

**BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI**

In the Matter of Union Electric Company d/b/a)
Ameren Missouri's 2020 Utility Resource Filing) File No. EO-2021-0021
Pursuant to 20 CSR 4240 – Chapter 22)

**ARMADA POWER, LLC'S OFFICAL COMMENTS
SUBMITTED ON MARCH 30, 2021**

Armada Power, LLC ("Armada Power") respectfully submits these comments as it relates to the above referenced matter currently pending before the Commission.

BACKGROUND INFORMATION

Armada Power creates technology solutions for the electric utility industry, and our mission is to make the power grid more reliable, renewable, and cost effective. Our main product line is a combination smart and secure water heater controller that combines with our software platform FleetCommander. We use FleetCommander to turn thousands of connected water heaters into flexible energy storage for the power grid while minimizing the impact to the water heater user.

Our water heater management solution provides convenience and intelligence so that consumers save money and enjoy hot water availability whenever they need it. The system does more than monitor water usage and employ cost-saving demand management. It also includes thermal storage to shave household power usage during peak demand. Residential users come out ahead when programming the system for time-of-use pricing, with average savings of \$100 to \$150 annually.

ARMADA POWER'S COMMENTS ABOUT THE PROPOSED INTEGRATED RESOURCE PLAN

Armada Power appreciates and supports Ameren's plan to incorporate demand response and demand side management programs in addition to energy efficiency for residential customers. However, Armada Power respectfully suggests that the Integrated Resource Plan ("IRP") should incorporate a combined demand and grid control program for residential customers through a behind the meter thermal storage program. Ameren's IRP currently separates certain functions between demand response and grid modernization.

Armada Power recommends Ameren incorporate a behind the meter thermal storage program using water heater demand control to combine multiple functions through a single program.

Thermal storage technology has accelerated since the simple on/on/off direct load control (“DLC”) switches in Ameren’s prior residential water heater load control programs. New thermal storage technologies, like Armada Power’s technology, create utility control for grid purposes including demand response, cold load pickup and solar sparging, in addition to customer time of use functionality. The technology can be used multiple times a day with millisecond response times allowing for grid functionality calls without long reboot times. For the residential customer, the design of Armada Power’s technology specifically ensures hot water when needed, and thereby eliminates potential comfort overrides that might come from a thermostat or HVAC DLC.

PROGRAM RECOMMENDATION

As previously stated, Armada Power recommends Ameren incorporate behind the meter thermal storage technology into its IRP in two ways (i.e. behind the meter storage and multifamily dwellings).

Behind the Meter Thermal Storage Program

Ameren should have a program allowing its customers the option to receive, and have installed, a behind the meter thermal storage technology device for water heaters at no cost to the customer. The individual customer should be able to enroll into the utility program through a time of use water heater tariff or free device for demand response program. The utility, or its designated program coordinator, would be responsible for setting up an appointment for installation with the customer. With respect to the installation, the utility, or its designated technician, would perform the installation.

As more fully explained in the Direct Testimony of Teresa Ringenbach, which is attached hereto and incorporated by this reference, there are both cellular and Wi-Fi devices for this behind the meter thermal storage technology. In the event that Ameren opted for the Wi-Fi devices, then the customers would need to participate in the installation for the purpose of inputting the Wi-Fi password in order to sign the device into the customer’s Wi-Fi network. However, if the Ameren program elects to use cellular devices, then no additional step is required by the customer with respect to installation.

Multifamily Component

Ameren recognized multifamily dwellings in its IRP. However, the proposal stops short of fully utilizing the unique access and ownership rights of property owners. For technologies like those offered by Armada Power, a multifamily property owner that is incented to participate in certain programs can offer faster deployment and access than a traditional individual account rebate and installation. Currently, a multifamily property owner receives no reduction in costs for their investment, and a tenant does not own the property. As such, multifamily property owners currently have limited to no incentive to allow tenants to switch out devices and appliances for demand response or efficiency participating.

In order to incorporate multifamily properties into the IRP, Ameren should offer multifamily property owners a designed program to implement and install behind the meter thermal storage technology. The program design would certify properties as green participants to ensure property owners are installing and not just receiving program incentives. This approach provides benefits for the property owner, tenant and utility. Multifamily property owners have access to and ownership of multiple water heaters, thermostats, appliances, etc. Additionally, multifamily properties typically have on-site maintenance staff and other advantages that would help eliminate gaps in use or assist utility access to devices. A program targeted at multifamily properties would deploy demand response technology faster and more efficiently.

