



Portland General Electric
121 SW Salmon Street · Portland, Ore. 97204

November 25, 2019

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

RE: Advice No. 19-33, Updating Schedule 4, Multifamily Water Heater Pilot Extension

Portland General Electric Company (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 **January 1, 2020**:

Second Revision of Sheet No. 4-1
First Revision of Sheet No. 4-2
First Revision of Sheet No. 4-4

The purpose of this filing is to request a short-term extension of 90 days, starting on January 1, for the Demand Response (DR) Water Heater, also known as Multifamily Water Heater (MFWH), pilot and update the participant cap by increasing it by 10% to 10,000 connected units to align with this extension. Currently, the pilot is set to expire December 31, 2019. During the extension, PGE will work with Staff to address challenges that were discussed in Navigant's evaluation, filed on November 1. Specifically, key findings related to network reliability and connectivity rates, which are described below. Load impact results from the 2019 summer season are being compiled and analyzed. Finalized results will be available in Q1 2020. Also, PGE will meet with Staff during the extension on these results to determine the future of the pilot. This pilot is important as it will help PGE get to its 2016 Integrated Resource Plan DR goal, target an underserved customer segment (multifamily), and play an important role within the DR portfolio by addressing value beyond capacity through flexible load.

Background on the MFWH Pilot

PGE's long-term decarbonization strategy involves building advanced DR pilots and programs to serve as demand-side resources. The MFWH pilot is PGE's first flexible load

resource as it provides a suite of grid services intra-hour without affecting customer comfort. This pilot retrofits existing water heaters in multifamily residences with DR-enabled technology to create an effective design for a program that is flexible, cost-effective, and provides a positive customer experience. PGE operates the MFWH pilot to evaluate the various modes of device connectivity and different Operating Equipment Manufacturer solutions to obtain flexible load through cost-effective program design and event performance. To ensure this program is effective, we are using the pilot to:

- Integrate and test different technologies,
- Implement different DR dispatch strategies,
- Determine appropriate incentive levels for customers, and
- Quantify energy consumption that can be shifted to different times.

Navigant's MFWH Final Evaluation

On November 1, PGE submitted Navigant's final evaluation of the MFWH pilot (evaluated through 2018) which raised key findings that will change how PGE operates the pilot. Specifically, two key changes are related to technology used to maintain network reliability (Wi-Fi to cell-enabled) and water heater connectivity rates.

Network reliability is essential in determining the overall effectiveness and the viability of the water heater technologies being piloted. PGE anticipates that each communications network will have different levels of reliability and varying costs. Network performance is important because the asset can become unreachable if there is a communication outage. This pilot will be testing up to three different types of networks: Local Area Network, the first network deployed and is dependent upon a Wi-Fi-enabled switch (which makes it the least reliable network); Long-Term Evolution, introduced in October 2019 and not yet evaluated, allows a direct connection from the unit to the network; and Field Area Network, utilizing a 200 and 700 MHz spectrum, owned and controlled by PGE, and assures near continual up-time and communication availability to and from the device (there is no current viable switch solution for using FAN).

During the evaluation, the connectivity rate of water heaters averaged 60% for Wi-Fi switches, which is below PGE's acceptable rate (80%) of controllable switches per event. PGE has learned that Wi-Fi connectivity rates are dynamic due to several factors which include network outages, equipment failure (routers and repeaters) as well as tenant behaviors that interrupt connectivity. To address these issues, PGE's implementation vendor has gained competencies in detecting connectivity issues and use maintenance visits to correct underperforming connections such as replacing routers or addressing tenant behaviors. Preliminary findings from the 2019 Summer season indicate that maintenance activities have been successful, and connectivity is improving over time. The Summer evaluation included 90 events across two control groups, which achieved an average connectivity rate of 80%. During the first month (May) of the season the connectivity rate averaged 69% and the last month of the season reached an average of

91%. The gap in connectivity rates may be overcome through ongoing maintenance protocols for Wi-Fi equipment and by leveraging cell enabled switches instead of Wi-Fi switches for future installations. Cell-enabled switches are expected to reduce connectivity issues significantly, and probably result in over 90% connectivity rate per device during.

Since the Summer season, PGE updated event calling procedures from intra-hour to hourly intervals. As a result, events started and stopped on the hour so both telemetry and AMI data are in alignment and impact results can be clearly evaluated. During the first quarter of 2020 the load impact from the cell-enabled switches will be unknown; however, connectivity reports will be available to determine how they are performing in comparison to Wi-Fi switches. PGE is also exploring ways to create control sets outside the current fleet to increase the number of available callable switches.

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

The proposed revisions to Schedule 4, Multifamily Water Heater Pilot, do not increase, decrease, otherwise change existing rates, or impact revenues; costs are being deferred in UM 1827 for later ratemaking treatment. As of November 25, 2019, PGE has approximately 6,000 customers who participate in this pilot and there are an additional 1,600 units that are scheduled to be installed by the end of 2019. It is expected that PGE will reach the cap of 10,000 by March 31, 2020 as approximately 2,200 installations are forecasted to be installed given work already underway.

