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Comments of Portland General Electric Company to the US Environmental Protection Agency on the ENERGY STAR Certified Residential Water Heater Product Specification

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Sent via email: WaterHeaters@energystar.gov

Portland General Electric Company (PGE) wants to express our appreciation for the connected criteria enhancements contained in the February 2019 *Connected Criteria for Large Load Products Discussion Guide*. We are especially pleased that the US Environmental Protection Agency (the Agency) acknowledged the value that connected, flexible load resources can offer utilities in a changing energy landscape. With this in mind, we are encouraged by the revised, optional connected criteria included in the ENERGY STAR certified residential water heater product specification released on April 16, 2019. However, to further improve the cost effectiveness and customer experience of grid-connected devices in demand response programs, we respectfully urge the Agency to modify the proposed product specification in a few key areas. Also, PGE recommends that the Agency either modify the ENERGY STAR program or create a sister, voluntary program that addresses resistance water heaters, and ultimately other large, non-ENERGY STAR loads, to further enable grid-connected devices.

PGE is a fully integrated electric utility that serves almost half of all Oregon homes and businesses – more than 875,000 residential, commercial and industrial customers in the Portland metro region and the northern Willamette Valley. We share our customers' and our communities' vision of a clean and reliable energy future. Our vision includes driving down greenhouse gas emissions in our own resource portfolio and creating a smart, more resilient energy grid to help efficiently integrate clean, renewable resources. Demand response and flexible loads are key components of this smarter grid. Our vision is consistent with the February 2019 discussion guide regarding grid-enabled devices.

Recommended Changes to the Proposed Product Specification for Residential Water Heaters

1. **Communication Link:** In the proposed product specification for residential water heaters, the Agency requires the Communication Link to be fulfilled with Open Standards and an Interface Specification. As there are many such standards, it could lead to water heater manufacturers implementing different approaches. PGE finds this troublesome as it will require utilities implementing demand response programs to develop unique connections with each water heater manufacturer (based on our initial review, if this specification is added to each large-load product category as currently written, utilities will need to inventory at least 20 different

types of hardware to accommodate each manufacturer). This outcome will result in demand response programs that are expensive to implement and will likely reduce both the number of products supported and programs offered. This will also frustrate the customer, likely causing lower customer adoption. Higher expenses and reduced customer appeal greatly reduce the effectiveness and benefits of demand response programs.

To help eliminate this outcome, PGE recommends that the Agency implement a standard physical method for customers to establish a communication link. This needs to extend beyond open standards within the communication link. Adopting a standard physical method:

- Allows customers an easy, consistent approach to connect their water heater with demand response programs, regardless of the manufacturer;
- Allows utilities a cost-effective approach to implementing and operating demand response programs; and
- Provides the necessary volume to lower the cost of the communication hardware.

The agency specifically recognizes the importance of open, standard communication methods, at the device, in their February 2019 discussion guide. The CTA-2045 communication port, or equivalent, enables this standard method and can easily be incorporated into water heaters (and other large load products) at the time of manufacture. Since an appliance with connected features provides no grid benefit unless that appliance is enrolled in a demand response program, we encourage the Agency to adopt a standard approach to yield the greatest grid benefits.

Please note that the State of Washington has recognized the importance of grid-enabled residential water heaters in passing HR 1444 this year (signed by Governor Inslee on May 7, 2019). The new law requires a communication port that is compliant with CTA-2045, or equivalent, on all electric water heaters manufactured on or after January 1, 2021. We recommend that the Agency follow the precedent set by the State of Washington in the ENERGY STAR residential water heater product specification.

2. **Other suggested edits:** The follow suggested changes are related to the stated goal in the February 2019 discussion guide of "Open at the Device" and specific to Section 1.M, Page 3, definition of Connected Water Heater Product.

- In Figure 1, please identify the Connected Water Heater Product Boundary to exist within the Customer premise.
- In the definition of Connected Water Heater Product, please rephrase the following sentence to remove reference to the internet/cloud as a primary element to enable demand response functionality: "These elements, either individually or together, could be within the water heater/controller, and/or an external communication module, a hub/gateway, or in the Internet/cloud." Please change to the following: "These elements, either individually or together, could be within the water heater/controller, and/or an external communication module, **or a hub/gateway—all located within the**

Customer premise. The Internet/cloud may be permitted as an additional, optional path for functionality in either Sections 4.B (Remote Management and Consumer Feedback) or Section 4.C (Demand Response)."

