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Comments for Docket 20-FDAS-01 Flexible Demand Appliance Standards

Additional submitted attachment is included below.

FLUIDRA

2882 Whiptail Loop # 100
Carlsbad, CA 92010
T. 800 822 7933
FluidraUSA.com

October 29th, 2021

California Energy Commission
Docket Unit
Re: Docket No. 20-FDAS-01
715 P Street
Sacramento, CA 95814

Re: Request for Information, and Pre-Rulemaking Draft of the Proposed Language for Flexible Demand Appliance Standards, Docket 20-FDAS-01

Esteemed California Energy Commission,

Fluidra appreciates the opportunity to participate in the rule making process for Flexible Demand Appliance Standards (FDAS) to meet the GHG reduction and electric grid resiliency goals of California Senate Bill SB 49. As a pool equipment manufacturer with U.S. Headquarters in California, Fluidra recognizes the importance and demand for energy efficient and environmentally sustainable swimming pool operation. Accordingly, continual efforts are made in the development of products that can meet the competitive goals of a sustainable future.

In support of these initiatives, the following comments are intended to help the Energy Commission develop Flexible Demand regulation that can achieve and maximize the energy goals of the FDAS program, while minimizing any negative impact to the consumer and the pool industry. Fluidra hopes to provide helpful insight into the possibilities, complexities, consumer engagement or "stickiness", and safety considerations for Flexible Demand Response in a swimming pool system.

Defining Flexible Demand Response (DR) for Pools

The current proposed language for "pool pump controls" focuses the scope on controlling the motor of a pool filtration pump. Although a pump motor is a source of electrical load and potential load shifting benefits, the basic control of a pump motor may not take into account important requirements of a complete "swimming pool system".

Each pool is a unique system with its own requirements for water chemistry, flow rates, sanitation, and bather experience. Modern pool systems include:

- Filtration (Drains, Skimmers, Filtration Pump, Filter)
- Sanitation (Chemical Feeders, Electrolytic Chlorination, Minerals, UV, Ozone, Secondary and Supplemental Sanitizers)
- Heating (Gas, Refrigeration, Electrical, Solar)
- Lighting
- Automatic Pool Cleaners
- Water Leveling
- Water Features (Waterfalls, Spillways, Negative Edge, Jets)

FLUIDRA

2882 Whiptail Loop # 100
Carlsbad, CA 92010
T. 800 822 7933
FluidraUSA.com

- Pool and Spa Controls and Automation
- Pool Covers

The proposed definition and scope of "Pool pump controls" only considers one component (**the motor**) of one part (**the pool pump**) of a large system that operates in concert. It is like regulating just the igniter of a water heater, or the spray jet of a dishwasher, without considering the performance of the complete appliance as a system. While we understand and agree that the pump motor (particularly a variable-speed motor) can help reduce and shift energy consumption when properly installed and programmed, the pump motor alone should not be considered a standalone device without considering its impact to the other pieces of pool equipment necessary to maintain a safe and energy efficient pool environment. Large-scale blanket DR events for the pump will affect every pool differently and can therefore present numerous health and safety risks that a standalone dedicated pool pump controller may not account for.

Pool Controls

With these considerations in mind, Fluidra believes the more effective long-term approach for Flexible Demand in the pool sector would be to shift the FDAS scope from "Pool pump controls" – to "**Pool Controls**".

Modern pool controls, or pool "Automation Systems", are connected products capable of executing the Demand Response events for the pool pump, while also having the ability to understand the requirements of all the other pieces of equipment that make up the complete pool system. They are designed to communicate with and control all the electrical appliances on a pool pad– such as heat pumps, electrolytic chlorinators, lights, cleaners, water features, etc.– and have the potential to maximize energy savings and flexibility through all the energy loads, while minimizing the potential for safety hazards and a negative user experience.

When it is impractical or hazardous to adjust the operation of the filtration pump, the same overall goal of energy load reduction may be achieved with a combination of load shedding through the various pieces of equipment on a pool system. With decarbonization efforts reducing natural gas utilities throughout the State, heat pumps consuming 5-6kW will quickly be the next significant load for swimming pools. We should expect consumers to demand the same heating speed and rate as gas heaters, which would require multiple heat pumps in a system. Load management for these heat pumps can be addressed now using the same connected pool automation systems already available.

