

Chapter 4. Flex Load Activity

4.1 Demonstrations and Small-Scale Pilots

PGE launched a Strategic Innovation function in 2022 to manage the portfolio of early-stage demonstrations of new technology. Through this approach, PGE has been able to centralize visibility of the decisions made to allocate PGE resources and R&D dollars while simultaneously accelerating the process of conducting demonstrations end-to-end. In doing so, PGE ensures that new technology demonstrations such as those articulated in this section are well-aligned to customer, grid, and business needs and that dollars committed to demonstration activities across the company are coordinated and visible to different groups. This type of internal coordination is expected to inform and share while also identifying opportunities for shared learnings, and where possible how projects might improve through co-location, co-funding or sharing of resources.

4.1.1 Smart Grid Testbed

The Smart Grid Testbed⁴⁸ facilitates various demonstrations that test smart grid technology and customer programs that explore the use of more sustainable resources, how Distribution Side Management activities can help keep energy prices lower and explore pathways to invest in future projects that may create Oregon jobs and a healthier environment. The following are the SGTB demonstration activities through 2024. PGE initially described these activities in 2021 under the UM 1976 SGTB Phase II Proposal and has filed subsequent detailed plans for underlying studies and demonstrations under the same docket.

- Testbed EV Charging Study
- Testbed Smart Solar Study
- Multi-family Bundle (New Construction) - Central Heat Pump Water Heater, Unitary Heat Pump Water Heater
- Single Family Bundle (New Construction)
- Flexible Feeder (overlaps with Department of Energy-funded SALMON project)
- Vehicle-to-Everything (V2X)
- C&I, Municipal Flexible Load and Resiliency

⁴⁸ OPUC Docket No. UM 1976 *PGE DEFERRAL OF EXPENSES ASSOCIATED WITH DEMAND RESPONSE TESTBED PILOT* available at <https://apps.puc.state.or.us/edockets/DocketNoLayout.asp?DocketID=21662>. Schedule 13 SMART GRID TESTBED PILOT, retrieved from https://assets.ctfassets.net/416ywc1laqmd/1FXchtG1UCoqK74YIOWBoF/699972c24ae1b34287acf24744206db9/Sched_013.pdf.

Table 14. Smart Grid Testbed Forecasted Phase II Budget⁴⁹

Category	2025	2026	2025-2026
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Total	\$2,030,214	\$1,254,289	\$3,284,502

Further detail on SGTB activities can also be found in [Appendix B](#).

4.1.2 Smart Battery Pilot

The Smart Battery Pilot was launched in 2020 under docket UM 1856. The pilot is paid for under UM 2078 and will continue to operate thereunder until its mandated June 31, 2025 expiration. At that point PGE will evaluate transition into the Flex Load portfolio as the technology and market continues to mature.

The pilot objective is to understand how best to incorporate residential energy storage into PGE’s power operations, customer acceptance and experience, and programmatic operation. PGE has already made several adjustments informed by pilot findings:

- Provided customers more options regarding the amount of battery capacity utilized by PGE
- Streamlined enrollment and outreach processes, including automatically sending enrollment links to qualified customers through PGE’s PowerClerk tool (used interconnection applications)
 - Automatically sent pilot information to customers as they progress through the interconnection process
 - Created a process for customers to enroll in the pilot even if their transformer was “export limited”
 - Published pilot enrollment link on our public website, allowed those additional eligible customers to enroll

The pilot has always been vendor agnostic. PGE is expanding the qualified products list (QPL), with requirements based on the following features: UL listed, commercially available in PGE’s service territory, and dispatchable by PGE’s Distributed Energy Resource Management System (DERMS). PGE has onboarded three additional brands, and the QPL now allows 97% of existing battery devices in PGE’s service territory to participate.

⁴⁹ The forecasted Testbed budget does not yet include an allocation for the C&I, Municipal Flex Load, and Resiliency project.

PGE will continue to pursue enhancements as the pilot moves into its final year of operations under UM 1856, and later under the Flex Load portfolio.

The process evaluation of the Pilot's performance can be found as the appendix of the 2023 Annual Energy Storage Update filed with the OPUC⁵⁰. PGE will file the second comprehensive process evaluation for close-out of the Pilot.

The UM 1856 pilot expires July 31, 2025, amidst the summer demand response season. So as to avoid interruption of the resource, PGE will seek to extend the date to September 30, 2025. This extension would allow the pilot to continue through the summer DR season uninterrupted and give the program team the fall shoulder season to transition customers to the next iteration of the Pilot.

Continued Iteration

After the conclusion of the UM 1856 pilot, PGE seeks to continue operating and growing the resource. For clarity this document will refer to the first Pilot associated with UM 1856 as "Phase 1" and the continuation as "Phase 2". Phase 1 is currently funded through the Schedule 138 Energy Storage Cost Recovery Mechanism.

While PGE has made significant progress in stabilizing and growing the pilot over the past four years, the market remains nascent and relatively small, with about 8 MW of total nameplate capacity among all residential customers. PGE seeks to continue to tailor the offering and pursue market transformation to grow the overall adoption as well as expanding participation.

Options under consideration for Phase 2 of the pilot include:

- Allowing small non-residential customers to participate with a qualifying dispatchable battery. Currently, businesses with residential-scale devices (e.g., a Tesla Powerwall installed at a small vineyard) are enrolled in Energy Partner On-Demand.
- Adjustments to the incentive structure based on what has been learned from Phase 1.
- How to further optimize the value of customer rooftop solar when paired with batteries.
- A rebate to income-qualified customers participating in the Oregon Solar For All⁵¹ grant program to pair their solar project with an eligible battery.
- Investigating options to increase the rate of market adoption of battery storage technology, including alternative paths to procurement and distribution.

