Rheem Comments in Response to RFI and Consultant Report

Additional submitted attachment is included below.

August 12, 2024

Submitted via: Docket No. 24-FDAS-02

Commissioner J. Andrew McAllister
California Energy Commission
715 P Street
Sacramento, CA 95814

Re: Comments on Request for Information: Expanding Flexible Demand in California through Statewide MIDAS Data Delivery, Docket 24-FDAS-02

Dear Commissioner McAllister,

Rheem Manufacturing Company (Rheem) appreciates the opportunity to submit the following comments in response to the Request for Information (RFI) and consultant report pertaining to Expanding Flexible Demand through Statewide MIDAS Data Delivery.

Rheem is an industry leader in total heating, cooling, refrigeration and water heating solutions and one of the few global brands with product offerings covering residential and commercial heating, cooling, conventional and hybrid storage water heaters, tankless water heaters, solar water heating systems, pool and spa heaters, commercial boilers, residential hydronic and geothermal systems, commercial refrigeration products, indoor air quality accessories, and replacement parts for all categories. Rheem is headquartered in Atlanta, Georgia, and has U.S. based manufacturing facilities in Alabama, Arkansas, California, Connecticut, and North Carolina. The company also operates distribution facilities throughout the US, Canada, and many other countries around the world.

Rheem appreciates CEC's efforts to develop flexible demand regulations authorized by Senate Bill 49-2019 to reduce greenhouse gas emissions through standards that enable appliances to schedule, shift, or curtail electric appliance operations with consumer consent. With the newly introduced Market Influenced Demand Automation Server (MIDAS), and capability to transmit signals that represent electricity prices, greenhouse gas emissions, or other time-dependent grid indicators directly to compatible appliances, Rheem recognizes the need to standardize communications. And more specifically, to establish a signaling infrastructure to transmit data from MIDAS to appliances such as water heaters. While the consultant's report provides a comprehensive technical assessment of the options identified, Rheem has several concerns as detailed below. Also, for residential water heaters, flexible demand and demand response protocols and programs have been developed with little coordination within the state and neighboring states driving a proliferation of requirements and equipment configurations.

Establishing an infrastructure without fully considering specific product applications could add to the complication.

General Comments

The California flexible demand market is very complex. Incentive programs drive adoption of flexible demand water heaters, unfortunately these programs often update or add requirements that are inconsistent with existing products, which necessitates accelerated design changes to add functionality that may be narrowly applicable or quickly obsoleted. Rheem encourages coordination and consistency in program designs and flexible demand regulations, whether in Title 20, the building code (Title 24 Parts 6 and 11), or CPUC-funded incentive programs.

Rheem recommends that adoption of existing demand response or flexible demand standards be prioritized. For water heaters, there is a nationally recognized standard for demand response, AHRI 1430[1] that was developed with several CA based entities and stakeholders. AHRI 1430 requires two-way communication and the ability to locally input time-of-use rates. Incorporation of over-the-air time-of-use rates, or price streaming, is included as optional but hasn't been prioritized due to the inability of utilities to communicate this information.

While Rheem recognizes the MIDAS platform was designed to send but not receive data and that flexible appliances will receive and process the MIDAS information and act accordingly as programmed by the manufacturer or the consumer. The California vision for mass-market load flexibility fails to acknowledge the growing number of appliances with two-way communication capabilities that are internet-connected and designed to provide certain consumers benefits and features, including but not limited to, over the air updates, notifications, energy use monitoring, remote control, and prognostics. From an appliance manufacturers perspective, implementation of unidirectional architecture, such as radio broadcast, may be sufficient to transmit the MIDAS data, however it will require a second communications layer and infrastructure to facilitate two-way communications for consumer value and certain demand response programs (outside CA). Rheem is very interested to see the in-depth analysis of the potential limitations and benefits of unidirectional and bidirectional signaling infrastructures to be completed under Subtask 2.5 of the contract.

Timeline

Rheem requests that CEC detail and clarify the expected timeline for this rulemaking and related product specific standards.

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[1] AHRI 1430: https://www.ahrinet.org/search-standards/ahri-1430-i-p-demand-flexible-electric-storage-water-heaters-addendum-1

Rheem notes that the consultant report suggests implementation can begin by 2026. Rheem requests clarification on whether this is the date for implementation of the proposed broadcast communication system or when compliant products would need to be shipped. Less than two years is unlikely to be long enough to implement the design changes that would be necessary to add RDS communication components to a product and fully evaluate that consumer satisfaction is not affected. However, product requirements around existing communication technologies (*e.g.,* Wi-Fi in water heaters) can readily be deployed to incorporate MIDAS data.