Loss of internet signal is one of the biggest challenges for outdoor wireless systems. Ideally, wireless transceivers should be installed in a location away from electrically "noisy" equipment (such as motors) that may cause undesirable operation due to RF interference. Allowing connectivity through devices separable from the pump motor will minimize the RF interference issues that are inherent to motors and motor drives.

FLUIDRA

2882 Whiptail Loop # 100
Carlsbad, CA 92010
T. 800 822 7933
FluidraUSA.com

Proposed definition for "Pool Controls":

(d) Pool Controls.

"Pool controls" means any device or group of components that are designed to control the various equipment of a pool system, and includes pool pump controls. Also known as "Pool Automation Systems".

Proposed definition for "Connected Pool Systems"

(e) Connected Pool Systems

"Connected Pool Systems" means integrated or separate communications hardware, and additional hardware and software required to enable connected functionality.

Speed to Market and the Use of Existing Manufacturer's Application Programming Interface (API)

Many of the proposed DR events and scheduling capabilities may already be possible with pool automation systems currently available from various pool equipment manufacturers. A significant number of these systems with connected capabilities are already installed throughout the State (and nationally), and that number continually grows due to market demand. Using the existing manufacturer's API for Demand Response communication would allow the fastest rollout of FDAS for pool controls and could also capture pool automation systems that are already installed and in the market.

Pool automation serial communication, which is currently used by 100% of the market, by design can only receive commands from one master. There's currently no safe way to send commands to a pump in communication with a conventional pool automation controller without taking the pump out of master control from the pool automation system. Developing new hardware, firmware, software, and cybersecurity to safely support new IoT protocols for OpenADR and CTA-2045 will require years of development time, and millions of dollars in investment costs that would ultimately impact the consumer and small manufacturers.

NON-RETROFITTABLE - It's also important to note that these new connected protocols would not be retrofittable to all the connected systems that are already installed, or will be installed in the time between. In general, pool owners only install a new system when their old system breaks. It can take upwards of 10 years or more for new OpenADR/CTA-2045 capable systems to be integrated into existing pools. This would be a huge miss for California's energy flex and conservation efforts, as well as for the consumer.

Fluidra strongly recommends that CEC leverages existing Pool Controls and IoT infrastructure already in place to maximize the speed to market and impact of a successful Flexible Demand program.

FLUIDRA

2882 Whiptail Loop # 100
Carlsbad, CA 92010
T. 800 822 7933
FluidraUSA.com

Specific to Pool Pump Controls

With regards to devices that fall into the CEC proposed definition of a "Pool pump control" in the Pre-Rulemaking Draft:

> **Section 1687. Definitions**
> **(d) Pool Pump Controls.**
> "Pool pump control" means any component or group of components that controls or causes the pool filter pump to start or stop operation.

Fluidra recommends the ruling provide the option for pool pump controls to only require the "ability" to connect to devices that meet the FDAS requirements for "connected" devices. This would allow flexibility for the consumer to use various pool control systems and reduce additional costs to the consumer for a filtration pump and replacement filtration pumps. This will also allow innovation by manufacturers and minimize impact to small manufacturers and a pool industry that supports over 30,000 jobs in the U.S.

Suggested changes to draft proposed language *underlined and italicized:*

Section 1690 Appliance Specific Standards and Requirements.
(d) *Pool ~~pump~~ controls*

(2) Flexible demand appliance standards. All pool ~~*pump*~~ controls manufactured on or after January 1, ***2027*** shall meet the following standards.

(A) Pool ~~*pump*~~ controls shall be a "connected device", *or have the ability to readily connect to a separate "connected device"* as defined in section 1687 of this Article.

Pool pump controls shall be a "connected device", or have the ability to readily connect to a separate "connected device" as defined in section 1687 of this Article.

