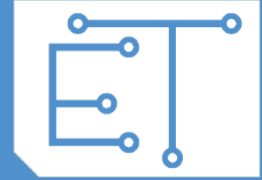


# Smart Water Heaters

## Emerging Technology Field Test

### Demand Response Using ANSI/CTA-2045 Technology



#### Opportunity

Up to 600 residential electricity customers may participate in a smart water heater emerging technology demonstration project that enables better management of energy. A smart water heater is a water heater with a modular communication interface that will be able to receive and respond to demand response (DR) signals from utilities. By enabling the smart water heater to send and receive utilities signals, the water heater can help support the grid. By changing the time when, and at what rate, it re-heats water the tank acts like a battery; controlling the re-heat rate has the same effect on the grid as storing or releasing energy from a battery. These small changes in when and how often water heaters run can be a valuable tool in grid management.

#### What

Smart water heaters will be equipped with a communications port adapter and a universal communicating module (UCM) that conforms to the Consumer Technology Association's secure and open CTA-2045 *Modular Communication Interface* standard. Demand response (DR) commands will be sent by BPA, using "texts" (radio data systems RDS) to the water heater via radio signals sent from a local FM radio station. The water heater communicates back to BPA the resident's WiFi enabled connection. It will record power consumption, tank operations, and user interaction data, such as whether an occupant selects to override a DR event. All data will be recorded in 1 min intervals.

#### Where

This emerging technology demonstration will occur in single-family and multi-family residences within the Pacific Northwest service territories of participating electric utilities.

#### Benefits

Renewable energy such as wind and solar is increasing on the electric grid. However, these intermittent generating resources create integration challenges for utilities. DR can be a cost effective tool to reduce customer's electricity demand for brief periods. It can also be used to help the grid absorb extra energy when needed. Using CTA 2045 communication technology, utilities are able to use the inherent energy storage capability of water heaters to smooth out the intermittent nature of renewable generation. Enabling this low cost communication port on every water heater in the Pacific Northwest could mitigate the cost of renewable integration and provide support to the electric grid.

#### Why

Participating in smart water heater demonstration will achieve the following:

- Demonstrate that low-cost communication technologies can enable broad-scale DR
- Facilitate better integration of low-carbon wind and solar power generation with the grid
- Minimize the perceived impact of demand response (e.g., inconvenience, discomfort) to the residential customer
- Provide data on the benefits of communicating water heaters to a reliable and low-cost grid

#### Available Funding

BPA will provide funding for up to 12 utilities to compensate residential customers for their participation in this demonstration. Payments will be made in three installments:

- \$50 per demonstration site, after verifying one month of connectivity for an initial set of participants;
- \$50 per additional demonstration site recruited through the sign up period (August 31, 2017)

- \$100 per site for those who participate until the end of the DR events (July 31, 2018). And on a limited basis, an additional \$100 for those who allow a logger to be installed for the duration of the project.

### Application Eligibility Criteria

BPA's goal for this demonstration project is to enlist a total of 600 households across all participating utilities. BPA seeks equal participation of residences with qualifying electric resistance water heaters (ERWH) and heat pump water heaters (HPWH). Eligibility requirements include:

- Residential customers only
  - Single-family or multi-family residences
  - Primary residence that is continually occupied: no seasonal or vacation homes
  - Reasonable expectation of remaining at address for at least 12 months
- Have an eligible water heater
  - AO Smith HPWH (list to be obtained from AO Smith),
  - GE Geospring HPWH installed January 2014 or later, and
  - Specific AO Smith ERWH (tanks to be delivered for this project).
- Strong radio reception of specific FM stations to be used in the project (Seattle/Tacoma: TBD, Portland: KINK 101.9, Eugene: TBD, Wenatchee: TBD)
- Existing home Wi-Fi network that is continually available to the water heater, in order to:
  - Allows the utility-provided communication module to connect to the internet
  - Allow secure communication to the data collection server

### Participation Responsibilities

Participating utilities are the point of contact for all interactions with residential customers. This includes recruiting, customer care, initial level of technical support to the customer, issuing incentives to customers, and managing customer account passwords to the BPA-procured DR dispatch system (e-Radio). BPA will make available additional technical support, if required.

Utility customers are responsible for keeping the in-home WiFi system active. Customers will have the

opportunity to provide feedback to the project team via a website with log in and password security, and ability to override the DR controls for a 24-hour period.

### Application Process

Interested utilities must submit an [application](#) to Wesley Saway, [wjsaway@bpa.gov](mailto:wjsaway@bpa.gov) by 1/31/2017.

### Selection Criteria

Awards will be made based on meeting eligibility criteria, geographic location, and estimated number of sites to be recruited. BPA will hold a utility call and discuss modifications to the estimate of customer participation, if needed, to maximize study costs and results. Once there is agreement on the estimated number of customers from all interested utilities, BPA will offer a grant agreement to each interested utility for consideration.

### Project Timeline

1/12/2017	Grant solicitation released
1/31//2017	Applications Due 6pm (PST)
2/15/2017	Utility proposals selected
2/28/2017	Anticipated Award to Utility
3/31/2017	Submit invoice for initial \$50 payment based on estimate
4/15/2017	Utility starts recruiting residential customers
7/1/2017 – 7/31/2018	DR signals sent to connected hot water heaters
9/1/2017	Submit invoice for payment/reconciliation based on actual sign up and connectivity
8/1/2018	Remove UCM and port adapter (removal restores tank to factory-built conditions)
9/1/2018	Submit invoice for final incentive payment \$100, and if applicable \$100 logger payment
9/30/2018	Final reports produced by BPA

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### For More Information Contact

Your Energy Efficiency Representative or Project Manager, Tony Koch, at [jakoch@bpa.gov](mailto:jakoch@bpa.gov) 206.220.6777