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ERCOT Pilot Project	)	
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COMMENTS
ROADMAP TO REACH 80 MW AND BEYOND OF ADER CAPACITY

Introduction

Bandera Electric Cooperative, Inc. ("Bandera Electric" or "BEC") is a member-owned electric cooperative formed under the Electric Cooperative Corporation Act. For the past 85 years, Bandera Electric has provided electric service to rural Texans. In 2014, the member-owners asked the cooperative to modernize and innovate by exploring the ability to:

(1) provide high speed internet access,

(2) deliver behind the meter distributed energy resource options, and (

3) finance distributed energy resources and energy efficiency options.

Today, Bandera Electric is a fully integrated utility providing generation, transmission, and distribution service as well as delivering electric and internet services to its members and residents of the Texas Hill Country. In 2016, Bandera Electric began providing solar and energy storage options to its members. In 2017, the cooperative launched BEC Fiber. It uses fiber optic technology to deliver high speed internet access across its service area and now in Llano, Texas as well. In the same year, BEC began developing its Apolloware energy management platform to provide device level metering in real time. In 2020, Bandera Electric formed its Energy Services Division to combine Apolloware, Energy Efficiency financing, and Solar and Storage options in a comprehensive program and making those options available through a tariff based, on-bill financing program call BEC Energy Saver.

Bandera Electric has been a member of the ADER Task Force since its inception and is _**the first open access ADER platform to be qualified in the ERCOT energy market**_ and provisionally qualified for non-spin reserve service and ERCOT contingency reserve service.

Based on its 85 years of delivering electric service, its experience in developing the energy and communications capability of an integrated utility, and its success in qualifying an ADER in ERCOT, Bandera Electric respectfully submits these comments.

Objective

To provide a roadmap to reach 80 MW of Aggregated Distributed Energy Resource (ADER) capacity by leveraging smart thermostats and other residential devices capable of participating in ERCOT's Wholesale Market Ancillary Services.

1. Understanding the Current Landscape

Half of ERCOT's winter and summer peak loads come from residential customers' weather-sensitive loads. To achieve the 80 MW target and enhance grid reliability and resiliency, we must leverage existing assets:

o **Number of Households in ERCOT**: ERCOT serves approximately 8 million customer meters, representing about 26 million people.

o **Smart Thermostat Penetration**: Approximately 16% of households, or about 1.3 million homes, have smart thermostats. Each thermostat can provide around 2 kW of registered capacity as an ADER.

2. Leveraging Devices for Revenue Generation in Ancillary Services

To meet the 80 MW capacity goal, we should focus on devices capable of participating in ERCOT's Wholesale Market, particularly Ancillary Services like Frequency Regulation and Responsive Reserves.

o **Smart Thermostats:** With 1.3 million homes equipped with smart thermostats and each providing 2 kW of capacity, targeting even a small fraction could significantly contribute to the 80 MW goal.

o **Energy Storage Systems and Other DERs**: Additional capacity can be sourced from batteries, water heaters, and other controllable devices, enhancing flexibility and responsiveness. For example, we have identified almost 9 MW of energy storage systems from a single manufacturer within the LCRA footprint. Apolloware is already integrated with this manufacturer's API, demonstrating the endless possibilities for expansion.

3. Strategic Considerations for Task Force Expansion

Before expanding the task force, we must evaluate the value each new member can add toward achieving the 80 MW goal.

o **Expertise in DER Integration and Telecommunications**: New members should possess specific knowledge in DER technology, grid integration, and market participation. Our analysis shows that many DERMS platforms lack the capability to meet ERCOT's real-time telemetry requirements, which is crucial for participation in a complex market like ERCOT. Our own experiences reveal that a critical point of failure in meeting market goals is the communication capability of the devices along with the

internet access available at various premises. BEC's experience with network communications helped it with ensuring quality communications between the devices and the Apolloware platform.

- o **Network and Influence**: Members with strong connections to technology partners or consumer bases could accelerate device recruitment and aggregation. NOIEs and REPs have the most direct access to consumers. Device manufacturers and their installer networks could work along with NOIEs and REPs to quickly enroll consumers and increase participation.

- o **Commitment to the Goal**: It is vital that members are committed to achieving results and contributing resources, whether financial, technological, or logistical. Bandera Electric's Apolloware platform, for example, has already met ERCOT's requirements and was provisionally qualified for NSRS and ECRS, showing its readiness and capability.

