

**PUBLIC UTILITY COMMISSION OF OREGON
STAFF REPORT
PUBLIC MEETING DATE: December 17, 2019**

REGULAR _____ **CONSENT** X **EFFECTIVE DATE** January 1, 2020

DATE: December 9, 2019

TO: Public Utility Commission

FROM: Nick Sayen

THROUGH: Michael Dougherty and JP Batmale **SIGNED**

SUBJECT: PORTLAND GENERAL ELECTRIC:
(Docket No. ADV 1067/Advice No. 19-33)
Requests a short-term extension of 90 days for the Multifamily Water Heater Demand Response Pilot which expires December 31, 2019; also requests increasing the participant cap from 8,000 to 10,000.

STAFF RECOMMENDATION:

The Oregon Public Utility Commission (Commission) approve Portland General Electric Company's (PGE or Company) Advice No. 19-33 which requests a 90 day extension of Schedule 4 the multifamily water heater demand response pilot which expires December 31, 2019, and an increase to the participant cap from 8,000 customers to 10,000 customers, effective with service on and after January 1, 2020.

DISCUSSION:

Issue

Whether the Commission should approve PGE's Advice No. 19-33 which requests a 90 day extension of the multifamily water heater demand response pilot which expires December 31, 2019, and an increase to the participant cap from 8,000 customers to 10,000 customers.

Applicable Rule or Law

Under ORS 757.205(1):

Every public utility shall file with the Public Utility Commission, within a time to be fixed by the commission, schedules which shall be open to public inspection,

showing all rates, tolls and charges which it has established and which are in force at the time for any service performed by it within the state, or for any service in connection therewith or performed by any public utility controlled or operated by it.

The Commission may approve tariff changes if they are deemed to be fair, just and reasonable. ORS 757.210. Tariff revisions may be made by filing revised sheets with the information required under the Commission's administrative rules, including OAR 860-022-0025. OAR 860-022-0025(2) specifically requires that each energy utility changing existing tariffs or schedules must include in its filing a statement plainly indicating the increase, decrease, or other change made with the filing, the number of customers affected by the proposed change and the resulting change in annual revenue; and the reasons or grounds relied upon in support of the proposed change.

Filings that propose any change in rates, tolls, charges, rules, or regulations must be filed with the Commission at least 30 days before the effective date of the change. ORS 757.220; OAR 860-022-0015. Tariff filings to be effective on less than 30 days following notice of the change may be authorized with a waiver of less than statutory notice pursuant to ORS 757.220 and OAR 860-022-0020.

Analysis

Background

In June 2017, the Commission approved the original deferral filing, and related advice filing establishing Schedule 4, for the multifamily water heater demand response pilot.¹ The pilot retrofits existing water heaters in multifamily residences with demand response technology. The pilot has several research objectives including:

- Evaluating effective program design,
- Quantifying energy consumption that can be shifted to different times,
- Determining appropriate incentive levels for customers,
- Integrating and testing different technologies, and
- Implementing different demand response dispatch strategies.²

In the initial application PGE estimated the pilot would last approximately two and a half years and cost approximately \$5.1M.³ Of the \$5.1M PGE estimated approximately half would consist of implementing the communication interface, managing defaults or repairs, and managing new participant enrollment. The other costs would include

¹ See UM 1827, Order 17-224, June 27, 2017, <https://apps.puc.state.or.us/orders/2017ords/17-224.pdf>.

² See UM 1827, Application for Deferred Accounting of Costs Associated with the PGE Demand Response Water Heater Pilot, April 18, 2017, <https://edocs.puc.state.or.us/efdocs/HAA/haa16364.pdf>, page 3.

³ Ibid, page 7.

software licensing, data plan subscription for communication, and PGE marketing.⁴ PGE estimated the pilot would achieve a net positive benefit based on a Total Resource Cost Test.⁵ Forecast and actual costs (as reported to date) are presented below.