Budget and Uptake

The pilot will seek cost-effectiveness in its operations and will be evaluated bi-annually to measure performance and cost-effectiveness and identify areas for continued improvement.

We provide the following preliminary MW and funding estimates for informational purposes only. PGE does not request funding for Phase 2 of the Smart Battery Pilot with this filing.

⁵⁰ <https://edocs.puc.state.or.us/efdocs/HAD/um1856had151748.pdf>

⁵¹ <https://www.oregon.gov/energy/Incentives/Pages/Solar-for-All.aspx>

Table 15. Preliminary MW and Cost Estimates for Smart Battery Pilot Phase 2 (2025-2029)

Year	Estimated Cumulative MW	Estimated Incremental Cost (\$MM)
2025 ⁵²	1.4	\$0.30
2026	2.3	\$1.22
2027	3.3	\$1.43
2028	4.0	\$1.20
2029	4.7	\$1.55

4.1.3 Energy and Emissions Estimator

In September 2023, in response to an increasing number of questions from customers with commercial real estate projects around the potential for energy and emissions savings from various design choices PGE launched a web tool to visualize and estimate impact from various design choices. This web tool, referred to as the Energy and Emissions Estimator, allows users to model design approaches on five common real estate project types. Examples of these design choices include on-site solar, systems choices like efficient electric heat pump heating or hot water and building performance improvements like window and wall efficiency upgrades or heat recovery ventilation.

The Estimator provides education around flexible loads and the value of incorporating flexible load systems into project design. The Estimator then uses the inputs made on type and size of building project, as well as selections made on typical design as well as potential building systems and performance improvements to give the user an estimate of emissions reductions, energy savings and associated cost improvements possible with the incorporation of the selected improvements into their project. The tool provides options for the five most common types of commercial building projects in PGE's service territory.

Users of the tool have the option to request further engagement with PGE including a pathway into the Energy Partner Design offering for projects that could benefit from additional support through that program.

In the nine months since launch, the Estimator has received 2,100 unique site visits with 202 visitors exploring projects. Patterns emerging in the use are a small level of seasonal variation and a surge of interest following targeted promotion of the tool to the commercial real estate audience.

4.1.4 Energy Partner Design

Energy Partner Design (EPD) was launched in Q2 of 2023 in response to positive feedback that PGE received following efforts to support unique projects, like the development of the Broadway Corridor. Customers found value in PGE evaluation of the lifecycle benefits of electric building systems and

⁵² 2025 costs reflect three months of operations.

designing with an intent for grid interactivity. PGE continued to receive requests from similar projects for this type of design assistance engagement.

The target market for this service are large commercial real estate projects (+100K SF or +100 units of multifamily) in a conceptual/design phase. EPD analysis surfaces options for the use of efficient electric building systems, and also shows the expected impacts on energy and emissions from the selection of the same. EPD also provides information regarding how to configure those building systems for the unique attributes of the project. Where appropriate for the project, EPD also evaluates the use of a battery energy storage system (BESS) for the project's resilience needs and provides options for BESS integration through a one-line drawing. As part of the BESS evaluation, EPD evaluates BESS sizing options, optimizing to meet project needs as well as enrollment in the appropriate PGE customer flex load program.

The complex and unique nature of projects at this scale requires robust customer engagement, which begins with a review of the project's building systems engineering. This ensures that the project is at a stage where design engagement is warranted and also provides a scope of work identifying the project needs. From here, the team develops a project report, which includes a project plan laying out options as well as guidance on incorporation into PGE flex load programs. The report also provides guidance on expected energy usage and emissions impacts. The engagement concludes with a review and issuance of the report.

EPD was introduced in a "limited launch", with the intent of interacting with a smaller number of projects and validate outcomes. Based on those learnings, the team set a 2024 goal to engage with eight projects and provide six BESS evaluations. As of August, the EPD team has completed six reports on building systems (one of which included a BESS analysis and recommendation) as well as one standalone BESS report. As might be expected, PGE has observed that interest in the EPD service has tracked with fluctuations in commercial real estate development activity.

At the close of 2024, PGE will complete an evaluation of the Energy Partner Design activity. The evaluation will include interviews with the project teams and assess whether EPD was successful in driving adoption of options presented. Given the typical design to construction timeline, the system benefits from the projects engaging with the program in 2024 are anticipated in late 2025 and beyond.

4.1.5 Smart Panel

In Q4 of 2023, PGE partnered with a third party to conduct a single-unit demonstration on a smart panel device. The goal of this demonstration was to evaluate whether a smart panel, installed at a residential home, would maximize load served while minimizing the cost of electrical upgrades necessary to serve that load, and to assess the potential value of using a home energy management system to avoid electrical upgrades.

Electrical upgrades in this context included possible changes to the customer premises—such as service entrance upgrades—as well as distribution equipment whose costs might be borne by the individual customer or spread across utility rate payers.

Overall, the results indicated that the smart panel functioned effectively in dynamically managing household electrical loads. It maintained a balance between energy demand and the panel's capacity, thereby enhancing the overall efficiency and safety of the electrical system. This functionality is particularly relevant in modern households with high electrical consumption due to devices such as

EV chargers and may offer an avenue to electrification for homeowners where it previously was only possible with an electrical service upgrade. This is an important issue where equity of electrification is a concern as removing upfront cost barriers through utilization of a smart panel proves beneficial to both the utility and the customer.

PGE will continue to monitor this technology as part of its continuing assessment of emerging opportunities (see [Section 4.4](#)).

4.1.6 Grid-Enabled Window AC

In 2024, PGE undertook a demonstration to assess the demand response capabilities of a Windmill Air grid-enabled window AC unit. Utilities in New York (Con Edison and PSEG Long Island) and California (San Diego Gas & Electric, Pacific Gas & Electric, and Southern California Edison) have programs using these devices. Five employees who reside in rentals lacking permanent cooling are part of this demonstration work.