Time-of-Use Rate Schedule

The proposed "Time-of-Use Rate Schedule" requirements for what appears to be up to 150 distinct schedules [5 time of use x 5 time periods each x 2 (weekdays and weekends) x 3 seasons = 150] may be overly prescriptive in achieving the goals to reduce and shift energy consumption. Today's variable-speed pumps and pump control interfaces are limited in functionality and scope, and most do not have real clock calendar and seasonal scheduling capabilities. This would require significant investment and 3-5 years of development time to fully vet a new product. The proposed timeline of 24 months for development, testing, certification, and launch would be impossible– particularly for small manufacturers who would be most impacted with loss of revenue and possibly job loss.

The goals for load reduction and long-term consumer engagement may possibly be achieved by limiting the reduction of pump speeds during shed events and avoiding complete shutdowns of the pool pump. At motor speeds above 1725 RPM, just a **5%** reduction in speed equates

2882 Whiptail Loop # 100
Carlsbad, CA 92010
T. 800 822 7933
FluidraUSA.com

to an approximate **10% reduction in energy consumption.** This means with only small changes the pump can drastically impact energy demand without the need to turn off the pump. Pool automation systems can intelligently reduce energy load while maintaining min/max flow requirements, turnover rates– and minimizing impact to the user experience.

The Commission should consider simplifying the standard language to allow for innovation by the equipment manufacturers in developing methods to maximize load shifting for DR events, and make it easy and less disruptive for the consumer and pool professional.

Consumer Consent

The success of a Flexible Demand Response program is dependent on the participation of the consumer. A consumer must have the ability to opt-out of specific events that may impact the safety and user experience of their pool, but they should not be so negatively impacted that they opt-out for good. We can expect hot days to see the highest swimming pool use by families taking advantage of their investment to cool off from the heat. An educated pool owner knows a pump needs to be running, filtering, and circulating chemicals when there is bather load. Connected pool controls that control and understand the requirements of the entire swimming pool system can minimize disruption and negative impacts of DR events during times of heavy swimming pool use. The day a consumer's pool turns green, or they're ready to use their spa and it's not heated due to an event, is the day the consumer permanently opts-out of the program.

Safety is Paramount

The swimming pool pump is considered the "heart" of the pool system, and pool installation and service professionals address a myriad of requirements, including speeds and schedules to optimize water filtration, sanitization, energy usage, and ensure flow rates do not exceed the limits for suction entrapment. Unplanned changes and interruption in only the pump operation may have drastic effects on the system that can cause damage to equipment and property, and an increased risk of injury.

In particular, The speed of a pump will affect water quality, which may lead to unhealthy pool sanitation; and Pump flow rates and water velocity standards through the Virginia Graeme Baker Pool and Spa Safety Act (2007) and its codes and regulations have been published to minimize the risk of entrapment. If, due to a load shed event, a pool owner decides they need to overdrive a pump in order to achieve the necessary turnover and chemical disbursement to maintain pool sanitation, it may exceed the design flow rates of the drains and safety systems– putting unsuspecting bathers at risk of injury or death due to entrapment.

Unanticipated changes in flow may also damage or create hazardous conditions for pool heaters, chemical feeders, and electrolytic chlorinators that depend on adequate flow rates to ensure safe continuous operation. Certain water features like negative edges, spillways, and waterfalls may also cause flooding damage if the system flow is not properly managed. Some pumps are set up to lift water a significant height for operation and priming. These pumps may not have the performance overhead to be turned down or off. Insufficient power to

FLUIDRA

2882 Whiptail Loop # 100
Carlsbad, CA 92010
T. 800 822 7933
FluidraUSA.com

properly self-prime may cause these pumps to overheat, melt their plastic housings and cause flooding and/or fire.

Thus, it is vital for safety of the consumer that any controller with the capabilities of executing Demand Response events have the ability to recognize and react to the safety and sanitation requirements of an entire pool system.

In Conclusion

Fluidra supports California's efforts to reduce the energy demand and environmental impact of swimming pools using a smart and safe approach. We hope our comments have provided meaningful insight and are taken into consideration for this rule making. We look forward to working together with the California Energy Commission in meeting California's goals of a sustainable energy grid and ensuring consumer safety.

Cordially,

Philip Escobedo
FLUIDRA - Regulatory Compliance Manager
pescobedo@fluidra.com