Pilot costs	2017 (6 mo.)	2018	2019	Total
Forecast ⁶	\$769,125	\$1,794,625	\$2,563,750	\$5,127,500
Actual ⁷	\$93,970	\$1,592,378	Not yet reported	\$1,686,348

Establishing successful and cost-effective demand response program capacity is important for the region. The Northwest Power and Conservation Council Seventh Power Plan found demand response to be the least-cost solution for providing new peaking capacity, and that at least 600 megawatts should be developed to meet peaking needs and satisfy regional resource adequacy standards.⁸

In the Company's UM 1827 PGE Supplemental Information filing PGE noted the 2016 Integrated Resource Plan (IRP) reference scenario demand response goal of obtaining 74 MW summer and 78 MW winter capacity by 2021. Water heating direct load control (e.g. demand response) had a target in the IRP reference scenario of 1.6 MW summer and 3.4 MW winter capacity by 2021.⁹ The pilot intended to pursue and potentially exceed these MW capacity targets.¹⁰ Specifically, PGE envisioned the pilot could shift up to 4 MW, assuming enrollment of up to 8,000 customers and a reduction of 0.5 kW per customer.¹¹

In the initial pilot application PGE also noted elements of the pilot in addition to MW capacity reduction which highlight its importance to the broader demand response resource:

- Multifamily housing has a high concentration of electric water heaters, yet broadly is a segment of the residential market where few demand response technologies are currently feasible,

⁴ Ibid, page 5.

⁵ Ibid, page 5.

⁶ Ibid, page 7.

⁷ See UM 1827, Order 19-282, August 29, 2019, <https://apps.puc.state.or.us/orders/2019ords/19-282.pdf>, Appendix A, page 3.

⁸ See Northwest Power and Conservation Council, Seventh Northwest Conservation and Electric Power Plan, Chapter 1, https://www.nwcouncil.org/sites/default/files/7thplanfinal_chap01_execsummary_6.pdf, page 1-6.

⁹ See UM 1827, Supplemental Information in Support of PGE's Application for Deferred Accounting of Costs Associated with the PGE Demand Response Water Heater Pilot, June 6, 2017, <https://edocs.puc.state.or.us/efdocs/HAQ/um1827haq112829.pdf>, page 2.

¹⁰ Ibid, page 2.

¹¹ See UM 1827, Application for Deferred Accounting of Costs Associated with the PGE Demand Response Water Heater Pilot, April 18, 2017, <https://edocs.puc.state.or.us/efdocs/HAA/haa16364.pdf>, page 5.

- Electric water heaters represent a distributed resource as each water heater can be controlled to meet specific demand response needs,
- Water heater demand response is a more flexible resource compared to other forms of demand response because it requires no notification, is a year-round resource, and has minimal customer comfort impact.¹²

PGE encountered challenges implementing the pilot. Initially, the pilot worked with three manufacturers of the switches used to cycle participants' water heaters. One of the manufacturer's products were faulty and required removal from participants' water heaters. Another manufacturer's switches required two rounds of calibration after installation.¹³ The length of time required to select a switch then affected the length of time required to integrate the demand response management system – used to execute an actual demand response event – with the selected switch systems.¹⁴ Initial participant recruitment was a significant challenge as well, at times requiring 6-8 months for a multifamily property to commit to participating in the pilot.¹⁵

Ultimately, the pilot's pace of participant enrollment was slower than anticipated. The first demand response season was delayed from summer 2018 (June through September) to winter 2018-19 (November through February).¹⁶ The challenges and delay are reflected in the spend rate in the cost table above; actual spending in 2017 and 2018 was approximately 62 percent of forecast spending.

The first demand response event was called on December 12, 2018.¹⁷ The pilot spent approximately \$1.6M over the preceding 18 months to reach that point. (The next section will discuss the results from these events.)

PGE filed the preliminary evaluation of the pilot on November 1, 2019.¹⁸ This evaluation covered the winter 2018-19 demand response season. (A second evaluation focusing on the summer 2019 demand response season is anticipated in early 2020.) The evaluation was both a process evaluation (examining how the pilot functioned) and an impact evaluation (examining pilot demand reductions).

The process evaluation yielded six key takeaways:

- Technology integration and recruitment challenges delayed the pilot timeline.

¹² Ibid, pages 3-4.

¹³ See UM 1827, Navigant Final Evaluation of PGE's Multifamily Water Heater Pilot, November 1, 2019, <https://edocs.puc.state.or.us/efdocs/HAH/um1827hah16189.pdf>, page 13.

¹⁴ Ibid, page 14.

¹⁵ Ibid, page 16.

¹⁶ Ibid, page 15.

¹⁷ Ibid, page 28.

¹⁸ Ibid.