During the demonstration, PGE will determine whether demand response communication is feasible with these units, confirm grid reliability, and establish a proposed planning value during peak events. Due to their portable nature, these devices will be suitable for renters or homes that lack sufficient cooling in certain areas. Should PGE determine that these devices are viable for demand response events, a pilot design could be proposed by Q2 2025 in preparation for the 2025 cooling season. No requests for funding this activity are being made at this time.

4.2 Programs and Larger Scale Pilots

Regulatory Reference	Capacity (forecasted for end of year 2026)	Proposed Funding (2025-2026) ⁵³	Cost Effectiveness (TRC)
PGE Flexible Load Plan (UM 2141)	Summer 128.5 MW Winter 65.3 MW	\$34,320,359 (Admin 48%, Incentives 51%)	2.07

As part of this MYP filing, PGE seeks authorization to fund operations of the existing Flex Load portfolio for 2025-26, advance the current initiatives, and acquire an additional 22 MW of customer-sited resources by the end of 2026. PGE remains committed to the continued acceleration of Flexible Load growth, as well as continued advance of program maturity, performance, and portfolio operations. Cost recovery for both pilots and programs is funded through Schedule 135.

PGE’s comprehensive Flexible Load portfolio includes the following key pilots and programs:

⁵³ We include the \$357,500 in proposed 2025 funding for the NEEA Market Transformation activity for consistency’s sake, as, despite the fact that it is not a customer program or pilot, it is included in portfolio total proposed funding and cost effectiveness.

- **Energy Partner on Demand Schedule 26:** This program targets large commercial and industrial customers, providing incentives for custom load curtailment strategies and event-based energy shifts. The offering is technology agnostic and flexible, with a mix of behavioral/manual participants and other customers who opt for direct load control.
- **Residential Smart Thermostat:** A direct load control offering aimed at residential HVAC systems, utilizing smart thermostats to manage and optimize energy usage.
- **Peak Time Rebates (PTR):** A behavioral/manual DR offering which incentivizes residential customers to reduce energy consumption during peak times without the need for up-front equipment investment.
- **Time of Day (TOD):** A residential time-varying rate offering designed to encourage customers to shift their energy use to off-peak times, reducing overall demand during peak periods.
- **Energy Partner Commercial Thermostats Schedule 25:** A direct load control offering which targets small and medium-sized businesses, using smart thermostats to manage HVAC loads.
- **Multi-family Water Heater:** An offering targeting multi-family residences to control water heater loads, providing significant demand response potential in an underserved market segment.

Of these pilot programs, Energy Partner On-Demand Schedule 26, Residential Smart Thermostats, and Peak Time Rebates account for ninety percent of portfolio megawatt capacity. These offerings were instrumental to support grid reliability during last August's heatwave and have demonstrated their critical contribution to managing peak demands and ensuring uninterrupted service during extreme weather events. This contribution underscores the importance of continuing and expanding these offerings for our system's resilience and operational efficiency.

The Commission approved the transition of Energy Partner Schedule 26 pilot to program as of PGE's November 2021 MYP. Given the continued growth and stability of impact of the PTR and Residential Smart Thermostat pilots, this filing now proposes a transition of those offerings to full-scale programs. This transition acknowledges the maturity of these offerings as they enter their 5th and 6th year, respectively, and also their significant contributions to our flexible load capacity during event seasons. Both offerings encourage energy-saving and -shifting behaviors through financial incentives, which contributes to grid stability during peak periods, and have proven effective at delivering at scale to residential customers. With transition of Residential Smart Thermostat and PTR, fully one half of PGE's Flex Load activities will have graduated to "programhood", reflecting the maturity of the portfolio.

PGE will continue to operate Time of Day, Energy Partner Commercial Thermostats, and Multi-family Water Heater pilots and will accelerate pace to complete learnings and address barriers to scale. PGE intends to progress these pilots to programs in the 2025-26 MYP cycle.

Continued focus on growth and scale

Since 2021, existing pilot and program capacity has grown +20%, forecasted to end 2024 with an additional 9.7 summer MW and 1.9 winter MW. PGE seeks to continue to grow existing pilot and program capacity with an additional 20.4 summer MW and 8.8 winter MW by the end of 2026. This performance represents both growth and retention of the portfolio.

Flex Load capacity acquisitions are summarized in [Table 16](#), below, with detail for the underlying offerings in the subsections thereunder.

Table 16. Flex Load Portfolio: Forecasted Capacity (MW)

	2023 (actual)	2024 (forecast)	2025 (forecast)	2026 (forecast)
Summer MW	96.8	106.5	116.3	126.9
Winter MW	55.0	56.9	61.2	65.7
Summer Incremental MW	–	9.7	9.8	10.6
Winter Incremental MW	–	1.9	4.3	4.5

From 2021-2023 the number of customers served by existing residential offerings grew 19%. We forecast to add another 16.4K customers in 2024 and seek to add a further 48.8K customers by the end of 2026. While the number of customers served by existing commercial offerings has been flat since 2021—due chiefly to two pilots in design transition⁵⁴—we forecast to add 2.4K customers in 2024 and seek to add a further 4.0K customers by the end of 2026. This performance represents the continued growth in residential enrollment, and stability of commercial enrollment, for which we anticipate a return to growth in 2024 and beyond.

Flex Load customers served are summarized in [Table 17](#), below, with detail for the underlying offerings in the subsections thereunder.

Table 17. Flex Load Portfolio: Customers Served

Customers Served	2023 (actual)	2024 (forecast)	2025 (forecast)	2026 (forecast)
Residential Offerings	188,187	204,629	229,847	253,430
Commercial Offerings	13,162	15,602	17,512	19,578

PGE will continue to deliver on growth and scale, executing on the following portfolio-wide efforts:

⁵⁴ Energy Partner Smart thermostat and Multi-family Water Heating are the two pilots in design transition. Note also that PGE does not include Energy Partner on Demand (Sch 26) in the number of commercial customers served, as that program serves large C&I customers, whose size and longer enrollment cycles make MW a better measure of growth.

