

PUBLIC UTILITY COMMISSION OF OREGON
STAFF REPORT
PUBLIC MEETING DATE: March 21, 2017

REGULAR _____ CONSENT X EFFECTIVE DATE March 22, 2017

DATE: March 6, 2017

TO: Public Utility Commission

FROM: Nolan Moser ^{NM}

THROUGH: Jason Eisdorfer and John Crider ^{JE} ^{JC}

SUBJECT: PORTLAND GENERAL ELECTRIC:
(Docket No. ADV 507/Advice No. 17-02) NEW Schedule 3 Residential
Demand Response Water Heater Pilot Rider.

STAFF RECOMMENDATION:

Staff recommends that the Commission approve Portland General Electric Company's (PGE or Company) Advice No. 17-02 (Advice Filing) and the replacement tariff sheet revisions be allowed to go into effect with service rendered on or after March 22, 2017.

DISCUSSION:

Issue

Whether the Commission should approve PGE's proposed Schedule 3 revisions, as described in the Advice Filing, effective with service rendered on and after March 22, 2017.

Applicable Rule or Law

ORS 757.205 and 757.210 states that the Commission may approve tariff changes if they are deemed to be fair, just and reasonable. OAR 860-022-0025 provides that utilities may make tariff changes by filing an entirely new tariff or by filing revised sheets which refer to the tariff sheets on file.

OAR 860-022-0025(2) requires that the tariff filing must include a plain statement of proposed changes, the reasons for the change and grounds relied upon for the change,

and a statement of the numbers of customers affected and the resulting change in revenue or customer charges.

ORS 757.247(1)(c) allows the Commission upon the application by a utility to put in place tariffs for the installation of energy resource measures, including "equipment or devices" that enable demand reduction and/or peak load reduction.

Analysis

On February 3, 2017, PGE filed Advice No. 17-02 requesting an effective date of March 22, 2017. The Advice Filing proposes a demand response pilot project for "smart" (smart) residential water heater control testing. The proposed pilot is part of a larger effort in which the Bonneville Power Administration (BPA) is a participant and the funding entity. In January 2017, BPA commenced the Smart Water Heater emerging technology field test in order to demonstrate "low-cost DR [Demand Response] communication technologies." PGE intends to invite its customers to participate in the BPA program.

The pilot is expected to be conducted from April 1, 2017, through July 31, 2018. PGE customers must enroll in the BPA pilot by August 31, 2017. Participating customers will receive a \$50 sign-up incentive payment provided by BPA. The pilot will enroll customers with water heaters equipped with a communication interface that supports direct load control events.

BPA will issue electronic commands to the enrolled water heaters and in conjunction with PGE will measure a variety of performance and technology indicators. In a direct load control event, BPA will remotely control the appliance through the communication device and review resulting electricity consumption and other performance characteristics. The participating customer may voluntarily terminate service under the pilot at any time by contacting PGE. The customer may also activate a 24-hour suspension from the pilot by contacting PGE through a log-in web page.

The water heater communication devices will be connected to, and thereby leverage, customer owned and operated WiFi systems. Customers that meet participation requirements for a period of 12 months will receive a \$100 participation incentive at the end of the pilot. An additional \$100 will be made available to customers that allow PGE to install a logging device on the water heater for the full period of the pilot. PGE states that the number of logging devices is limited. Recruitment of customers will be conducted through a network of trained plumbers and through equipment distributors.

Incremental costs for the entire pilot program will be provided by BPA to PGE and then to customers. PGE describes the proposed schedule in the Advice Filing as having no increase, decrease, or change in existing rates. The overall pilot project participation goal as set by BPA, including non-PGE customers, is 600 households. PGE is jointly leading the research effort under this project with BPA; however BPA will issue all load control directives to the devices in the pilot. The pilot will be conducted through July 31, 2018.

Research Questions

At the request of Staff following an informational meeting on February 13, 2017, PGE supplemented its filing on February 22, 2017, with stated research objectives. The research objectives stated by PGE for this project are as follows:

“To integrate and test resistance and heat pump water heaters equipped with a communication interface that supports Direct Load Control Events; To test different demand response dispatch strategies; To quantify the energy consumption that can be shifted to different times of the day; To determine kW load that can be reduced at times of system peak demand; To evaluate customer acceptance of frequent control events with “smart” water heaters; To create a business case that justifies a regional market transformation plan demand response ready (smart) water heaters.”

As described by this filing supplement, PGE’s pilot is focused on smart water heaters. PGE will focus on testing two-way communication technology, different dispatch strategies for this technology, the performance of the technology, and customer reactions to its use. By testing different dispatch strategies in the program, PGE can learn ways in which the tested devices react to remote command.