4. Bandera Electric's Apolloware Platform is a Shovel-Ready Solution

Shovel-Ready Status: The Apolloware Platform is ready to support any participant in ADER, allowing quick qualification under ERCOT's rules. Attempts to alter ERCOT's SCED platform or relax requirements could delay achieving the 80 MW goal. ADERs should meet real-time telemetry requirements to ensure system reliability. Apolloware is ready to help any entity that wants to achieve the 80 MW goal today.

Notable Achievements:

- **The Apolloware Solution provides device level telemetry agnostic from the OEM by using a hardware and software solution.**

  Every DER OEM will have its own unique limitations, including device reliability, data accuracy, data granularity, device responsiveness and performance attributes (e.g. batteries get hot and fail to discharge at instructed levels). Apolloware solves for these limitations by monitoring DER circuits independent of the OEM, providing real-time telemetry feedback and calibration.

  Apolloware provides a source of truth with independent real-time circuit monitoring that is crucial because it provides accurate and reliable data on the actual performance of DERs, avoiding the inconsistencies that can arise from relying on OEM device telemetry.

  Apolloware's real-time feedback loop enables the prediction of aggregate commands needed to reach a target MW level without needing detailed knowledge of how each command affects various devices under different conditions. By continuously monitoring actual outputs, the system dynamically adjusts to fine-tune the overall load response across a diverse array of DERs. Direct circuit monitoring, like for an HVAC system, provides precise data on how a specific adjustment—such as changing the thermostat by 2 degrees—impacts the load. This is far more accurate than estimating

from whole-home energy use, which can be affected by other appliances. Using real-time feedback, the system can learn and adapt, ensuring that the aggregate response of all devices meets the desired target, making grid management more reliable and efficient.

This "open access" architecture is key to achieving ERCOT's 80+ MW ADER target, as it's the quickest, most scalable approach to incorporating a wide array of OEMs and DERs.

- **Apolloware passed SCED in its first attempt using scalable technical infrastructure.**

  o Ability to follow ERCOT's instructions by translating the UDBP value into device-level commands across the fleet of participating resources once every minute

  o Dynamic management of Low Power Consumption (LPC) and Max Power Consumption (MPC) to communicate real-time capacity to ERCOT

  o Leveraged cutting-edge, highly performant cloud infrastructure that is capable of elastic scaling to large ADERs (i.e. 80+ MW of deployable resources)

BEC SCED Results

Target Base Point (UDBP) — Actual Load

Time
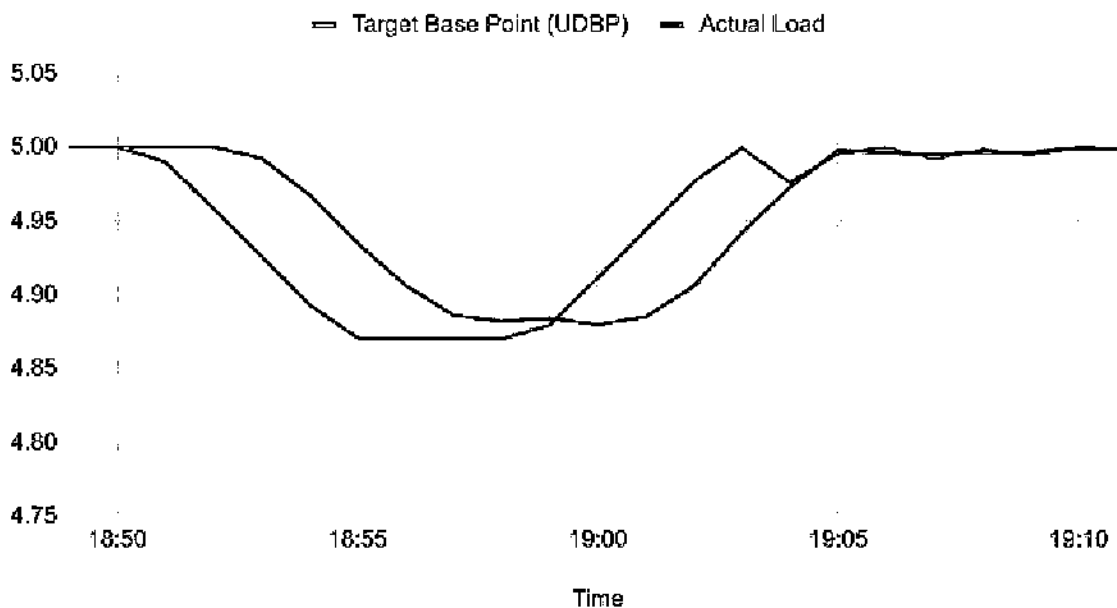
- **Apolloware passed Telemetry qualification by focusing on a holistic solution that:**