- Enhance portfolio durability with a “continuous improvement” approach to managing offerings and operations
- Focus on portfolio-level education and outreach campaigns to ensure we are reaching customers at strategic points in their energy journey, encourage both their selection of grid-enabled technology and ongoing event participation
- Highlight individual customer impacts and progress and greater transparency in our work
- Expand and refine enrollment channels, qualified products lists of grid-enabled devices capable of integration into DERMS platforms, and also partnerships with regional stakeholders
- Increase utilization of the customer-sited DERs and load shifting this grid resource (which was key to PGE’s grid management strategies during the 2021 “heat dome” and August 2023 heatwave)

Improved flexibility of portfolio operations

PGE continues to pursue opportunities to improve the flexibility of portfolio operations by executing on the following portfolio-wide efforts:

1. Drive consistency across operating tariffs (detailed in [Section 2.2.1](#))
2. Align customer journeys (detailed in [Section 3.1](#))
3. Reconcile of customer programs impacts with the regional market and resource adequacy programs in which PGE participates (detailed in [Sections 2.1.4.1](#) and [2.1.4.2](#))

[Table 18](#), below, describes the activities PGE expects to undertake for each Flex Load activity in this MYP cycle; the subsections thereafter contain additional detail for each activity.

Table 18. Flex Load Programs and Larger Scale Pilots Activities 2025-2026

Maturing Activities	2025-2026 Activities
Residential Smart Thermostat	Enhance customer event notification capabilities Monitor heat pump manufacturer development of demand response capable proprietary thermostats Continue to work in close coordination with Energy Trust of Oregon to deploy thermostat incentives as part of the “bring your own thermostat” (BYOT) channel
Peak Time Rebates	PGE will continue with the current outreach strategy to recruit customers with substantive load shifting capacity and propensity to participate PGE will also explore (or test) a winter focused outreach to customers with the high potential for load shifting capacity in the winter season
Time of Day	Continue to expand recruitment efforts including leveraging new channels for all customer segments Identify process and system enhancements that can improve the customer experience for existing and potential Time of Day customers Continue to work with other pilots/programs to identify cross-enrollment opportunities that are beneficial to our customers

Maturing Activities	2025-2026 Activities
Energy Partner on Demand (Sch 26)	<p>Revisit and simplify the program notification and incentive structure to address customer barriers to participation and encourage participation</p> <p>Work with third party implementer to enhance the customer experience with technical sales support and outreach activities</p>

Pilots in Design Transition	2025-2026 Activities
Multi-family Water Heating	<p>Utilize NEEA Learnings and stakeholder feedback to grow existing program</p> <p>Continue to operate the existing program and capture learning related to dispatch strategies</p> <p>Conclude the assessment of the pilot program redesign utilizing NEEA and Testbed learnings, stakeholder engagement</p> <p>Once redesigned and reopen the pilot to new enrollments</p>
Energy Partner Smart Thermostats (Sch 25)	<p>Expand work with Energy Trust and their Trade Ally network to increase enrollments</p> <p>Work with third party implementer to enhance customer experience with technical sales support and outreach activities</p> <p>Assess the 2024 expansion of the qualified grid-enable thermostats list. Conduct proactive outreach to customer with thermostat models slated for discontinuation by manufacturer</p>

4.2.1 Residential Smart Thermostats

Regulatory Reference	Capacity (forecasted for end of year 2026)	Proposed Funding (2025-2026)	Cost Effectiveness (TRC)
Schedule 5 Residential Direct Load Control Pilot (Deferral UM 2234)	Summer 52.5 MW	\$7,800,000	1.97 (2023)
	Winter 10.8 MW	(Admin 41%, Incentives 59%)	1.86 (2024)
			3.90 (2025)

Table 19. Residential Smart Thermostats: Budget

Category	2024 (previously approved)	2025 (forecasted)	2026 (forecasted)	2025-2026 (current funding request)
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██████████	██████████	██████████	██████████	██████████
Total	\$3,837,000	\$3,756,000	\$4,044,000	\$7,800,000

Table 20. Residential Smart Thermostats: Overview of Activity

Activity	Residential Smart Thermostat program
Connection to PGE’s Flex Load Strategy	<p>Flexible Load has become critical to both operate the grid and give customers the tools they need to manage their bills, contribute to decarbonization efforts, and become more resilient.</p> <p>Residential Smart Thermostat program adds heating systems and rapidly increasing cooling systems to PGE’s flexible DER necessary to meet PGE’s VPP goals.</p>
Description	<p>The Direct Load Control Smart Thermostat pilot aims to enroll and operate connected residential thermostats to control electric heating and cooling load, providing PGE with firm capacity. To participate in the program, PGE customers must have a qualifying HVAC system (ducted heat pump, electric forced-air furnace, or central air conditioner).</p> <p>Customers may enroll online in PGE’s DR program by purchasing a new qualifying thermostat via the PGE Marketplace or another retailer or using an</p>