Requests for Information

1. Regarding communication standards, what reliable alternative communication technologies exist to communicate directly to or with appliances?

Other technologies the CEC may wish to investigate are long range Wi-Fi,[2] LoRa,[3] and Amazon's Sidewalk.[4]

3. Given the report's conclusion that broadcast delivery of MIDAS data is more cost-effective than point-to-point delivery for the volume of appliances envisioned under FDAS, what are the main concerns with a statewide FDAS signaling system that relies on a broadcast, and what cost-effective solutions might mitigate these concerns?

Rheem notes that the costs of adding communication to a device does not account for the costs of upgrading the controls to respond to the received communications. For example, improved controls for water heaters are significantly more expensive than the cost to add a CTA-2045 compliant port which is required for electric storage water heaters sold into Oregon and Washington. All non-flexible demand products will need to be evaluated independently to ensure the flexible demand requirements are actually cost-effective.

Rheem has concerns about the responsiveness of the broadcast to actual prices. Protocols should be established to ensure prices are updated well before they are implemented to ensure flexible demand products have the time needed to prepare for high and low rate (price and/or GHG emission) events.

As the electrical grid continues to expand and add renewables, California may experience more brown or black outs. The ability to immediately respond to grid emergency events necessitates communication protocols that allow for immediate deployment. Rheem would be concerned with a broadcast grid emergency signal and its usage in a "manipulation of signals" attack.

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[2] Long Range Wi-Fi: https://en.wikipedia.org/wiki/Long-range_Wi-Fi
[3] LoRa: https://en.wikipedia.org/wiki/LoRa
[4] Amazon's Sidewalk: https://www.aboutamazon.com/news/devices/everything-you-need-to-know-about-amazon-sidewalk

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Load synchronization, or snap back, is another concern that was identified in the consultant report. Rheem notes that under a time-dependent flexible demand structure, all similar products in an area will respond to the same rate schedule. Load synchronization is inevitable if the communication is broadcast rather than tailored. As discussed above, AHRI 1430 is a nationally recognized demand response standard which is expected to address "price streaming" in future revisions. Tailored price streams to blocks of water heaters could easily be implemented by a utility or aggregator and significantly mitigate load synchronization.

6. Voluntary utility and third-party programs for load flexibility (shifting) have typically had very low participation from end users. What alternate Load Flexibility program(s) would you recommend that maximize participation while being ubiquitous, cost-effective, equitable, and technically feasible without requiring or precluding participation from third parties?

Rheem notes that the consultant report referenced older information on participation rates in flexible demand programs. While opt-in and opt-out rates directionally make sense, they don't account for more recent developments and the increased focus on flexible demand. With a consistent approach, Rheem anticipates increased participation rates of opt-in programs.

Rheem notes that implementation of time-of-use rates needs to be carefully considered and applied. This pricing structure may overly burden low income and rural consumers as they are less able to immediately switch to these higher cost flexible demand products. Without rate "optimized" products installed, the costs to a consumer can be expected to significantly increase due to typical operation during peak times.

Rheem recommends that examples of the MIDAS database be posted in the docket. Results of the lookup table and RIN list calls would help evaluation of the available information.

8. The report proposes a hybrid communication architecture that incorporates both plug-and-play MIDAS response and third-party program enabling technology, represented by the Plug-and-Play Port scenario, as the most cost-effective solution to enable demand flexibility for an appliance. What do you think are some pros/cons of this approach?

As stated above, Rheem believes two-way communication is needed to ensure consumer value and grid-reliability. One-way broadcast communication is viable for baseload reduction, but the value as compared to a default schedule is not well understood. Rheem recommends default schedule vs. one-way communication be evaluated on a product-by-product basis.

Rheem recommends transparency in how a broadcast communication system working in conjunction with a 3rd party program would price electricity. For example, a 3rd party "load up" request should be paired with the lowest price electricity regardless of the broadcasted rate schedule. Conversely, a "shed" request should not necessarily be paired with the highest price

but throttled based on the needs of the utility. In all cases, the cost to the consumer should be minimized while ensuring that they have adequate hot water.

Thank you for the opportunity to provide these comments. If there are questions, please contact me directly.

Sincerely,

James Phillips
Senior Regulatory Affairs Manager
Rheem Manufacturing Company

cc: Karen Meyers, Joe Boros