

September 26, 2014

Christopher Kent
US Environmental Protection Agency
Ariel Rios Building 6202J
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Dear Mr. Kent:

The Consortium for Energy Efficiency (CEE) respectfully submits the following comments in response to the *ENERGY STAR® Draft 1 of the Pool Pump Connected Specification*, released by the US Environmental Protection Agency (EPA) on January 14, 2014.

CEE is the binational organization of energy efficiency program administrators and a staunch supporter of the ENERGY STAR® Program. CEE members are responsible for ratepayer-funded efficiency programs in 45 US states and seven Canadian provinces. In 2011, CEE members directed \$6.1 billion of the \$7.6 billion in energy efficiency and demand response program expenditures in the two countries. These comments are offered in support of the local activities CEE members carry out to actively leverage the ENERGY STAR brand. CEE consensus comments are offered in the spirit of strengthening ENERGY STAR so it may continue to serve as the national marketing platform for energy efficiency.

We have organized our comments into *General Comments* that are relevant to many products, including pool pumps, and *Specific Comments* that relate only to pool pumps. We wish to recognize the significant contribution of the Electric Power Research Institute (EPRI) towards the development of these specific comments, particularly its leadership with regard to the necessary functional requirements of connected pool pumps capable of demand response functionality. We have also responded to the four questions EPA specifically requested stakeholder input on.

CEE highly values the role ENERGY STAR plays in differentiating energy efficient products and services that the CEE membership supports locally throughout the US and Canada. We appreciate the opportunity to provide these comments.

General Comments on “Connected” Criteria

Since 2011, CEE has been actively engaged with EPA, DOE, and manufacturers to assess the market conditions and specification requirements that would be necessary for the ENERGY STAR Program to successfully address “connected” (i.e. interactive communications with energy consuming devices for energy and non energy related purposes). Our members, who manage voluntary energy efficiency and demand response programs, continue to work with EPRI, and affected industries to develop an acceptable set of minimum communication requirements that will serve a critical mass of DSM administrator in the U.S. and Canada. Below please find our preliminary comments to consider as you evaluate connectivity for pool pumps. We anticipate developing a specific DSM industry position on the minimum requirements to connect within 2014 that will be relevant to a host of products, including pool pumps.

We Applaud EPA’s Commitment to Open, Non-Proprietary Communications and Seek Additional Specification of Pathways that Ensure Consumers Realize Benefits Nationally

CEE applauds EPA’s proposal to disallow architectures that do not provide an open, non-proprietary means of achieving grid connectedness with the appliance within the bounds of the customer’s premises via interoperability with open standard peripherals and applications. A number of different communication technologies and protocols are presently used by consumers depending on available infrastructure and regulatory environments. Maintaining an appropriate focus on openness, function, and communication technology neutrality will allow EPA to define the salient objectives of a “connected” architecture for appliance integration, while avoiding conflicts with the efforts of standards bodies to develop, validate and ratify the evolving portfolio of intelligent grid communications topologies. These bodies include the Institute of Electrical and Electronics Engineers, Society of Automobile Engineers, ASHRAE, Air Conditioning, Heating, and Refrigeration Institute, Consumer Electronics Association, American Society for Testing and Materials, National Institute of Standards and Technology, as well as others. We encourage EPA to keep this high-level principle in mind as it develops tight language to ensure open non-proprietary communication.

Such an approach, coupled with the assurance that an ENERGY STAR product will support all communication pathways, will ensure that the customer has the ability, and flexibility, to choose how their appliances are connected in the future, and will also minimize any onus on the customer to purchase ancillary devices to fully enable two-way connectedness. EPA’s proposal appears to provide the flexibility necessary to allow appliance manufacturers, utilities, and other efficiency and demand response program administrators to support customers’ needs, however, we are concerned that as a critical mass of DSM administrators seek to connect with a pool pump, additional requirements will prove necessary. **This is particularly true for the more traditional direct load control programs, where regulators have come to expect that the DSM administrator has established a long-term, reliable connection with customers that isn’t reliant on customer broadband, or the long-term maintenance of a cloud-based network by a product manufacturer.** While we believe that an open, non-proprietary means for achieving two way connectedness within the bounds of the customer’s premises should be a base requirement for obtaining “connected”

certification, CEE supports alternative means as long as these are supported in addition to those that ensure that the customer has the ultimate say and that emerging communication pathways are not squelched. Further, we note the importance of ENERGY STAR supporting compatibility across multiple products and manufacturers so that customers continue to retain flexibility for future product choice across manufacturers.