Activity	Residential Smart Thermostat program
	<p>existing qualifying thermostat attached to a qualifying HVAC system. Customers receive up to \$25 as an enrollment incentive and \$25 for each DR season that they are able to participate in (defined as 50% of the DR hours called within a season).⁵⁵ Customers are permitted to opt out of any or all events. This customer value proposition is complemented by Energy Trust rebates of up to \$165 on new smart thermostats.</p>
<p>Product Phase</p>	<p>PGE proposes to transition this pilot to a program. The following paragraphs describe how the activity meets OPUC guidance for transition⁵⁶.</p> <p>PGE launched the residential Smart Thermostat pilot in 2015 with the Bring-Your-Own-Thermostat delivery channel. PGE collaborated with the Energy Trust of Oregon to recruit customers receiving energy efficiency incentives for smart thermostats into the demand response pilot.</p> <p>In 2018, PGE expanded eligibility by launching a Direct Install (DI) delivery channel, offering customers a free or discounted smart thermostat device with complimentary installation from a technician to remove the barriers of the hardware cost, installation cost, and the difficulty of self-installation. Energy Trust of Oregon provided DI customers with a smart thermostat energy efficiency incentive, which when combined with the PGE incentives, helped reduce the customer cost of the thermostat and installation to between \$0 and \$150 depending on the heating and cooling system and choice of thermostat model.</p> <p>In 2022, PGE made the proposal, and OPUC Staff agreed⁵⁷, to close the DI channel to new enrollees based on performance and gradually transition the existing 6K DI customers into the BYOT channel as they reach five years in the program. This decision was made based on declining enrollments and the fact that the BYOT offers a more effective and cost-effective means of enrollment. Third-party evaluations have been performed annually since the pilot began and critical recommendations have been implemented.⁵⁸</p> <p>Given its status and tenure as a mature and stable pilot, PGE requests Staff’s review to transition the residential Smart Thermostat pilot into a program. PGE does not expect this transition to affect underlying operation of the activity.</p> <p>The pilot has achieved predictable peak energy reduction and customer satisfaction. Impact values have been stable across the years with some variation due to weather, event start time and length. Average per participant kW impact is 0.81 in summer and 0.73 in winter when averaged across all pilot seasons. The</p>

⁵⁵ Customers who enrolled through the direct installation delivery channel (closed to new enrollment as of May 30, 2022) received a free or discounted and professionally installed smart thermostat but are not eligible for the up to \$25 enrollment incentive or \$25 seasonal incentive.

⁵⁶ OPUC (October 2020). OPUC Requirements for Pilots and Programs.

⁵⁷ OPUC (2022). Docket No. ADV 1384/ADVICE NO. 22-04, REMOVE DIRECT INSTALLATION CHANNEL. Retrieved from <https://edocs.puc.state.or.us/efdocs/HAU/adv1384hau21565.pdf>.

⁵⁸ Historical evaluation reports are filed under UM 1708, forthcoming evaluation reports will be filed under UM 2234.

Activity	Residential Smart Thermostat program
	<p>pilot has also achieved consistent customer satisfaction scores averaging 86% across evaluation reports (6 or higher on 0 - 10 scale).</p> <p>PGE employs well defined and repeatable processes for ongoing implementation, including enrollment, dispatch, incentive payment, reporting and customer engagement communications. Dispatch of thermostats during direct load control events is stable.</p> <p>Customers enrolled in the residential Smart Thermostat pilot cannot be simultaneously enrolled in Peak Time Rebates, thereby ensuring customers are not paid incentives twice for the same peak energy reduction. In addition, the pilot has achieved a TRC of greater than 1, demonstrating cost effectiveness.</p>
Target Market	Residential customers with eligible heating and cooling equipment who have or are willing to purchase a qualified smart thermostat.
Coordination	Continue to work in close coordination with Energy Trust of Oregon to deploy thermostat incentives as part of the BYOT channel
Changes since last filing, if applicable	See Section 2.2.1 for detail on standardization of seasons and holidays across the Flex Load portfolio.
Objectives	The Direct Load Control Smart Thermostat pilot aims to enroll and operate connected residential thermostats to control electric heating and cooling load, providing PGE with firm capacity.
Evaluation	Current third-party evaluator develops load impacts by using a matched comparison group and difference-in-differences panel regression modeling using hourly time series consumption data.

Table 21. Residential Smart Thermostats: Flex Load Acquisition (MW)

Flex Load Acquisition (MW)	2023	2024 Forecast	2025 Forecast	2026 Forecast
Summer	40.0	43.7	48.1	52.5
Winter	8.7	9.0	9.9	10.8

Table 22. Residential Smart Thermostats: Customers Served

Customers Served	2023	2024 Forecast	2025 Forecast	2026 Forecast
Residential Smart Thermostats	49,452	55,394	60,934	66,418

4.2.2 Peak Time Rebates

Regulatory Reference	Capacity (forecasted for end of year 2026)	Proposed Funding (2025-2026)	Cost Effectiveness (TRC)
Schedule 7 Flex 2.0 (Deferral UM 2234)	Summer 16.6 MW Winter 12.4 MW	\$5,880,715 (Admin 33%, Incentives 67%)	0.68 (2023) 0.60 (2024) 1.13 (2025)

Table 23. Peak Time Rebates: Budget

Category	2024 (previously approved)	2025 (forecasted)	2026 (forecasted)	2025-2026 (current funding request)
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██████████	██████████	██████████	██████████	██████████
Total	\$2,971,605	\$2,913,610	\$2,967,105	\$5,880,715

Table 24. Peak Time Rebates: Overview of Activity

Activity	Peak Time Rebates
Connection to PGE's Flex Load Strategy	<p>Flexible Load has become more critical than ever, both for operating the grid and for giving customers the tools they need to manage their bills, contribute to decarbonization efforts, and become more resilient. We envision a future where customers can easily participate in an optimized energy system, and how their contribution not only enables their individual goals but also the region's broader climate and reliability goals.</p> <p>Today, approximately 15% of PGE's customers participate in Peak Time Rebates as a Flexible Load offering. PTR is accessible to most residential customers and serves as a gateway to broader participation and adoption of existing and future Flexible Load options. PTR also delivers consistent and reliable load shifting to meet both summer and winter capacity needs, providing a significant contribution to PGE's Flexible Load acquisition goals.</p>
Description	Peak Time Rebates is a behavioral DR activity and a cornerstone of PGE's residential Flexible Load portfolio. The pilot relies on individual customer

