

March 20, 2019

To: ConnectedProducts@energystar.gov

Re: **Zodiac Pool Systems LLC feedback on request for comments on Connected Products**

Dear Staff:

Due to some technical difficulties, we were unable to provide our comments on/responses to the requested questions posed by you as it relates to "Connected Pool Pumps". We hope that although we may be beyond the deadline of March 18th, 2019, you will still accept and consider our input as you continue to research the topic.

Below are our responses and comments to the specific questions posed in the discussion guide which was provided to us:

General Questions

- 1) What are the implications to upgrading local processors to be able to respond locally? (added hardware, software changes, energy use, other considerations)
- 2) What are the pros and cons of DR application layer message translation locally in the product?

-- Health and safety impact, minimum required turnovers per day should not be disturbed.

-- Cost could range from \$50 to several thousands to upgrade pool pad controls by end users.

-- To support application layer translation, for manufacturers it would imply be several years and potentially millions of dollars' worth of development. New components, new testing, new firmware and development of a brand new motor drives for on pump control would likely be required.

-- Preference would be to have EPA notify the pump manufacturer about demand events; then the pump manufacturer would act accordingly to execute the request. In other words, EPA systems would not talk directly to pump controls.

-- A definite "Con" – Change processor, firmware, and maintain software updates. In other words, design changes and product development efforts would be required.

- 3) What are the pros and cons of products using a cloud connection for DR response?

-- This method would be preferable to the pump manufacturer, such as Zodiac. Several manufacturers' automation controls may already be on the cloud; therefore, manufacturers can maintain current system protocols if EPA simply notifies the manufacturer of demand events, and then the manufacturers could quickly act accordingly.

4) Is there a way to quantify the additional utility support that would be available for products that do have local application layer protocol translation and therefore are a less risky investment?

5) The flexible load resources these products could provide would be most useful to the grid if distribution system operators know where they sit in the grid topology. For instance, this would allow optimum use of these resources to alleviate distribution bottlenecks. What mechanisms are used currently to provide this insight (e.g. in program deployment)? Are there specification criteria that could facilitate this?

-- Automation users register and provide location details.

POOL PUMPS

1) Market Changes: In 2019 and 2021, ENERGY STAR requirements will reward increased availability of variable speed products. Further, Federal 2021 Standards are expected to drive this market change further, which can support more advanced Demand Response. Is this anticipated to drive more pool pump DR products, interests, and programs?

-- We do not believe so; we believe that consumers may not care for DR events on their pump without being given monetary incentives to do so.

2) Technical: What are the technical barriers to pool pump DR and to creating an out-of-the-box connected product? Would industry or reference standards mitigate some of these issues?

-- Existing patents which specific pump manufacturers may hold, prevent others in the industry from easily developing new out-of-the-box connected products. This creates unfair competition and a potentially uneven playing field.

-- Various pump manufacturers in the industry do currently have connected products; however, we believe that connecting to the utility protocol is a challenge.

-- WiFi connection within the pump motor drive is susceptible to too much interference from motor. This has necessitated a separate "off-board" connection between the pump controls and pump/motor combination.

-- Health and Safety concerns can also arise with turnover rates being disrupted by Demand Response events.

3) Market Adoption: What are the current adoption barriers for pool pump DR? Stakeholders have previously mentioned: first cost, lack of equipped products, and lack of consumer interest/awareness. Will connected criteria lower some of these barriers?

-- There is a lack of equipped products, and certainly a lack of consumer interest/awareness. The industry does already offer connected devices today that can be talked-to through the cloud. We are not sure if connected criteria will lower these barriers, but concede that such criteria may help increase awareness.

4) Cost: First cost is often considered a key driver in pool pump purchases. Does the industry anticipate the incremental costs for connected and DR equipped pool products to decrease significantly? What would help drive adoption to reach a critical mass?

5) What data would pool pumps need to be able to send to a DR management entity (DRMS, etc.) about their state to optimize usefulness to the grid (e.g. daily filtering remaining)?

-- Minimum turnover / filter rates for a given application/installation would be required. It must also be noted that not all pumps used in and around a swimming pool are filter pumps; some pumps may be used for water features and to drive pressure type pool cleaners. DR management will likely be more effective on filtration pumps rather than on any of the pumps used in other applications since these types of other applications in most cases are intended for very intermittent use.

6) Can manufacturers remain in control of user experience when service may be impacted by use of pool pumps as grid resources? If so, are there any criteria necessary to ensure it's possible? If not, how will user impact be minimized?

-- This is an important consideration. As such, we want to be able to respond to DR events on our end, and decide if and when a pump can be turned down, shut off, or ramped up for excess power events. This is in the interest of maintaining required levels of safety, sanitation and user-experience.

Thank you for allowing us to provide comments to these issues.

Sincerely,



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