These suggested edits are required to prevent, as the exclusive option, an open application layer, in the cloud, for demand response programs. The suggested edits will create fully open access at the device. With that said, it is important to reiterate our first comment regarding the Communication Link; namely, that while this requirement will create an open device, the approach will likely be different for each manufacturer. If the Agency were to define this approach for other large loads, the unique differences will create multiple approaches to establishing the communication link and complexity and/or confusion for customers while adding significant cost to utilities to support hardware and customer support all these unique approaches. Again, the CTA-2045 communication port, or equivalent, enables a standard method and can easily be incorporated at the time of manufacture.

Grid-Connected Resistance Water Heaters (and Other Large Load Products)

In 2011, the Agency's first connected device specification was advanced on the innovative concept that by sacrificing a small amount of energy savings at the appliance, the cost savings to the manufacturer could enable them to support communication for demand response-ready appliances. The combined energy savings at the appliance, and in the grid, could yield greater energy savings overall. This notion of greater energy savings fits the objectives of the ENERGY STAR program well. With the continued development of intermittent renewable generation – currently 29 states have established renewable portfolio standards – the need for flexible loads and grid-connected devices to help integrate renewable generation is steadily increasing. The Agency's February 2019 discussion guide addresses this and specifically states on page 3: "... these factors contribute to the substantial interest among utilities in energy efficient products with features that also are DR ready, capable of being controlled or dispatched to provide electric grid services."

Significant energy savings can be achieved by shifting electric usage to times when the most efficient generation operates. Water that can be heated in the middle of the night when electricity prices and demand are low or in the middle of the day when renewables are abundant not only reduces emissions but is also a more efficient use of the electric grid. To help utilities and other grid operators maximize demand response programs and load shaping to integrate renewables, PGE recommends that the Agency either modify the ENERGY STAR program or consider a new, voluntary program – for the purpose of these comments we call the new program GRID STAR – for non-ENERGY STAR large load products. The GRID STAR specification would be specific to further enabling grid-connected devices for utility demand response programs. Again, the Agency specifically highlights the potential for resistance water heaters for grid management in the February 2019 discussion guide (page 9):

"Aside from connected criteria for heat pump water heaters, EPA is aware that control of electric resistance water heaters is promising for flexible load response. Though EPA has not reconsidered its position regarding the exclusion of electric resistance water heaters from the ENERGY STAR specification, there

is potential for these water heaters to eventually use an ENERGY STAR grid response test method, if developed. The ENERGY STAR platform could help drive a more consistent approach for demand response and grid balancing through both ENERGY STAR and non-ENERGY STAR electric water heaters...”

If a new classification is developed, a device might qualify for both ENERGY STAR and GRID STAR labels, such as with heat pump water heaters; however, resistance water heaters (and ultimately other large, non-ENERGY STAR loads) could separately meet the requirements for just GRID STAR.

The Pacific Northwest recently completed a successful demand response pilot program on connected water heaters. The study¹ demonstrated that resistance water heaters, because of their inherent thermal storage, create a unique and large opportunity as flexible loads with a high benefit/cost ratio. It should also be noted that the study utilized the CTA-2045 communication port. The CTA-2045 port allowed utilities to provide a communication device that the customer could easily plug into the water heater. This simple approach was critical to the success of the program, including the achievement of high customer satisfaction ratings within the pilot program.

Also, PGE commissioned a Deep Decarbonization Study² in 2018 that explored high and low electrification pathways to reduce energy-related greenhouse gas emissions in our service area to 80% below 1990 levels by 2050. The study found that, in the high electrification pathways, flexible loads, particularly flexible electric vehicle charging and flexible water heaters, show particular promise in ensuring renewables are efficiently integrated.

Thank you for your consideration of these comments, and for the Agency’s efforts to enhance connected appliances. To help improve the cost effectiveness and customer experiences of demand response programs, we request that an open, standard communication method, such as CTA-2045, be adopted in the residential water heater product specification. Also, PGE recommends that the Agency either modify the ENERGY STAR program or consider a new, voluntary program for non-ENERGY STAR large load products to further enhance grid-connected devices. PGE truly believes that the advancement and adoption of demand response and flexible loads at the residential level is a major component of a decarbonized future and we want to ensure that the precedent set in the Agency’s ENERGY STAR program is consistent with that future. For any follow-up communications, please contact Elysia Treanor at (503) 464-8528 or at Elysia.Treanor@pgn.com (Environmental Policy) or Conrad Eustis as (503) 464-7016 or at Conrad.Eustis@pgn.com (Technical Lead).

¹ See www.bpa.gov/goto/smartwaterheaterreport

² See <https://www.portlandgeneral.com/our-company/energy-strategy/resource-planning/integrated-resource-planning>