Activity	Peak Time Rebates
	<p>participation to reduce electrical demand during Peak Time Events by shifting energy consumption to non-peak periods or through conservation. There is no up-front equipment investment making it the ideal platform to introduce our residential customers to the concept and value of DR, educate them about the role they can play in supporting a reliable, greener grid for the community, and reward them financially for their efforts in doing so. PTR serves as the gateway to a deeper engagement with PGE’s energy-shifting products and services. It is also our first behavior-based DR resource and is proving to be a reliable, consistent resource that will support PGE’s Flexible Load acquisition goals.</p> <p>The PTR pilot provides educational energy-saving tips and rewards customers for shifting their energy use during three- to four-hour event periods when energy costs are higher and renewable energy sources are less plentiful. Customers are notified a day prior to the event via text and/or email, based on their preference, and encouraged to shift usage during the event hours the next day. On the day of the event, they may also receive a same-day reminder. After the event, they are notified of the result of their specific effort and, if applicable, their earned incentive. Customers earn \$1.00 for every kWh they shift during an event, and the rebate appears as a credit on their next monthly bill. There is no penalty if a customer uses more energy than expected during an event, making PTR a no-risk, “win-only” offering for our customers.</p> <p>Events are limited to the hours of 7:00 a.m. – 11:00 a.m. and 3:00 p.m. to 9:00 p.m. PGE is not permitted to call events on more than two consecutive days.</p>
<p>Product Phase</p>	<p>Peak Time Rebates has formally existed in its current state since its inception as the Flex 2.0 Pilot in the summer of 2019. As it reaches its fifth year in market, PTR is delivering consistent benefits and a stable enrollment base. In this submittal, PGE requests formal transition to Program status.</p> <p>The following paragraphs describe how the activity meets OPUC guidance for transition⁵⁹.</p> <p>In 2016, PGE tested 12 different pricing design options aimed at reducing residential peak demand during summer and winter months via an activity known as the Flex 1.0 pilot. Starting in April 2019, PGE revised the pilot to offer a larger-scale opt-in behavioral demand response pilot to residential customers as part of a Flex 2.0 pilot, which was highly coordinated with PGE’s Smart Grid Testbed research project. Based on earlier learnings, this pilot featured rapid scaling and growth in program enrollment. Now entering its fifth year, the Peak Time Rebates pilot has stabilized around 124,000 enrolled customers.</p> <p>Given its status and tenure as a mature and stable pilot, PGE requests Staff’s review to transition Peak Time Rebates into a Program based on the following:</p> <p>Peak Time Rebates fulfills a unique role within PGE’s flexible load portfolio as the most accessible demand response option for residential customers. There are no</p>

⁵⁹ OPUC (October 2020). OPUC Requirements for Pilots and Programs.

Activity	Peak Time Rebates
	<p>up-front costs or economic barriers to participation. PTR provides a gateway experience to help customers understand demand response and encourage subsequent migration to other flexible load options. In 2023 alone, nearly 2,800 customers migrated from PTR to PGE’s Smart Thermostat Program. PTR also captures demand response capacity where residential customers do not want to grant PGE control of their in-home device or have a device that does not meet requirements for other offerings.</p> <p>PGE has successfully operated the pilot through eight demand response event seasons. The systems for recruitment, managing customer enrollments, notifying customers of events and processing rebates are stable and scalable.</p> <p>Customer performance in Peak Time Events has been evaluated by a third-party for the life of the pilot. As the pilot has grown and stabilized, so too have the per participant average kW impacts. Notably, event impact results for the Summer 2022 season were remarkably consistent across all six events PGE called for Peak Time Rebates, averaging 0.13 kW per participant. Hourly averages demonstrated a similar level of consistency. Winter season results feature lower impacts and slightly more variability due to fewer events, inclusion of morning events and optimizing recruitment for summer performance.</p> <p>There are remaining barriers to cost effectiveness inherent to the design of the pilot. Reducing or eliminating pilot administrative costs does not have a significant impact on elevating the TRC value. Notably, the key benefits that are core to the Peak Time Rebates pilot are not systematically quantified or measured within the cost effectiveness calculation. These include providing an accessible participation option available to most residential customers, driving broad-scale awareness of demand response amongst PGE’s customer base and supporting customer migration to higher value offerings within the portfolio. Cost effectiveness for the Peak Time Rebates pilot is currently measured as TRC 1.19.</p>
<p>Target Market</p>	<p>The vast majority of PGE’s residential customer base is eligible to participate in this voluntary pilot. Now, in its fifth year, the program has stabilized around 124,000 enrolled customers. Almost Approximately 15% of PGE’s residential customers are enrolled in PTR.</p> <p>While Peak Time Rebates is open to most residential customers, PGE targets its marketing approach to focus on customers with the highest propensity to save energy through making event-based behavioral changes. PGE partners with a data science vendor to identify customers who have the highest propensity to be successful in the pilot. This ensures the program is optimizing for both performance and customer experience.</p> <p>Enrollment rates have slowed as the pilot has matured. In the 2023 calendar year, enrollment flattened with declines in some months. In 2024, enrollment growth has averaged about 0.4% monthly enrollment growth. One point worth mentioning is that the pilot added several thousand customers this summer via a</p>

