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Comments to CEC Title 24 2019 Version - Revised 15-Day Language (Rheem Manufacturing Co.)

Additional submitted attachment is included below.

May 7, 2018

Via Electronic Mail (e-mail)

California Energy Commission
Attention: Docket No. 17-BSTD-02
Dockets Office
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Sacramento, CA 95814
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Re: Comments to Revised Express Terms, 15-Day Language of California Code of Regulations, Title 24, Part 6 2019 Version – Docket No. 17-BSTD-02

Dear CEC Staff,

Rheem Manufacturing Company ("Rheem") submits the following written comments in response to the California Energy Commission ("CEC") revised, express terms 15-day language of the 2019 Revision to Title 24, Part 6 of the California Code of Regulations ("Title 24") issued on April 20, 2018. The comments below describe Rheem's position with respect to certain revisions within the 15-Day language as well as other aspects surrounding the proposed changes that may not have been taken into account by CEC.

Interests of Rheem Manufacturing Company

Rheem is a privately held company with headquarters in Atlanta, Georgia, along with operations in Alabama, Arkansas, California, Connecticut, Florida, Georgia, Indiana, North Carolina, Texas, and Utah. In its 93rd year of operation, Rheem is a global manufacturer of conventional and hybrid storage water heaters, tankless water heaters, solar water heating systems, pool and spa heaters, commercial boilers, residential hydronic and geothermal systems, residential and commercial heating, cooling, commercial refrigeration products, indoor air quality accessories, and replacement parts for all categories. The company's premium brands include Rheem, Raypak, Ruud, Richmond, Eemax, and EcoSmart. Rheem products have been recognized with countless industry and consumer awards for reliability, innovative design and high quality.

Water Heating Prescriptive Requirements

With respect to the proposed changes in Title 24 regarding water heating systems for non-residential and residential buildings, Rheem considers the overall simplification of requirements to be a better

approach for compliance methods. While much of what is required currently under the 2016 Version of Title 24 remains for water heating, many of the details suggesting minimal energy efficiency gains have been removed. Rheem appreciates the more comprehensive view of achieving energy savings in buildings as well as CEC considering a more fuel-neutral approach in this 2019 revision to Title 24.

Rheem believes the future of water heating will have energy efficient options with all fuel choices: natural gas, propane, grid-supplied electricity, and onsite solar PV panel-supplied electricity.

Rheem appreciates CEC maintaining electric heat pump water heaters in the prescriptive requirements for water heating systems in this 15-day language, as it recognizes electricity-fueled appliances are a better pairing with required home-site electric generation through solar PV panels (or other renewable energy source), and it understands the great energy savings heat pump water heating technology can provide on a state-wide level.

Utilities and water heater manufacturers alike find there is a worthwhile potential in developing heat pump water heater strategies. The technology allows for great operational energy savings while connecting those devices with utility demand response programs to assist in using solar-generated and other renewable energy-generated electricity during non-peak hours and aiding the utility in providing grid stabilization.

We continue to see a general preferred option with natural gas fueled water heating equipment in this proposal. Rheem understands the conceptual reasoning of favoring natural gas products in California, but we do have a few questions regarding the 15-day language additions made by CEC in Subchapter 8, Section 150.1 of this proposal.

The prescriptive requirement for gas storage water heaters in the low-rise residential building subchapter 8 has introduced a wide discrepancy between required additional energy-saving measures between a gas storage water heater at or below 55 gallons and one above 55 gallons. While Rheem appreciates CEC acknowledging the higher fuel rate input limit for residential gas storage water heaters at 75,000 Btu/hour, there are not many gas storage models above 55 gallons and rated at or below 75,000 Btu/hour available on the market. However, we appreciate the section 150.1(c)(8)A.iii. revision to only require this type of water heater (and its higher minimum energy efficiency) without another domestic water heater system efficiency attribute.

While the “residential-duty” commercial gas storage water heater category introduced by the U.S. Department of Energy (“DOE”) in 10 CFR 431.102 currently maintains a lesser energy conservation performance standard than those residential gas storage water heaters above 55 gallons, and rated up to and including 75,000 Btu/hour, there are a number of models of gas storage water heaters rated insignificantly higher than 75,000 Btu/hour and greater than 55 gallons. Many of these models incorporate higher energy efficiency performance technology like a power vent or condensing heat exchanger. CEC could continue to recognize a prescriptive option for these greater than 55 gallon gas storage water heaters rated between 75,000 and 105,000 Btu/hour to provide builders with more gas-fired water heater options to meet building demand while also requiring another energy savings measure in tandem with the water heater (such as a compact hot water system or higher energy

efficiency fenestration products). Such a prescriptive option would ensure the energy savings value for using this "residential-duty" commercial type of water heater is on par with the greater than 55 gallon, up to 75,000 Btu/hour gas storage product.