Specifically, we note the following observations:

- **Information-based “behavior change” demand response programs are emerging, and merit the support of ENERGY STAR.** In several states, demand response portfolios are increasingly adding new programs that communicate information (e.g. a peak price or reliability challenge) via a compelling consumer engagement technology (e.g. an in-home display, dashboard, or mobile app). These types of programs commonly “ride the coattails” of an engaging technology that provides non-energy benefits, and often communicates via an internet or cellular connection. This program approach, which is distinctly different from direct load control, is designed to share the responsibility of program implementation with 3rd-parties, and may not face the challenges we highlight in our argument for EPA to require connectivity within the physical premises of the home. However, these programs remain in the minority, and CEE members report that direct load control programs are expected to remain common in many states for the foreseeable future. We recommend that the ENERGY STAR Program require communication pathways that will support direct load control programs, variable pricing (TOU/ CPP/RTP) programs, and these emerging information based “behavior change” programs.
- **While customer-supplied broadband may be a viable way to achieve connectedness within a customer’s home, we note that there remains a significant number of customers nationally who do not have broadband and/or wireless access.** Furthermore, there are customers who may not be willing to support the use of their broadband connection by their utility for demand response purposes. Given that the ENERGY STAR Program is a mass market program, we recommend that a “connected” appliance be equipped to communicate via multiple communication pathways so as not to inadvertently preclude or limit market development and participation in potential utility programs. Requiring a standardized modular port is another option that would address the fact that program administrators operating under diverse sets of conditions (regulatory, terrain, customer density, metering life cycle) are likely to use a variety of communication technologies to reach devices for demand response, energy efficiency, and other amenity afforded by “connected.” A modular approach that is based on an open standard is one option to address this diversity and provide consumers, utilities, manufacturers and third parties with flexibility.
- **Regulators in some states may determine that cloud-based solutions would compromise customer data privacy and security due to the introduction of a third party into the flow of customer data and pool pump control.** If not proactively managed within the ENERGY STAR specification requirements. We recommend EPA carefully address how its connectivity requirements will safeguard customer data.

- **Requiring that the pool pumps communicate in an open, non proprietary manner from within the customer’s premises (in addition to any cloud-based connectivity) optimizes the customer’s ability to choose who “manages” their pool pump in the future.** For example, a customer may choose to pay their local cable company to, in addition to managing cable broadcast recordings, manage when their pool pump consumes energy based on their current rate structure. However, a few months later, that same customer may decide to allow their security system provider to manage their pool pump energy consumption along with their security settings and lighting to maximize savings and comfort. Open access within the physical premises of the home would help ensure that the customer is afforded the ability to choose which offer to participate in based on her own needs and wants.
- **We suggest that the DOE and EPA take steps to ensure that “connected” pool pumps are capable of receiving and responding to price signals as well as reliability-based signals.** Some CEE members are moving towards offering time-based pricing in the residential market, and nearly all members are evaluating this option. A customer may enroll in a time-based rate to capture the financial benefits of their “connected” appliance. In this scenario, signals sent to an appliance would be price-based, as opposed to reliability-based. Our understanding is that the current US Department of Energy (DOE) draft test procedure for DR functionality only addresses reliability-based signals, though time-based pricing is mentioned as a possible signal type. While reliability will be an important consideration for DR events, the price of energy will also be important and could more frequently determine DR events, particularly for purposes of delaying and shifting load. Consequently, a test method that can evaluate the appliance’s ability to respond to price signals will be necessary to verify that the consumer will capture the financial benefits of DR. This is especially true of cycle-based intermittent appliances. The consumer’s ability to shift load to lower price, off-peak periods would be greatly enhanced with price signal capabilities.

Specific Comments on Pool Pump Functionality

While our members experience with the demand response functionality of pool pump remains limited, we offer the following specific suggestions for EPA’s consideration. These recommendations aim to balance consumer uptake with optimizing the value of connected pool pumps for load management purposes.

4.2 Definitions

Figure 1 (line 74): For balance, we suggest including a long-range communication example in the list to the right side of the diagram, such as “cellular network, AMI, or SCADA system.” These examples highlight commonly used communication technologies employed by electric utilities for demand response programs, and are relevant for pool pump manufacturers to consider as they design connected pool pumps.

