



Portland General Electric Company
121 SW Salmon Street • Portland, Oregon 97204
PortlandGeneral.com

February 3, 2017

Public Utility Commission of Oregon
Attn: Filing Center
201 High Street, S.E.
P.O. Box 1088
Salem, OR 97308-1088

RE: Advice No. 17-02, NEW Schedule 3 Residential Demand Response Water Heater Pilot Rider

Portland General Electric (PGE) submits this filing pursuant to Oregon Revised Statutes 757.205 and 757.210, and Oregon Administrative Rule (OAR) 860-022-0025, for filing proposed tariff sheets associated with Tariff P.U.C. No. 18, with a requested effective date of **March 22, 2017**:

Fifteenth Revision of Sheet No. 1-1
Original Sheet No. 3-1
Original Sheet No. 3-2
Original Sheet No. 3-3
Original Sheet No. 3-4

PGE hereby submits Schedule 3, a residential demand response pilot. Participating Residential Customers will remain on Schedule 7 during this pilot. PGE will conduct this pilot in partnership with the Bonneville Power Administration (BPA) to demonstrate the regional value of grid interactive water heaters. PGE will be the main point of contact for all interactions with Residential Customers during this pilot. BPA will provide additional technical support, if required. This pilot is expected to be conducted through July 31, 2018.

This pilot is a demand response option for eligible Residential Customers. The pilot is designed to quantify the energy consumption that can be shifted to different times of day using water heaters equipped with a communication interface that supports direct load control events. Direct load control events are a period of time in which the Company will implement direct load control over the Customer's water heater.

The Northwest Energy Efficiency Alliance (NEEA) will generate a detailed project report at the conclusion of the project that will include the costs and benefits of this pilot to create a business case to justify NEEA's regional market transformation plan. The market transformation plan will inform utilities and other regional stakeholders about the most cost effective way to make demand response-ready water heaters the primary type installed in the Pacific Northwest. PGE will share all reports created for this pilot with the PUC.

To satisfy the requirements of OAR 860-022-0025, PGE responds as follows:

The incremental costs to implement this pilot will be paid by BPA, through PGE, to compensate Residential Customers for their participation in this pilot. This schedule does not increase, decrease or otherwise change existing rates or have anything other than a de minimis impact on revenues.

Included in this filing as Attachment A, is BPA's announcement of the project, which details project specifics.

Should you have any questions or comments regarding this filing, please contact Peter Davis at (503) 464-8068.

Please direct all formal correspondence and requests to the following email address pge.opuc.filings@pqn.com

Sincerely,

A handwritten signature in black ink, appearing to read "Karla Wenzel". The signature is written in a cursive, flowing style.

Karla Wenzel
Manager, Pricing and Tariffs

Enclosures

**PORTLAND GENERAL ELECTRIC COMPANY
TABLE OF CONTENTS
RATE SCHEDULES**

Schedule Description

Table of Contents, Rate Schedules

Table of Contents, Rules and Regulations

Standard Service Schedules

3	Residential Demand Response Water Heater Pilot Rider	(N)
5	Direct Load Control Pilot Rider	
6	Residential Pricing Pilot	
7	Residential Service	
15	Outdoor Area Lighting Standard Service (Cost of Service)	
32	Small Nonresidential Standard Service	
38	Large Nonresidential Optional Time-of-Day Standard Service (Cost of Service)	
47	Small Nonresidential Irrigation and Drainage Pumping Standard Service (Cost of Service)	
49	Large Nonresidential Irrigation and Drainage Pumping Standard Service (Cost of Service)	
75	Partial Requirements Service	
76R	Partial Requirements Economic Replacement Power Rider	
77	Firm Load Reduction Program	
81	Nonresidential Emergency Default Service	
83	Large Nonresidential Standard Service (31 – 200 kW)	
85	Large Nonresidential Standard Service (201 – 4,000 kW)	
86	Nonresidential Demand Buy Back Rider	

SCHEDULE 3 RESIDENTIAL DEMAND RESPONSE WATER HEATER PILOT RIDER

PURPOSE

The Residential Demand Response Water Heater Pilot Rider is a demand response option for eligible residential Customers. The pilot is being conducted by the Bonneville Power Administration (BPA) and PGE. The objectives of the Residential Demand Response Water Heater Pilot Rider are:

- To quantify the energy consumption that can be shifted to different times from water heaters equipped with a communication interface that supports Direct Load Control Events;
- To create an effective program design for a water heater demand response program;
- To determine kW load that can be reduced at times of system peak demand;
- To create a business case that justifies a regional market transformation plan for demand response ready (smart) water heaters;
- To integrate and test different technologies, and
- To implement different demand response dispatch strategies.

DEFINITIONS

Customer Override – The ability for the Customer to temporarily suspend Direct Load Control for a period of 24 hours.

Direct Load Control – the means for a utility to remotely control an appliance. In terms of this pilot, direct load control allows the Company to control when the water heater uses electricity to heat water.

Direct Load Control Event – a period of time in which the Company will provide Direct Load Control.