In addition, the alterations section for low-rise residential buildings needs refinement to align with the current federal energy conservation standards. In the alterations section of Subchapter 9, Section 150.2(b)1.H.iii.d., the recognition of electric water heaters having to be replaced with other electric water heaters is needed. However, the upper limit of 60 gallons for electric resistance storage water heater replacements does not comport with the federal energy conservation standard of any consumer electric storage water heater above 55 gallons having to have heat pump (or heat pump equivalent) water heating technology included (see raised UEF required minimum standards for electric storage water heaters above 55 gallons in 10 CFR 430.32). Therefore, that section should be further revised to state, "For electric resistance only storage type water heaters, the capacity shall not exceed 55 gallons." This revision will have the Title 24 alterations section align with the higher federal energy efficiency standard requirements for residential electric storage water heaters.

Demand Response Protocol

Rheem appreciates CEC considering a thorough demand response protocol for connected equipment to operate in a manner to assist utilities in managing energy distribution and to achieve connectivity reliably, with flexibility, and to enhance energy savings. The proposed requirements of "Demand Management" in Section 110.12 provide for proper flexibility of connection options to allow Demand Response programs to work reliably with grid-connected equipment and appliances.

We support beneficial policies for connected appliances that we manufacture which provide space heating and cooling and water heating applications. With regard to reliable, efficient communications protocols for demand response programs, we further support utilities wanting standardized platforms that can minimize operational burden and provide a proven framework for actively or passively interacting with a grid-connected device.

We believe the focus of appliance connectivity to the grid and utility-based controls should be on reliability and a positive customer experience. The Open ADR 2.0 platform provides a proven communications system for utilities to manage demand response and a means to achieve cost-effective energy savings for the utility and the customer. Rheem fully supports the use of Open ADR 2.0 and its ability to be integrated within digital, cloud-based control systems for our appliances. The future of connectivity and "smarter" appliances lies with software-based controls and communication networks. Rheem supports embedding Open ADR 2.0 into those controls systems for the foreseeable future until a better digital protocol is created for utilities and OEMs alike.

Rheem places a high value on the customer's experience with our product. A digital control cloud-based platform allows the customer to have transparency into how a utility is operating its water heater through operational mode communications, time of operation communications, water temperature

alerts, and a control override function that would provide the homeowner hot water demands they may need during high volume periods while alerting the utility. The cloud-based control systems allows the information interface for a customer to be at the appliance and on any other supported smart device (i.e., tablet, phone) that has the requisite app downloaded. The ease of understandable, convenient information regarding product usage has become a value-add for the energy-conscious consumer.

In contrast to a software-based standard, any prescriptive requirements in Title 24 of one type of connectivity protocol, or a hardware-based connectivity, for appliances is limiting for product innovation and adds little benefit compared to the cost burden for applying such hardware and integrating its usage with the operation of high efficiency appliances.

Rheem acknowledges using a demand response control system only based on one type of signal, like Wi-Fi, is limited to the strength and availability of that signal at the end-user location at any given time. However, Wi-Fi signal reliability is improving with more consumer adaptation as well as cost-effective routing equipment and areas of integrated fiber optic infrastructure. Numerous recent technologies rely on the use of Wi-Fi signals, and the failure rate of Wi-Fi is improving to mitigate any sizeable unpredictability in a utility's grid management system. Wi-Fi signal integration for an appliance control system is more cost-effective and preferred for its ease of use and reliability over other remote signal systems today.

Additionally, any product having a cloud-based digital control system is a hidden asset for a utility operating a demand response system. A customer can buy a product with the cloud-based control system and have no intent to be enrolled in a demand response program. However, if their utility wants a certain area of homes to consider being enrolled at a later date or if the utility initiates a grid-management system in the future, that appliance is already set up with the integrated controls to be connected to a demand response system. There has to be no planned purchase of a water heater that has required hardware or other accessory equipment to be enrolled in a demand response system for it to work as an asset for a utility.

The current 2019 prescriptive compliance option draft language for Title 24 with respect to domestic water heating systems in low-rise residential buildings (Section 150.1(c)(8)(A)(iv)) provides for a heat pump water heater meeting the NEEA Advanced Water Heater Specification Tier 3 requirements or higher. The NEEA Advanced Water Heater Specification, Appendix G "Demand Response Validation" provides that the anticipated physical connection for the water heater to be in compliance with CTA 2045. However, we believe this singular focus on the modular control interface for connected equipment minimalizes manufacturer-designed control hierarchies for connected appliances (designed for optimal control and performance by the manufacturers) and prohibits other types of control systems (ex. cloud-based systems) from being used on grid-connected devices.

Open ADR 2.0 allows for uniformity in the communications platforms between a demand response utility manager and connected appliance while allowing for the types of signals and optional hardware to vary. Having a standard communication "language" in place will allow utilities to be comfortable with

directing the use of equipment in real time and receiving responses from the equipment as well. A prescribed demand response control strategy allowing for various connectivity options would better suit the market and allow for continued innovation among utilities, OEMs, and other stakeholders in the energy conservation and grid management arena. Grid-enabled water heaters were only recently recognized as residential water heating products serving a valuable function by U.S. Congress in 2015, and regulations allowing their use formally were adopted later that year. The landscape to use technology to create effective, reliable communications systems for grid-enabled devices is vast and open for innovation. Any standard requiring hardware-based connectivity is quickly becoming outdated with the emergence of Internet of Things ("IoT") platforms.

