time.
- It would be prohibitively expensive to install such equipment on each residential or small commercial load within a Load Resource aggregation.
- AMI systems and their portals are not presently set up to provide real-time information (although they could perhaps be reconfigured to do so).
- Consequently, participation of smaller loads in ancillary services markets may require some relaxation of ERCOT's requirements for telemetry.





Current Telemetry Rules are an Impediment (Continued)

- Current AMI meters do have the ability to be polled by a local device up to every 7 seconds; however, protocol telemetry requirements would still need to be modified. However, the data are currently not collected through the portal; consequently this approach would have to leverage either a customer's current broadband connection or some other communication mechanism.
- Another proposed solution is virtual telemetry, involving the creation of a virtual meter to provide QSE-level assessment of what the aggregation is doing in real time.



Current Telemetry Rules are an Impediment (Continued)

- One proposed solution is to leverage wireless broadband networks via the retail electric providers, aggregators or qualified scheduling entities.
- While they can potentially provide real-time status of, signaling to, and response by Load Resources, this requires that the resource communicate directly via a gateway or home energy management (HEM) system within each residence.
- It also requires a management and control system (software) capable of interacting with the gateways/HEMs and aggregating the resources.
- These capabilities are being developed, but are in their infancy and will likely take 3-5 years to achieve the required maturity and reliability.



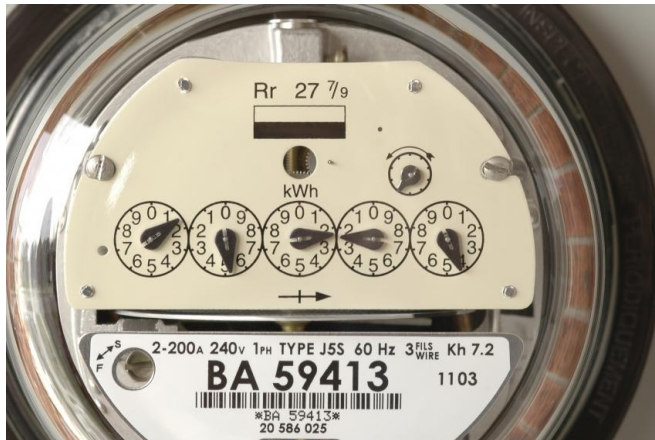
Other Possible Impediments

- The network modeling requirement that a resource be assigned to a node combined with the 100 kW minimum offer may prove to be a problem for aggregations spread out over a large geographic area (e.g., an aggregation of chain stores with sites in many areas of the state).
- It may be difficult to forecast residential and small commercial load levels one day in advance with sufficient accuracy. For an ancillary service, a QSE must generally provide at least 90% of an amount offered to the market.



Are the AMI Meters Installed by the TDSPs Sufficient?

- Some promising control technologies require that an existing meter be replaced with a new meter which incorporates communications and control equipment from a particular technology provider (e.g., Consort's system).
- Thus, new AMI meters installed by a utility may need to be replaced with a different meter.



- Tariffs are in place to compensate the transmission and distribution utility for this activity.
- But, is this an appropriate approach?



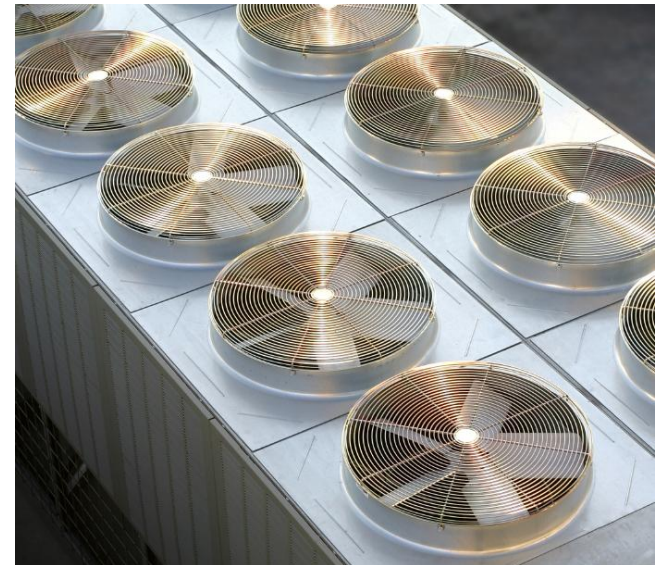
The Questions We are Exploring

- Could ERCOT's market rules be revised to allow statistical sampling in lieu of telemetry upon all members of an aggregated Load Resource? (Note that Southern California Edison installed 500 telemetry sensors to estimate the load levels of 2300 air conditioning loads in their pilot.)
- What are the respective costs associated with statistical sampling vs. telemetry at each site?
- How can telemetry standards be relaxed to ease economic burden yet retain visibility/reliability by System Operators? For example, is one minute telemetry acceptable? Should ICCP be required for all ancillary services, or would "mesh networks" suffice for Non Spinning Reserves?
- What would be involved in developing an algorithm to estimate the total demand reduction from a sample of premises involved in a load control program? How large a sample would be required?



The Questions We are Exploring

- Could the real-time signals, extrapolated to the population of loads providing an ancillary service, be later checked against AMI data for purposes of measurement & verification?
- Could ERCOT's statistical load profiling models or EILS default baseline methodologies be combined with telemetry data to provide a refined estimate of the available load reduction potential?
- Could ERCOT's load profile model results or EILS default baseline methodologies be used to forecast the amount of Non Spinning Reserves available from an aggregation that relied upon air conditioning direct load control to provide a Resource?





The Questions We are Exploring

- For water heater control or the control of appliances, could end-use profiles from load research studies be used, or would end-use metering be required?
- Could the requirement that Resources be assigned to a node be waived for an aggregation of small Load Resources?
- What is the true potential for aggregating resources over wireless broadband in terms of technology and the Texas market structure?
- Should we develop something similar to what CAISO calls a “Sub-LAP”?
- Should the demand reduction associated with small loads be scaled up for transmission and distribution line losses?