Load shifting strategies will also be reviewed. As stated in Attachment A to the filing, “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.”

The pilot will review customer acceptance of the technology. Customers will have ample ability to drop out of this voluntary program according to the proposed tariff. Under the pilot, they are subject to survey response requirements in order to remain eligible for incentives. Participant feedback will be essential to determining if customers are comfortable enough with the technology for broader adoption.

The amounts of load that can be reduced with the communication technology will be a research objective. As explained by PGE during the February 13, 2017, informational meeting, different water heaters respond differently to the commands issued through

the communication technology. Understanding how non-similar water heaters react to commands and how much load drop or other response is produced will be a priority in the project.

Additionally, the overall load changes when a command is issued to a group of devices will be measured. Effective evaluation of this technology and identification of appropriate dispatch strategies has the potential upon broader adoption to provide significant low-cost support to the electric grid, including support for the integration of renewable resources.

To support the goal of smart water heater adoption, PGE and BPA intend to work with the Northwest Energy Efficiency Alliance (NEEA) during this pilot to create a detailed project report designed to justify NEEA's regional market transformation plan. By demonstrating that low-cost communication technologies can enable broader demand response programing, NEEA can support efforts to expand the installation and use of smart water heater technology.

PGE will not be evaluating program or delivery models, models for customer engagement, or other mass-market program delivery concepts as part of the pilot. This pilot is limited to emerging but not yet established technology. Importantly, this pilot does not aim to study the technology or program characteristics of water heating direct load control, which is a long established demand response tool across the county.¹

Staff encourages PGE to pursue all viable demand response opportunities, including program models that have been successfully pursued for many years in other jurisdictions. A pilot to review the potential of emerging smart water heater communication technology does not and should not preclude PGE from pursuing larger scale cost effective demand response opportunities with mature technology and program models, including potential water heater applications.

Reviewing the performance of smart water heater technology, the potential dispatch strategies, customer reactions, and load shifting and load reduction opportunities is valuable. Pursing the realization of NEEA's market transformation plan will support efforts to make demand response-ready water heaters the predominate installed equipment. Smart water heater programing has considerable potential and offers the opportunity for more system benefits than does traditional direct load control.²

¹ For example, Ohio's electric cooperatives have installed over 100,000 load control switches on water heaters, totaling about one quarter of their overall customer base. This water heater load control program began in the 1970's, and continues to provide cost-effective demand response to the Buckeye Power system today. See: <http://ohioec.org/country-living/co-op-success-story/>

² See "Demand Response Market Research: Portland General Electric, 2016 to 2035," January 2016,

Reporting and Evaluation

As part of the supplemental filing PGE made on February 22, 2017, the Company agreed to share its evaluation plan with Staff. Staff recommends that the following metrics and questions be included in the evaluation plan along with items the project leaders deem appropriate:

- the overall number of customers involved in the pilot and the participation drop rate;
- the demand response capacity measured in the pilot;
- whether the research supports the expansion of a smart water heater program in the PGE territory;
- identified successes from the pilot;
- data gaps that emerge from the pilot; and
- whether the pilot identified strategies for lowering the cost of smart demand response enabled water heaters and smart demand response water heater programs.

As outlined in the Advice Filing, NEEA will issue the evaluation report for this pilot and PGE states in its Filing that it will share all reports created for the pilot with Staff. This role will allow NEEA to bolster its market transformation plan.

Conclusion

No changes to rates are proposed as part of PGE's Advice Filing. The tariff language is being updated to allow customers to voluntarily participate in a demand response pilot that seeks to study the opportunities associated with emerging smart water heater communication technology. Staff concludes that PGE has provided a clear explanation of the proposed tariff changes. Staff finds that the proposed language change to Schedule 3 will not cause harm to customers. Staff also concludes that the tariff changes proposed in Schedule 3 are fair, just and reasonable and have the potential to improve demand response adoption in Oregon.

p. 21. This Brattle Group study found that "Residential water heating load control is a cost-effective opportunity with a broad range of potential benefits" p.16. The study reviewed both traditional water heater direct load control programming and the kind of smart water heater programming proposed here. While recognizing that traditional programming is also cost-effective today, the study recommended both types of programming, noting that smart water heating programming had considerable additional benefits. p. 21.

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PROPOSED COMMISSION MOTION:

Approve PGE Advice Filing 17-02, with PGE's proposed Schedule 3 revisions, to be effective with service rendered on and after March 22, 2017.

PGE ADV No. 17-02