

**DOCKETED**

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February 3, 2021

Mr. Nicholas Struven  
California Energy Commission  
1516 Ninth Street  
Sacramento, CA 95814

Re: Public Comments, Senate Bill 49 Flexible Demand Appliance Standards pre-rulemaking workshop

Dear Mr. Struven:

Johnson Controls is grateful for the opportunity to comment on the California Energy Commission's (CEC) Senate Bill 49 Flexible Demand Appliance Standards pre-rulemaking workshop.

Johnson Controls (JCI) is a leading global provider of heating, ventilating and air conditioning equipment, building controls, security and fire/life safety solutions which includes brands such as York, Metasys, Simplex, Grinnell, Zettler and Tyco. The company has ~105,000 employees and ~2,000 locations across six continents. JCI first set sustainability goals in 2002, and the company has reduced greenhouse gas emissions from our global operations by 51%. Since then, JCI has committed to meeting science-based targets by 2030 that are aligned with a 1.5°C pathway for global temperature rise, and to achieve net-zero carbon emissions from its operations before 2040.

JCI strongly supports CEC's efforts to implement SB 49 and set standards for appliances that enable the shift and shed of electric loads to improve grid reliability and enable deep decarbonization. As California further electrifies building end uses, the need for load flexibility will continue to increase. JCI expects that this will result in new control specifications for our ducted air conditioners and heat pumps. We are still evaluating the objectives of SB 49 against our future product plans and expect that we will have more substantive feedback for the CEC as this rulemaking progresses. In the meantime, JCI has identified several principles that we recommend for consideration by the CEC, discussed below.

*Leverage multiple technologies to generate the largest impact*

Air conditioners and heat pumps with multiple cooling and heating stages offer the potential to shift or shed load while minimizing the impact to occupant comfort. Load management programs do not necessarily need control of the indoor setpoint; with limited design revisions these programs could rely on the OEM's native, onboard controls to lockout the higher stages of heating and cooling when an event is triggered. In circumstances where loads need to be curtailed, the equipment will significantly reduce its electricity consumption while still providing an appreciable level of heating and cooling. Likewise, staged equipment can "load up" by pre-cooling or pre-heating without making the occupied space too cold or too hot while also minimizing energy use and cost to the consumer.

Traditionally, load management programs for air conditioners and heat pumps have relied on cycling equipment off to curtail load during periods of peak demand. These programs can utilize a thermostat provided by the utility or aggregator and incorporate heating and cooling equipment regardless of compressor staging. However, it is unclear if integrating flexible demand capabilities into single stage equipment controls will lead to participation in load curtailment programs at scale; single stage equipment will be limited to cycling on and off, leading to occupant discomfort as well as creating health concerns.

Additional consideration is needed to address flexible demand standards for single stage equipment, as it remains the predominant volume in the market. To maximize impacts, it may be necessary for CEC to work with utilities to incentivize the market to upgrade or replace such equipment.

If the CEC does intend to pursue standards for all air conditioners and heat pumps, it is critical that communications protocols are used that would be compatible with, and encourage, programs that aggregate loads from the installed base of HVAC equipment (i.e., equipment that is installed prior to the enforcement of flexible demand standards). Unless there is a significant uptake in equipment replacement, the installed base will represent the larger proportion of peak grid loads for at least a decade following the enactment of these standards. Ultimately, a utility or aggregator will be responsible for communication with the equipment. Establishing a specification that could be feasibly added to existing non-connected equipment, and thus enable the aggregation of new as well as previously installed equipment, would dramatically increase the potential to shed and shift loads in a coordinated fashion; limiting the integration to new or retrofit applications will make the effectiveness of demand response more gradual.

Finally, the CEC should consider the potential of hybrid heating systems such as dual fuel heat pumps in enabling load flexibility. Traditional heat pumps will operate until the outdoor ambient temperature drops too low for the system to meet the heating capacity, at which time the backup resistance heating element is engaged. Dual fuel systems use a high efficiency furnace in place of the backup resistance heat, meaning that the vast majority of their energy consumption can shift from electricity to gas in a matter of seconds. Load management programs could leverage these systems through communication with the thermostat to adjust the fuel type used. Dual fuel systems offer significant decarbonization potential as they enable rapid deployment of heat pumps without the risk of increasing coincident winter peak loads. A recent study by the UC Davis Western Cooling Efficiency Center<sup>1</sup> found that in a typical California home heated with gas, dual fuel systems have a greater carbon emissions reduction potential than heat pump-only systems. The CEC should preserve, if not encourage, the use of dual fuel systems as part of its implementation of SB 49.

#### *Leverage existing industry standards*

JCI encourages the CEC to review existing standards where feasible to demonstrate compliance with standards established in this rulemaking. For air conditioners and heat pumps, AHRI Standard 1380 creates a standardized set of operational sequences to increase or decrease equipment load and return to normal, and allows for communication via the OpenADR protocol. AHRI is currently developing an operations manual for testing to Standard 1380, after which it will create a certification program, which may be suitable for compliance with CEC flexible demand standards. Such an approach would likely receive widespread support from HVAC OEMs as well as contractors. CEC should also take note that AHRI 1380 is applicable to multi-stage and variable speed products, it does not address single stage equipment or their thermostats.

#### *Complement other regulatory timelines*

The feasibility of new flexible demand appliance standards is also dependent on alignment with other regulations that have been established and are effective at a later date. For air conditioners and heat pumps, JCI and the industry at large is updating its portfolio in response to U.S. Department of Energy

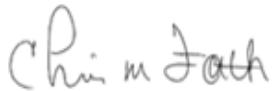
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<sup>1</sup> Dichter, N., & Aboud, A. (2020). Analysis of Greenhouse Gas Emissions from Residential Heating Technologies in the USA. UC Davis Western Cooling Efficiency Center. <https://wcec.ucdavis.edu/wp-content/uploads/GHG-Emissions-from-ResidentialHeating-Technologies-091520.pdf>

(DOE) appliance efficiency standards, which take effect in 2023. Additionally, the California Air Resources Board (CARB) is nearing the completion of regulations that will set limits on the global warming potential of refrigerants for stationary air conditioners and heat pumps, expected to take effect in 2025. These regulations too will require equipment redesign and a revised product portfolio. As part of this rulemaking, CEC should survey equipment manufacturers of the equipment under consideration for flexible demand standards and avoid interruption to product plans where possible. CEC should not overlook the cumulative effects are multiple regulations when promulgating its own. Understanding the impact of these cumulative regulations will help control the cost of compliance with the flexible demand standards, and in turn reduce costs for California consumers.

Thank you again for the opportunity to comment on this pre-rulemaking workshop. If you wish to discuss these comments any further, please do not hesitate to contact me at the information below.

Respectfully,

A handwritten signature in black ink that reads "Chris M Forth".

Chris M Forth  
Executive Director, Regulatory, Codes & Environmental Affairs  
Johnson Controls  
5005 York Drive North  
Norman, Oklahoma, 73069  
(405) 826-5802  
[chris.m.forth@jci.com](mailto:chris.m.forth@jci.com)