Activity	Peak Time Rebates
	<p>direct mailing, which we attribute to the unique nature of that communication in an increasingly crowded digital space.</p> <p>The primary drivers of enrollment loss are customers leaving the service territory or moving within the service territory, loss of customer’s event notification contact channel, and migration to other DLC programs where cross-enrollment is not permitted. In 2023, nearly 2,800 customers migrated from PTR to the Smart Thermostat program. This is a net benefit to the overall Flexible Load portfolio and an intended positive outcome but can impact enrollment growth for PTR specifically. Similar to other large-scale, mature programs that feature ongoing customer engagement, annual enrollment growth must outpace annual attrition to continue to grow the enrolled customer base. With a pilot program of this size the net result can be with little to no topline growth.</p> <p>For PTR, enrollment growth does not track directly with growth in adoption of new technologies in the same way that it does for programs centered around devices like a smart thermostat or home battery. So, no new rapid growth is expected at this time. However, as home electrification increases, participation in PTR becomes more appealing to customers adding electrical load in their homes, such as conversions to heat pump for heating and cooling. PTR remains a valuable participation option, particularly for customers who are not receptive to direct control options or who have devices that are incompatible with existing direct control options.</p>
Coordination	<p>Peak Time Rebates is accessible to most residential customers and features a simple enrollment process. The ease of enrollment and participation provides customers with a positive no-cost and no-risk first exposure to demand response. The pilot serves as a gateway to other Flexible Load offerings, particularly the Smart Thermostat program, Time of Day rate and the Smart Battery pilot. Additionally, Peak Time Rebates captures demand response capacity for customers who are not receptive to direct control options or who have devices that are incompatible with existing direct control options.</p>
Changes since last filing, if applicable	<p>Enrollment growth for PTR has slowed since 2022 as the pilot has matured and stabilized. This is common and expected for a program that is not based on new technology adoption and has been in-market for nearing five years. As such, enrollment and impact projections have been revised downward, though some modest growth is still possible as the service territory continues to grow. PGE will continue to target optimal customers who can contribute substantive load shifting capacity and who will also be the most satisfied with their participation. PGE may begin to target customers who have high potential for load shifting capacity in winter season as well.</p> <p>See Section 2.2.1 for detail on the standardization of seasons and holidays for schedules 5, 7, 8, and 25).</p>
Objectives	<p>The key objectives for Peak Time Rebates remain the same since inception of the Flex 2.0 pilot:</p>

Activity	Peak Time Rebates
	<ul style="list-style-type: none"> • Design and deploy a large-scale DR program that equitably and cost-effectively contributes a substantial DR amount to PGE’s IRP goals • Provide DR offering that is easy for residential customers to engage in • Provide a DR offering that serves as a gateway for adoption of other Direct Load Control offerings, primarily to the Smart Thermostat program
Evaluation	<p>PGE has used a third-party vendor to evaluate the Peak Time Rebates pilot annual for the entirety of its lifespan. These evaluations typically consist of evaluating seasonal event impacts, process evaluation and measuring customer experience. In addition to third-party evaluation, PGE regularly monitors customer feedback via ongoing customer surveys to assess areas for improvement as well as overall satisfaction.</p>

Table 25. Peak Time Rebates: Flex Load Acquisition (MW)

Flex Load Acquisition (MW)	2023	2024 Forecast	2025 Forecast	2026 Forecast
Summer	14.6	15.4	16.1	16.6
Winter	12.3	11.5	12.0	12.4

Table 26. Peak Time Rebates: Customers Served

Customers Served	2023	2024 Forecast	2025 Forecast	2026 Forecast
Peak Time Rebates	123,789	126,289	131,967	136,066

4.2.3 Time of Day

Regulatory Reference	Capacity (forecasted for end of year 2026)	Proposed Funding (2025-2026)	Cost Effectiveness (TRC)
Schedule 7 Flex 2.0 (Deferral UM 2234)	Summer 5.6 MW	\$1,201,650 (Admin 100%, Incentives 0%)	1.50 (2023) 1.37 (2024) 2.52 (2025)

Table 27. Time of Day: Budget

Category	2024 (previously approved)	2025 (forecasted)	2026 (forecasted)	2025-2026 (current funding request)
██████████	██████████	██████████	██████████	██████████
██████████	██████████	██████████	██████████	██████████
██████████	██████████	██████████	██████████	██████████
██████████	██████████	██████████	██████████	██████████
Total	\$690,000	\$666,500	\$535,150	\$1,201,650

Table 28. Time of Day: Overview of Activity

Activity	Time of Day
Connection to PGE’s Flex Load Strategy	<p>Time of Day helps reduce system peak loads and reduce associated carbon footprint and greenhouse gas emissions. Aligning on-peak hours with capacity constraints encourages customers to shift usage during energy peaks, reduces need for construction of new power plants and supports a reliable grid. TOD is one way our customers can partner with PGE and play an active role in grid management to enable a cleaner, greener energy future for all.</p> <p>PGE see a larger role for time varying rates in the future as we build the Virtual Power Plant and encourage customers to adopt DERs. Time varying rates also help customer manage their total energy costs as it provides a pricing signal to use electricity when costs are low. Time varying rates are also a great way for customers who drive EVs to control their transportation fuel costs.</p>
Description	Residential customers want more choice, information, and control to help them manage their energy use and costs. The Time of Day pricing plan gives customers more control over their electric bills and offers opportunities to save