  - Managed site reliability issues such as comms outages. This is key to qualifying for the ADER program – but it's *critical* to ADER operations and scaling to 80+ MW

  - Harnessed Apolloware's 2-second device level telemetry, fed to ERCOT via QSE ICCP connection

  - Employed a resilient API integration with battery OEM with edge-case management built into Apolloware's event management software

  - Achieved 97.95% telemetry accuracy, well over the 90% qualification threshold

BEC ADER Telemetry Qualification Results
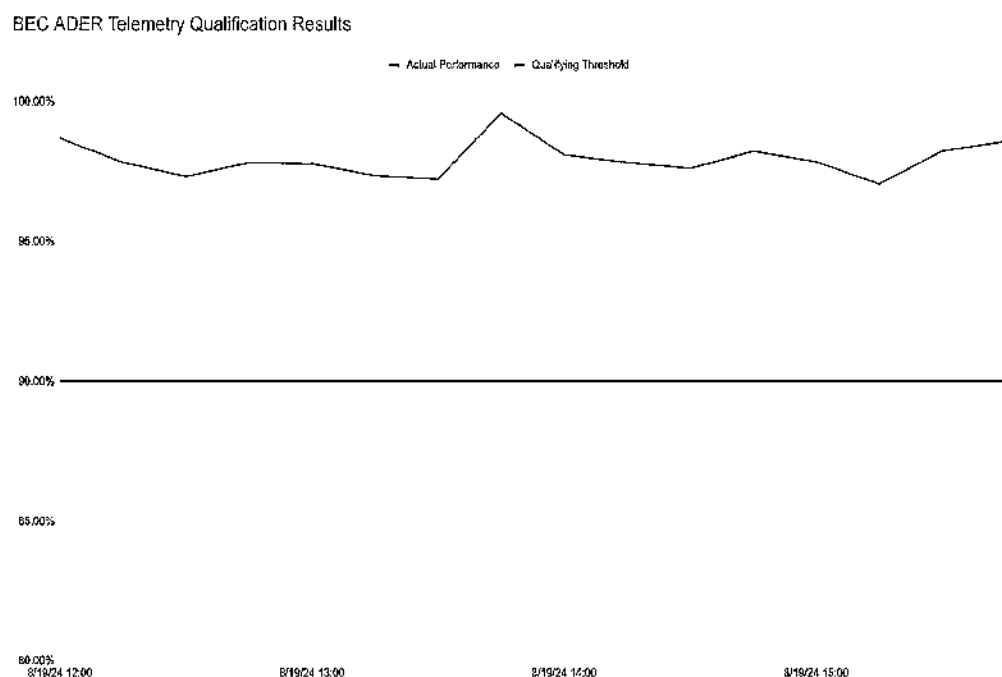
5. Incentives for Consumers

The Task Force should prioritize developing guaranteed financial incentives in collaboration with ERCOT to make ADER participation more attractive to consumers.

- **Financial Incentives**: Providing financial incentives for residential, commercial, and light industrial customers to enroll devices in the ADER program can significantly boost participation. This could include direct payments, bill credits, or rebates.

- **Education and Awareness**: Educating consumers about potential savings and revenue from Ancillary Services participation can motivate enrollment.

- **Simplified Enrollment Processes**: Streamlining enrollment through platforms like Apolloware will reduce barriers and increase adoption. More OEM participation is needed to improve API standardization and reliability.

6. Action Plan to Reach the 80 MW Goal

- **Target Households with Smart Thermostats**: Focus on the 1.3 million homes with existing smart thermostats. Aim to convert at least 40,000 thermostats into registered ADER participants to achieve the 80 MW goal.

- **Expand DER Integration Beyond Smart Thermostats**: Encourage OEMs to join the Task Force and collaborate on integrating devices like home batteries, EV chargers, and smart water heaters.

- **Leverage Apolloware's Capabilities**: Use Apolloware's infrastructure to manage these devices, ensuring compliance with ERCOT requirements and maximizing integration potential.

- **Incentive Rollout**: Develop a robust incentive structure to encourage participation, informed by consumer behavior and market trends.

By focusing on these strategic areas, we can not only reach the 80 MW goal but also create a sustainable model for ongoing participation in ERCOT's Ancillary Services, enhancing both grid reliability and revenue opportunities for all stakeholders.

Respectfully submitted,

John Padalino
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Bandera Electric Cooperative, Inc.
ADER Task Force Member