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Sent: Friday, May 17, 2019 4:44 PM
To: 'WaterHeaters@energystar.gov' <WaterHeaters@energystar.gov>
Cc: Thomas, Chuck <cthomas@epri.com>; Delay, Samuel J <sjdelay@tva.gov>
Subject: Comments in Support of Creating Specifications for Connected Water Heaters

Dear Energy Star;

RE: Comments about to the attached Energy Star Water Heaters memorandum and Water Heater Draft Connected Specification

Connected consumer devices which can support services to the grid will be highly valuable to creating an integrated grid where consumer owned appliances can participate as Distributed Energy Resources (DER).

Creating an Energy Star communicating water heater specification helps manufacturers reach consensus on how to build in a collaboratively managed and a protected best customer experience, and expands the appliance functionality to balance home loads, and can also provide aggregated grid services to local utilities (as documented in the demonstration cited).

Creating a consistent way to have connected consumer devices is key to creating the opportunities for least cost power, best prosumer integration value, and happy ownership experiences by consumers.

We agree that consumers should have the ability to access and manage access to functions and/or information embedded into their devices through an open standards-based interface at the device or from within the premises . Such interfaces do not depend on a remote cloud to enable optimum energy use, but can make key low cost appliance data locally available through the interface at the premises.

TVA has participated in research projects that demonstrated the value of (1) open access at the device, (2) open communication standards, (3) standardized physical connection (port) and (4) a well-defined map between functional requirements and the open communication standard.

- Both TVA and Local Power Companies have the opportunity to engage consumer home devices in a secure way using CTA-2045 and OpenADR 2.0b VEN communication standards paired with residential water heater which has a built-in interface port. This system has been tested confirming the customer experience using the equipment is not impacted and utility performance is reliably engaged for the local power company and other potential aggregators. Open architecture is used so utilities are not "locked into" a sole communication service provider. End use device operation provides real time grid edge visibility of resource potentials.

I believe this is the lowest cost load shifting/storage and load management resource. In addition to water heaters, the approach can tie a local control system to other loads such as thermostats, electric vehicles service equipment, heating and air-conditioning systems, and pool pumps for optimum energy performance.

A significant scale demonstration of low cost engagement with Distributed Resources, using water heaters has been provided Tony Koch (Bonneville Power Admin) and Conrad Eustis (Portland General Electric). Conrad Eustis (PGE) and (Tony Koch with BPA) completed a 3 year Pacific Northwest regional project where we issued DR commands to water heaters with CTA-2045 modular interface. On Nov 28, 2019 they published final report and supporting documents were posted on an external BPA webpage. The page is dedicated to the CTA-2045 technology. The first link on the page is the report proper. The second section contains supporting docs to the

report, the Excel file with detailed economic analysis and assumptions, and customer surveys. The third section has various links and materials that offer more details and resources.

The raw data (1 min interval) files are available as CSV and R Studio type data files from this project. Please see: <https://www.bpa.gov/EE/Technology/demand-response/Pages/CTA2045-DataShare.aspx> and please see www.bpa.gov/goto/smartwaterheaterreport

I think it is important that, the latest Energy Star DRAFT specification requires these functions be accessed through the proven ANSI/CTA-2045 port or with both ANSI/CTA-2045 and an OpenADR 2.0b VEN. The map between functions and commands are similar, in some cases identical, to those TVA and other utilities developed to support this documented field demonstration research.

Comments Related to the text of the WH Draft V3.3_Connected_Spec 04162019.pdf:

- I don't think an exclusion on "line 150 a. Electric resistance water heaters" is needed, simply because any water heater could benefit from a connected criteria, especially standard water heaters. It may be that other factors besides enhanced utility are the reason for that exclusion or that this particular product category cannot have an energy star label. However, I would not exclude them because they will be small capacity and this criteria moves these appliances forward even if they are not top tier efficiency.
- My feeling is gas utilities will also benefit from being able to have a new method of load control via this communication approach for better utilization of gas pressure in extreme weather.
- Overall I think the specification will demonstrate EPA leadership in connected devices.

Best regards,

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