Connected equipment in grid management programs serve valuable purposes for equipment manufacturers as well. Utilities can become frustrated when grid-connected appliances do not provide the reduction of peak energy demand accounted for in an energy generation budget. Manufacturers of connected devices are better served to understand the use patterns of their equipment and respond to such data through various control strategies that can better serve the needs of the utility and homeowner. The use of Open ADR platform connectivity allows enough flexibility and functionality with a manufacturer's control system to provide more advanced analytics and data on equipment usage that could drive more energy efficient products to the market. Manufacturers are in the best position to make appliance control strategy or product performance adjustments.

Additionally, utility-driven connectivity standards for connected equipment will expose utilities to more customer servicing potential. When connectivity devices or hardware is required to be placed on equipment that was not designed by a product manufacturer, the troubleshooting responsibility for failing communications in demand response applications will belong to the utility. Rheem will be ill-equipped to advise customers on problem solving in demand response applications and will rather refer customers to their utility management program for help. Rheem is not sure if utilities have properly considered this exposure and need for resources to provide troubleshooting assistance with connectivity issues and have problem-solving capabilities ready for the homeowner to have hot water available when needed. Because publicly-funded utilities pass additional costs onto the rate paying customer, having to add resources for additional customer service would most likely result in a rate-base cost adder for the customer. We believe that additional cost burden for utilities could be avoided if the control and connectivity strategy belongs with manufacturer-developed equipment.

Rheem would prefer to provide resources and troubleshoot problems for our customers based on equipment we design, manufacture, and warranty. If it is our control management system causing an operational issue in the field, we would be in a better position to provide a remedy due to already having customer call centers in place and resources dedicated to resolving product issues for our customers.

Overall, having an open-ended controls compliance option for demand response water heaters and other grid-connected appliances would be a better policy decision to assist manufacturers with a vested interest in product innovation and energy efficiency optimization. Rheem would prefer for CEC not to prescribe a singular protocol for utility communications with a device in Title 24. Such a

connection standard would limit the use of more encompassing control strategies that would partner well with demand response programs, and set a compliance standard for the next several years based on technology that is becoming quickly outdated in other IoT applications.

With the considerations mentioned above and the increased focus of demand response potential for electric water heaters and other devices in this 15-day language for Title 24 (as seen in section 150.2(b)1.H.iii.b. for a heat pump water heater installed with a communications interface compliant with section 110.12(a)), Rheem would like CEC to reconsider some phrasing in the revised section 110.12(a) – *Mandatory Requirements for Demand Management*.

The requirements for demand responsive controls on devices specify technical protocols that are not fully comprehensive of the certifications of many current-day demand response program management companies acting as the data consolidator and sharer between utilities and home management systems or devices themselves. Specifically, Rheem would like CEC to add "OpenADR 2.0a" as an option for devices to respond to a demand response signal. Thus, "OpenADR 2.0a or Open ADR 2.0b Virtual End Node" should replace "Open ADR 2.0b Virtual End Node…" in Section 110.12(a)1.B. Many demand response aggregator companies being transformative and influential in this marketplace are not certified to the "b" profile of the OpenADR 2.0 standard – only the "a" profile. The focus for communications protocols does not need to unjustly prohibit certain third-party certified signal structures, as the overall goal is to allow the signal to optimize energy performance and responsiveness of the device and not prescribe how the signal arrives too narrowly.

Additionally, if Title 24 prescribes the use of a certain hardware-based connection standard for grid-connected water heaters, we would have water heater model variants for the California market that include the necessary hardware equipment. Such higher costs for this hardware would be unnecessary due to Rheem also having more inexpensive models using our preferred control strategy and connectivity to achieve the same demand response program objectives. The economies of scale of mass producing products with prescribed hardware would not be achieved due to that path not ultimately being the preferred solution for the market in other demand response programs outside of California.

We believe the prescriptive requirement revisions above would assist CEC in having Title 24 achieve "Zero Net Energy" policy advancements and objectives for new building construction while not having water heating categorical deviations from the federal regulations administered by DOE.

Rheem supports the goals stated by CEC of zero net energy homes and reliable grid management programs for the appliances we manufacture. We further desire to find optimal solutions that achieve maximum energy savings and grid predictability for all stakeholders – utilities, regulators, energy groups, manufacturers, installers, and, of course, customers. Flexibility of connected equipment sets the stage for product innovation to more effectively achieve the energy savings and management goals of California. Workable solutions are many times complex and should not only be considered from one stakeholder's perspective. Therefore, we would appreciate your consideration of our comments and perspective to the proposed draft language for the 2019 revision to Title 24.

Rheem further appreciates CEC providing the opportunity to comment on the express terms 15-day language for the 2019 Version of Title 24.

Respectfully submitted,

Russell W. Pate
Regulatory Affairs Manager

Cc: Karen B. Meyers, Rheem Manufacturing Co.