In the interest of an example demonstrating how multifamily properties could deploy demand response technology faster and more efficiently, Armada Power notes that when tenants in a multifamily property are moving in/out, they would be informed of the device, controls and instructions on how to enroll in the time of use options or demand response program. The natural move in/out process in a multifamily property affords a great opportunity to easily and inexpensively advertise the program. A multifamily property owner enrolled into the program would receive incentives for energy/demand reduction activities and a marketable green certification to tenants. While the example provided here is specific to Armada Power's technology, it is very easy to see how rollout of the program could be easily expanded to include thermostats, efficient appliances and beneficial electrification options for landlords.

GRID AND STORAGE BENEFITS

A behind the meter thermal storage program will allow Ameren to use affordable technologies to increase demand response potential in addition to grid control benefits similar to traditional batteries. Armada Power's FleetCommander is a scalable secure software platform that coordinates the power consumption and thermal storage status of the thousands of electric water heaters connected to it. FleetCommander manages these large fleets of water heaters to accomplish grid scale support functions, including peak demand management, fast frequency regulation, load shifting, distribution reliability support, and storage. In addition, the Armada Power technology can be used to absorb the small fluctuations in power output that occur with renewable sources like wind and solar. Armada Power has demonstrated experience in using the difference between forecast and real time output of wind farms to drive a control signal for fleets of water heaters in the local power grid to absorb excess wind or delay usage when wind output falls below forecast. This process is referred to as renewables firming.

FleetCommander provides grid operators information at a glance on available load capacity, customer comfort, and upcoming events. It allows for real time control via Supervisory Control and Data Acquisition (SCADA) or Automatic Generation Control (AGC) input and easy configuration of demand management events. Fleets of water heaters can be configured to match system characteristics such as substation, circuit, transmission zone, etc. allowing for precise control and verification of events. FleetCommander provides an elegant, easy-to-use platform for grid operators to transform fleets of water heaters into fast, accurate, and reliable grid assets.

Armada Power controllers can automatically respond to local voltage deviations from distributed renewables, and provide revenue quality measurements to augment other distribution automation systems. For example, with a Conservation Voltage Reduction (CVR) or Integrated Volt Var Control (IVVC) system, grid operators may want to use controlled voltage regulators to drop system voltage to the minimum ANSI limits. However, the system must be designed to compensate for voltage drop across the line and ensure delivery at the end of the line is within ANSI specifications. The Armada Power controllers on a circuit could be another verification point to observe voltage drop, and could enable a control system to maximize the CVR effect while staying within band.

RESIDENTIAL BENEFITS

For the residential customer, a behind the meter thermal storage program offers the benefits of a demand response program without a lifestyle change. For example, the design of Armada Power's technology ensures hot water is available when needed at the temperature the customer sets. There are no additional steps or requests of the customer for use given that the customer's water heater is incorporated into a fleet of water heaters. This eliminates some of the comfort overrides a thermostat or HVAC DLC may have where customers override utility calls for demand response. For example, a customer may override the thermostat due to being too hot or too cold. The same is true for on/off peak behavioral tasks where lifestyle needs such as laundry, dishes, etc. override the call for load shifting. The water heater serves the function of offering hot water when needed. Assuring that hot water is available when needed avoids comfort overrides while ensuring the demand resource is available when called upon. Also, residential customers, in partnership with Ameren, may achieve additional benefits through time of use pricing tariffs. By giving customers control over the second largest load in their homes, they can take advantage of low-cost off peak pricing while avoiding power consumption during peak periods with no interruption in hot water. Time of use advantages can be programmed by the customer or by the utility. Accordingly, no additional action is required of the customer beyond enrolling in the program and installation of the device in order for the customer to benefit from the time of use periods. The owner of the water heater will also receive maintenance alerts that notify the owner when components, like heating elements, have burned out. Finally, energy efficiency options, such as "Vacation mode", are accessible to the customer through the Armada Power app, and these energy efficiency options provide the customer the ability to further reduce energy use when hot water is not needed.

Technologies have improved and grid needs are changing as renewables and customer controllable devices grow and connect to Ameren's system. While batteries and smart home controls will continue to play a role, they have cost and customer lifestyle control limitations. The Ameren plan should incorporate new and diverse technologies which allow for multiple functions for both the grid and the customer.