Conventional Electric Resistance Water Heater – A water heater model ordered specifically for this pilot. It will be available to qualified plumbers through customary distribution channels. The water heater is the commercially manufactured PXNT-50 tank made and warranted by AO Smith. The model is shipped from AO Smith with a small change so as to interpret the commands provided by the project's communication provider.

Heat Pump Water Heater – Recent models manufactured by AO Smith or GE Appliances. When a Customer expresses interest in participation, PGE must verify that the customer's water heater model is compatible with the pilot's communication provider.

SCHEDULE 3 (Continued)

AVAILABLE

In territory served by the Company and a location with strong radio reception from KINK radio at 101.9 MHz.

APPLICABLE

Subject to selection by the Company, eligible Residential Customers may elect to participate in the pilot. Customers must have installed a properly sized conventional electric resistance or heat pump water heaters prior to the beginning of the pilot, and have home Wi-Fi. The number of eligible Customer to participate in the pilot is limited by BPA to approximately 100 to 200 Customers. Customers will remain on Schedule 7 and will be eligible for the incentives described in this schedule.

ELIGIBILITY

Eligible Customers must be located within radio coverage of KINK radio. Customers must be willing to implement a small, PGE-provided, socket-based, communication device on the water heater. Customers must allow PGE and BPA to use the Customer's existing Wi-Fi network which will be used to collect data from the water heater. Direct Load Control Events will be implemented via FM radio signals. Participating Customers must live full time in the home, with the hot water heater, with no plans of moving or changing full time residency before July 31, 2018. The Customer must agree to participate in an initial survey and short weekly surveys after commencement of the pilot.

DIRECT LOAD CONTROL EVENT

During the pilot there will be no limitation on the hours of Direct Load Control Events; however the Customer can implement an override as indicated in the Special Conditions. During Direct Load Control Events the Customer may allow the Company or BPA to control the water heater for the duration of the event. Direct Load Control Events do not require notification.

SCHEDULE 3 (Continued)

ENROLLMENT

The Customer enrollment period may begin prior to the term of the pilot. Customers must enroll in the BPA pilot by August 31, 2017. Customers with heat pump water heaters will be notified by mail or email and be provided with an opportunity to enroll in this schedule. Customers with Conventional Electric Resistance Water Heaters will have the opportunity to enroll through notification by a select, trained group of plumbers. PGE expects this notification to occur primarily in the course of a Customer replacing a failed electric water heater. However, qualified Customers that contact PGE, or are informed by another method, may be allowed to participate if they bear the cost of replacing their existing water heater with a Conventional Electric Resistance Water Heater named above. Unless this pilot is otherwise terminated, participating Customers will be enrolled for the entire pilot term.

INCENTIVE

Participating Customers will receive a \$50 sign-up incentive payment after PGE verifies one month of connectivity to the Customer's Wi-Fi network. A Customer that has participated, as defined in the special conditions, for 12 months will receive a \$100 participation incentive at the end of the pilot. Customers will receive an additional \$100 if they allow PGE to install a logging device on the water heater for the duration of the pilot. The number of logging devices is limited. Incentives are paid to the Customer with a check or generic gift card. To receive participation payment, the Customer must not move, withdraw, or be removed from pilot during the 12 months.

SCHEDULE 3 (Concluded)

SPECIAL CONDITIONS

1. The Customer may terminate service under this pilot voluntarily. The Customer will not receive a participation incentive if they withdraw or are removed from the pilot. The Customer must notify PGE if they choose to withdraw from the pilot.
2. PGE has the right to remove a Customer from the pilot at any time, for any reason.
3. If a Customer withdraws or is removed from the pilot, the Customer is not eligible for reenrollment during the pilot.
4. If the Customer moves from the enrolled residence during the term of the pilot, they are no longer eligible for the pilot.
5. The Company is not responsible for any direct, consequential, incidental, punitive, exemplary, or indirect damages to the participating Customer or third parties that result from Direct Load Control Events.
6. The Company or BPA shall have the right to select the Direct Load Control Event schedule.
7. The Customer may activate a 24-hour suspension from the pilot by notifying the Company through a Customer specific log-in page on the PGE website. A Customer may be removed from the pilot if they implement the override option excessively; an example of excessive is override use for more than 100 days, or more than 15 days in any 30 day period.
8. To receive a participation incentive, the Customer must respond to weekly surveys regarding the pilot, administered by the Company.
9. Radio transmitters installed onto the water heater will remain the property of the Company before, during and after the conclusion of the pilot. The customer shall return the device in a pre-paid postage box provided by PGE.
10. The provisions of this schedule do not apply for any time period that the Company interrupts the Customer's load for a system emergency or any other time that a Customer's service is interrupted by events outside the control of the Company.

TERM

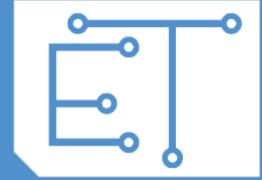
The pilot duration is 12 months from the Customer's enrollment date. The pilot is expected to be conducted from April 1, 2017 through July 31, 2018.

PGE Advice No. 17-02
Attachment A

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 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

For More Information Contact

Your Energy Efficiency Representative or Project Manager, Tony Koch, at jakoch@bpa.gov 206.220.6777