- Pilot staff learned that the most persuasive recruiting message is not about demand response.
- Property managers and customers are highly satisfied with the installation process.
- Tenant satisfaction could be improved with additional communication.
- Some tenants believe that they are experiencing hot water issues as a result of the pilot.
- Improved data tracking and reporting would improve pilot management and evaluation.¹⁹

The impact evaluation yield one key takeaway:

- Only a few events produced statistically significant demand reductions that are measurable in the AMI data.²⁰

Inconclusive evaluation results are discouraging

The impact evaluation concluded that only a few of the 56 events from the winter 2018-19 demand response season generated demand reductions that were statistically different from zero.²¹ While the evaluation was fast to note that this does not mean that the pilot was not generating demand savings²² the lack of demonstrable results regarding the pilot's primary aim – reducing demand – is discouraging.

This discouragement is heightened in light of the fact that the pilot spent millions of rate-payer dollars and impacted thousands of customers. This discouragement is exacerbated further when considering the pilot's inability to measure up to its research objectives (noted earlier), nor some clear and quantifiable criteria for success that PGE identified in the Supplemental Information filing to the application:

- Communications up-time of 80 percent + during pilot,
- Control equipment defects of less than 5 percent annually,
- Verification of capacity at 0.5 kW per water heater per event or better,
- Cost effectiveness achieved at completion of Phase III (or earlier), and
- 4.0 MW capacity with 8,000 participating electric water heaters.²³

The results of impact evaluation call into question whether the pilot ought to be allowed to expire.

¹⁹ Ibid, page 6.

²⁰ Ibid, page 6.

²¹ Ibid, page 28.

²² Ibid, page 28.

²³ See UM 1827, Supplemental Information in Support of PGE's Application for Deferred Accounting of Costs Associated with the PGE Demand Response Water Heater Pilot, June 6, 2017, <https://edocs.puc.state.or.us/efdocs/HAQ/um1827haq112829.pdf>, page 10.

The importance of the resource merits a brief extension to examine additional evidence

The evaluation noted at least two major challenges to calculating the impact analysis results: lack of connectivity and limited AMI data. First, the share of connected water heaters ranged from 53 to 69 percent,²⁴ substantially below the 80 percent goal. Second, PGE collected only hourly AMI data for the majority of participants²⁵ yet events were called on the quarter- and half-hour. This created a mismatch between event timelines and corresponding data timelines which reduced the ability to make statistically significant conclusions about event impacts.

PGE has indicated these critical obstacles have largely been resolved. The forthcoming evaluation of the 2019 summer DR season included 90 events and achieved an average connectivity rate of 80 percent (69 percent at the beginning improving to 91 percent at the end, due to improved vendor connectivity maintenance practices and adoption of a different communication technology).²⁶ PGE also updated event calling procedures to hourly intervals so that events started and stopped on the hour in alignment with data timelines.²⁷

Conclusion

Staff recommends approving PGE's request for a 90 day extension of the pilot for the following reasons:

- Recent improvements to the pilot reported by PGE,
- Positive process results included in the evaluation of the 2018-19 winter DR season, and
- Demand response is an important resource for the region, and gaining as many lessons as possible from pilots are critical steps in establishing this resource; this is especially so when the pilot features unique elements, as is the case with this one.

PGE reports that, as of late November 2019, approximately 6,000 customers are participating in this pilot, with an additional 1,600 participants scheduled to be installed through December, resulting in an approximate total of 7,600 participants by the end of 2019. Despite the current participant cap of 8,000 PGE reports another 2,200 installations forecasted by March 31, 2020. Staff does not object to the proposed increase to the participant cap.

²⁴ See UM 1827, Navigant Final Evaluation of PGE's Multifamily Water Heater Pilot, November 1, 2019, <https://edocs.puc.state.or.us/efdocs/HAH/um1827hah16189.pdf>, page 35

²⁵ Ibid, page 36

²⁶ See ADV 1067, Advice No. 19-33, November 25, 2019, <https://edocs.puc.state.or.us/efdocs/UAA/uaa154254.pdf>, pages 2-3

²⁷ Ibid, page 3

Staff believes the Commission may find this advice filing effects changes that are fair, just and reasonable.

In the first quarter of 2020 – within the window of this extension – PGE will file the evaluation of the 2019 summer DR season. It is anticipated this effort will be able to calculate impact analysis results and thus provide more, and higher quality data upon which to judge the pilot's performance.

Staff will engage PGE to fully review results of the evaluation. Staff anticipates returning to the Commission before, or at the end of, 90 days with a recommendation as to future of the pilot (e.g. it should be allowed to expire, be extended again on a short term basis, be extended on a long term basis, transition to a program, etc.).

PROPOSED COMMISSION MOTION:

Approve PGE's Advice No. 19-33, effective with service on and after January 1, 2020, and an increase to the participant cap from 8,000 customers to 10,000 customers.