Figure 1 (line 75): It is not clear from the diagram that a pool pump with a physical modular port interface that employs open standards would meet ENERGY STAR’s criteria. Specifically, the rendering in the drawing

resembles a communication module (shown mounted on the pump), but shows this within the CPPS boundary. The concern is that a separate module need not be required, if the physical port itself is an open standard. The following note (lines 76-78), furthers this lack of clarity by listing “external communication module” as being inside the CPPS.

We agree that if a physical port on a product were proprietary, then a communication module that converts to an open standard should be required. However, many CEE members believe a modular port that employs open standards (e.g. CEA 2045) will provide the necessary flexibility for a connected pool pump to communicate with a critical mass of demand response program administrators in the U.S. and Canada.

Figure 1 (Line 77): To address this potential confusion regarding the ability to rely on a modular port for connectivity, we suggest changing the wording for Note 1 under Figure 1 to the following: *These elements “either individually or together” could be within the pump controller, and/or an external communication module, a hub/gateway, or in the Internet/cloud.*

Figure 1 (Line 78): We suggest adding: “Note: An open standard interface is always required at the premises, even in the event that an Internet/Cloud system is provided.”

As previously explained in our comments, we believe translation to open standards within the premises should be required, regardless of whether or not the manufacturer is also offering cloud services. This ensures availability for all parties in the future, bolsters local uses (e.g. compensating for the intermittency of renewables), provides for consumer choice of apps and systems, supports the regulatory expectations for direct load control programs, and encourages competition in the marketplace.

4.3 Communications

(Line 108): We applaud EPA’s stated commitment to open standards within this section. It is recognized that standards development processes may be slow and that, as a result, the capabilities of standards may lag behind the emergence of new functional interests in the marketplace. To address this, manufacturers and vendor groups often develop “extensions” to standards so that they can continue forward in an interoperable way. Specifications like this document from the EPA stimulate the development of content of this kind, and accelerate the completing and maturing of standards. To this end we recommend the following specific additions:

(Lines 114 to 116): We suggest clarifying these lines to say: “B. In addition to A, an Interface Control Document (ICD), Application Programming Interface (API), or other documentation shall be made available to interested parties that, at a minimum, allows access to the following functionality:”

(Lines 122 to 123): We suggest solidifying as a requirement “economical and direct communications that complies with 4.3A and 4.3B” without the allowance for alternative approaches. As stated, this language could be mistakenly interpreted to imply that none of the communications requirements in 4.3A and B are mandatory. CEE members believe strongly that this disclosure is integral to the success of the Program.

4.6 Operational Status, User Settings & Messages

In addition to ensuring consumers are adequately informed and empowered, communication of key information from the connected pool pump is integral to the success and evolution of Demand Response programs. Requiring the following information from a CPPS will both enable implementation of DR in the short term, but also enable the design of more effective DR programs in the future. In fact, the ability of the CPPS to share this information is likely as important as the ability to receive and respond to a DR signal.

(Line 212): In addition to requiring the stated minimum information to consumers or an authorized third party, we suggest also requiring information that would support determination of the availability of a DR resource, as well as information to inform the evaluation, measurement, and verification of a DR program. At a minimum, CEE members request the following:

- Details of any consumer override, *(whether complete override, or partial override)*
- kW usage before, during, and after a DR event. *If obtaining kW usage is not possible, then the percentage of full speed at which the system is running before, during, and after a DR event, would serve well as an interim proxy for power.*

For example, status information may consist of 15 minute data across the hours before, during, and after a DR event.

4.8 Demand Response

With regard to the Demand Response functionality specified by ENERGY STAR we offer the following recommendations that will increase the value of ENERGY STAR recognized products to DR program administrators:

(Line 269) We recommend specifying response time with a minimum delay as a requirement. For example, the Australian/New Zealand standard specifies response *within 5 minutes of signal receipt*. Shorter response time is potentially useful for more applications supporting the grid.

(Line 269) We recommend a requirement that the manufacturer provide information to inform both the consumer and DSM administrator on pump behavior after a DR event (e.g., run-time adjustment to maintain pool health).