Should you have any questions or comments regarding this filing, please contact Kalia Savage at (503) 464-7432. Please direct all formal correspondence and requests to the following email address pge.opuc.filings@pqn.com.

Sincerely,



Robert Macfarlane
Manager, Pricing and Tariffs

Enclosure
Cc Nick Sayen, OPUC

SCHEDULE 4
MULTIFAMILY RESIDENTIAL DEMAND RESPONSE WATER HEATER PILOT

PURPOSE

The Multifamily Residential Demand Response Water Heater Pilot is a demand response option for eligible Residential Customers. The objectives of the Multifamily Residential Demand Response Water Heater Pilot 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, or
 - Water heaters retrofitted with a control switch in the power supply to the tank
- To inform further the program design for a water heater demand response program;
- To determine an appropriate incentive level for Customers who choose to participate in a demand response program for 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 in which the Company will provide Direct Load Control. (C)

Conventional Electric Resistance Water Heater – Customers' existing electric resistant water heaters will be retrofitted to be demand response enabled. Water heaters that require replacement will be replaced with smart electric resistance water heaters with the approval of the Customer. (C)

Heat Pump Water Heater – Models compatible with PGE's available hardware, software, and communication technology that can engage in direct load control events. (C)

AVAILABLE

In all territory served by the Company where PGE's demand response communication networks are available. (D)

SCHEDULE 4 (Continued)

APPLICABLE

Subject to selection by the Company, Residential Customers may participate in the pilot. Customers in multifamily residences (MFRs) will be the primary target of PGE's pilot. In cases of rental properties, the program will be structured as an opt-out program, meaning Customers will be automatically enrolled in the pilot if their property manager or property owner enrolls in the pilot and the Customer must withdraw from the program if they do not want to participate.

Customers will be given notice about this pilot at the time of installation of the communication interface. PGE will provide tenants with contact information and instructions on how to opt out of the pilot at the time of installation. If a Customer chooses to opt out of this pilot, the installed communication interface and any other installed PGE equipment will remain on the water heater. A Customer that has elected to opt out will be removed from the dispatch of direct load control events. A new Customer in a residence will be automatically enrolled in the pilot and will receive information and instructions on how to opt out of the pilot. PGE will be aware of a new tenant based on customer data from PGE's Customer Information System (CIS). The number of eligible Customers to participate in the pilot is 10,000 customer households. Customers will remain on Schedule 7 and will be eligible for the incentives described in this schedule. (C)

ELIGIBILITY

For MFRs, PGE will initially select large complexes, negotiating with property manager or owners for the installation of retrofit devices as well as new demand response enabled water heaters. At PGE's discretion, the Company will select qualifying properties based on number of apartments, size of apartments, occupancy, and size of existing water heater.

DIRECT LOAD CONTROL EVENT

During the pilot there will be no limitation on the hours of Direct Load Control Events. This pilot will offer the ability for the Customer to override a direct load control event, under the terms listed in Special Condition 4 of this pilot. Residential Customers living in MFRs may opt out of the program at their discretion.

ENROLLMENT

The Customer enrollment period will be through March 31, 2020. PGE will enroll MFR Customers by contracting with the property manager or property owner. Unless this pilot is otherwise terminated, participating Customers will be enrolled for the entire pilot term. (C)

SCHEDULE 4 (Continued)

INCENTIVES

A MFR property manager or property owner will receive an annual incentive in the form of: a monetary payment, and/or a specified number of replacement water heaters and/or, a monetary contribution towards water heater servicing/replacement costs. PGE will negotiate specifics with participating property management companies and/or owners based on the Customers' preferences.

PGE will also incentivize the costs for new smart electric water heaters for multifamily property managers or property owners in situations when the existing water heater is too old to be retrofitted cost effectively and/or when an existing electric water heater fails. PGE will pay the incremental cost between a water heater with a standard six year warranty and a qualifying smart water heater. Incentives should cover all or most of the cost difference between a standard electric water heater and a smart electric water heater. The incentive will substantially reduce the costs of making the water heater demand response enabled.

The Customer of the MFR property manager or property owner will also receive an incentive. The incentive that the Customer receives may differ from the incentive of the MFR property manager or property owner. The incentive amounts for each property manager, property owner and MFR complex made available will be determined based on the total number of demand response enable water heaters installed or active participation levels in demand response events.

SCHEDULE 4 (Concluded)

SPECIAL CONDITIONS

Customer

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 to withdraw from the pilot.
2. If a Customer withdraws or is removed from the pilot, the Customer is not eligible for reenrollment during the pilot.
3. If the Customer moves from the enrolled residence during the term of the pilot, they are no longer eligible for the pilot.
4. 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.
5. To receive a participation incentive, the Customer must respond to weekly surveys regarding the pilot.

PGE

6. PGE has the right to remove a Customer from the pilot at any time, for any reason.
7. PGE 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.
8. Communication interfaces 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.
9. 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 duration of this pilot is through March 31, 2020.

(C)