Table 2 (Line 281) For type 1 Response we suggest using the following language:

Multi-Speed: Pumping shall be “reduced (i.e., interrupted or curtailed)” to the lowest available speed

Variable Speed: Pumping shall be “reduced (i.e., interrupted or curtailed)” to no greater than a third of full speed

(Line 295-6): (Line 295-6): While we share EPA’s interest in protecting the customer, we are not convinced EPA will be able to measure or enforce the provision requiring energy consumption not increase within a

single day. Further, we question the likelihood of the net impact of a type 3 response ultimately leading to a net increase in energy usage within a given billing cycle (or over the long term) for a particular customer. We do acknowledge there will be times that an instantaneous increase in energy consumption will occur for load balancing purposes, but this increase should theoretically be more than offset by corresponding load shedding events. In the coming months, CEE will work with EPRI to analyze and share with EPA actual data from utilities that will assess the risk and potential magnitude of consumers experiencing a net increase in energy use due to type 3 responses. If we ultimately conclude there is a legitimate risk, and EPA has a method to manage this risk, we recommend that EPA require that the net energy consumption, and/or the net cost to the customer will not increase over the scheduled operation for a given month or billing cycle, rather than within a given day. We agree a Type 3 response shall be subject to consumer override

Comments in Response to EPA’s Specific Questions on Demand Response Functionality

In response to EPA’s specific questions, we focus our comments on changes that will enhance ENERGY STAR as a platform for demand response programs, without compromising the core tenets of the brand.

EPA Question 1 (Line 332): Will the proposed Type 1 responses per pump type, default 4-hour minimum duration, and 1x per 24 hour minimum response frequency provide tangible grid benefits while limiting consumer impacts?

We believe to enable tangible grid benefits, it’s necessary to expand the scope of a Type 1 response. This will enable greater promotion by electric utilities and other DSM administrators of a *Type 1 response* in many more use cases. Specifically, we recommend:

- a) Expand the currently proposed “1x per 24 hour” limitation to “3x per 24 hour”. (Alternatively, though less desirable, change to “1x per 12 hour”). It is quite likely that DSM administrators would desire (or require) the ability to call upon a DR resource more than once per day for tasks such as renewable integration.
- b) Eliminating the “4-hour minimum duration” and/or providing the ability to specify a minimum duration ranging from one hour to 12 hours.

EPA Question 2 (Line 334): Will the proposed Type 2 response, default 20-minute duration, and 3x per 24-hour response frequency provide tangible grid benefits while limiting consumer impacts?

We believe to enable tangible grid benefits; it’s necessary to expand the scope of a Type 2 response. This will enable greater promotion by electric utilities and other DSM administrators of a *Type 2 response* in many more use cases. Specifically, we recommend:

- a) Eliminate “3x per 24 hour” limitation. (Alternatively, though less desirable, EPA could change to “3x per 12 hour”). While we don’t believe it will be necessary, EPA could also limit the duration of the event to 1 hour, which would further minimize the risk of a negative consumer impact.

- b) Eliminate the “20-minute duration” and/or provide the ability to specify a minimum duration ranging from one minute to 60 minutes.

EPA Question 3 (line 336): Will the proposed Type 3 response provide grid benefits while effectively guarding consumers against the potential for responses that increase overall consumption or decrease the daily pumped volume? What is the impact to pool pump manufacturers relative to this additional proposed layer of consumer protection?

For greater usability of Type 3 response for more uses cases, particularly the integration of intermittent renewable energy resources, we recommend that EPA require the ability for a Type 3 response to both shed load and to accept load (i.e. increase pumping). We also encourage EPA to require that the pool pump precisely specify the maximum power that is either shed or accepted. In cases where kW changes are unable to be specified accurately, specifying the maximum speed would be an acceptable interim proxy for power.

EPA Questions 4 (line 339): What changes, if any, do stakeholders recommend in order to provide increased grid benefits, or conversely to limit consumer impacts?

To further limit negative consumer impacts, we recommend EPA address functionality to maintain integrity of pool pump operation in subfreezing temperatures (e.g., freeze protection). Some regions during winter season will require this safeguard. We are unable to propose a specific method for ensuring freeze protection at this time, but one possibility is that EPA would require running the pump at a specified regular interval. We believe freeze protection is an important consideration that merits additional consultation with pool pump manufacturers, and ultimately with pool pump installers to ensure the required settings are achieved.

Thank you for your consideration of these comments. Please contact CEE Principal Program Manager John Taylor at (617) 532-0944 with any questions.

Sincerely,

Ed Wisniewski
Executive Director