Activity	Time of Day
	<p>money by shifting energy use away from the peak hours when power costs more and renewable resources are less plentiful.</p> <p>Time of Day operates under Schedule 7 and all pricing plan details are provided in the tariff. Main pricing details are provided below:</p> <ol style="list-style-type: none"> 1. On-Peak 5:00 p.m. to 9:00 p.m. Monday-Friday 2. Mid-Peak 7:00 a.m. to 5:00 p.m. Monday-Friday 3. Off-Peak 9:00 p.m. to 7:00 a.m. Monday-Friday; All day. Saturday, Sunday and holidays 4. Holidays: New Year’s Day on January 1; Memorial Day, the last Monday in May; Independence Day on July 4; Labor Day, the first Monday in September; Thanksgiving Day, the fourth Thursday in November; and Christmas Day on December 25. If a holiday falls on a Saturday, the preceding Friday will be designated the holiday. If a holiday falls on a Sunday, the following Monday will be designated the holiday. See Section 2.2.1 for more detail.
Product Phase	<p>Time of Day is currently in pilot status and has been since its inception in May 2021. This pilot will be assessed for transition to Program status in Q3-4 2025.</p>
Target Market	<p>All of PGE’s residential customer base is eligible to participate in Time of Day. It is a voluntary pricing plan that has been offered to customers since May 2021. Time of Day is still in the learning phase and working to increase enrollments in various customer segments. As of end of May 2024, approximately 2.5% of PGE’s residential customers are enrolled in Time of Day.</p> <p>To achieve desired load impact, TOD must benefit a sufficient number of residential customers to encourage adoption. In this instance, customer benefit is measured by the amount a customer <i>could</i> save on the new pricing plan versus the Basic Service.</p> <p>Our rate modeling analysis forecasts ~46% of our residential customers could save 1% or more of their monthly bill without making any changes to their usage by transitioning from Basic Service to Time of Day. An additional 10% more could save on TOD by making shifts in usage during peak hours. While the Serviceable Obtainable Market is ~430,000 customers (56% of the 772,000 eligible customer residential population), up to this point we have focused our marketing on customers who have the highest savings impact and the greatest likelihood of adopting a time-varying pricing plan. The focus for marketing going forward will mainly include customers who could save on TOD by shifting their usage away from peak hours.</p>
Coordination	<p>Time of Day is a critical component in the company’s overall energy engagement and DR strategy. It is a foundational element that can bind multiple products and services together (Smart Thermostat, EV Charging pilot, and PTR) in a way that delivers a curated experience for a customer. That said, PGE (and the industry) are still learning about the impact of interactions between TOD and other DR programs. We want to ensure the viability of existing products alongside or in</p>

Activity	Time of Day
	<p>combination with TOD while also ensuring that customers have a great experience in their adoption of Time of Day. As TOD adoption scales, PGE is exploring how best to stage or combine offers and may enlist support from a third party to assist. PGE will also continue to gather customer feedback, industry best practices, and utilize our outreach channels to deliver a clear customer journey toward this product bundling future.</p>
<p>Changes since last filing, if applicable</p>	<p>A comprehensive third-party evaluation report (both process and impact analysis) for Time of Day was discussed in our previous MYP. The impact analysis portion of this evaluation report was inconclusive, specifically around the load impact accuracy, given the low number and types of customers enrolled in the pricing plan at the time of the evaluation. Due to this discovery, TOD will not begin another third-party evaluation until 2025, by when we expect sufficient customers and customer segments enrolled to perform such a study.</p>
<p>Objectives</p>	<p>The key objectives for Time of Day remain the same since the pilot’s inception in 2021:</p> <ul style="list-style-type: none"> • Support PGE’s IRP Goals: Help reduce peak load and support decarbonization goals and use of more renewables. Contribute 5.6 MW of capacity value by EOY 2026 to support PGE’s residential Flexible Load goals. • Deliver an exceptional customer experience (target 80% customer satisfaction score). • Deliver personalized, relevant educational tools and energy savings tips to help customers achieve their maximum savings potential. • Ensure unenrollment remains below 3% annually (exempting those targeted un-enrollments or those who move outside the service territory) • Work to create a clear, compelling customer journey that paves the pathway toward adoption of complementary DLC products (specifically Smart Thermostat) for increased DR value. • Build a flexible and extensible program foundation that can enable future time-varying offers.
<p>Evaluation</p>	<p>See “Changes since last filing, if applicable” in this table, above</p>

Table 29. Time of Day: Flex Load Acquisition (MW)

Flex Load Acquisition (MW)	2023	2024 Forecast	2025 Forecast	2025-2026 Forecast
<p>Summer</p>	<p>1.6</p>	<p>2.5</p>	<p>4.1</p>	<p>5.6</p>
<p>Winter</p>	<p>-</p>	<p>-</p>	<p>-</p>	<p>-</p>

Table 30. Time of Day: Customers Served

Customers Served	2023	2024 Forecast	2025 Forecast	2026 Forecast
Time of Day	14,946	22,946	36,946	50,946

4.2.4 Energy Partner on Demand (Sch 26)

Regulatory Reference	Capacity (forecasted for end of year 2026)	Proposed Funding (2025-2026)	Cost Effectiveness (TRC)
Schedule 26 (Deferral UM 2234)	Summer 43.8 MW Winter 35.5 MW	\$12,143,704 (Admin 46%, Incentives 54%)	1.29 (2023) 1.48 (2024) 2.59(2025)

Table 31. Energy Partner on Demand (Schedule 26): Budget

Category	2024 (previously approved)	2025 (forecasted)	2026 (forecasted)	2025-2026 (current funding request)
██████████	██████████	██████████	██████████	██████████
██████████	██████████	██████████	██████████	██████████
██████████	██████████	██████████	██████████	██████████
██████████	██████████	██████████	██████████	██████████
Total	\$5,406,410	\$6,087,977	\$6,055,727	\$12,143,704

Note the above material increase in incentives budget from 2024 to 2025, which reflects an investment in participant communication to drive higher participation during event seasons.

Table 32. Energy Partner on Demand: Overview of Activity

Activity	Energy Partner on Demand (Schedule 26)
Connection to PGE’s Flex Load Strategy	Energy Partner on Demand serves a key constituency and is the one of the largest contributors to Flex Load capacity and PGE’s VPP goals. As such, the program is critical to PGE’s strategic imperatives to electrify, perform, and decarbonize. It enhances grid reliability and efficiency, supports significant emissions reductions, and engages customers in the transition to a cleaner energy future.
Description	Energy Partner Schedule 26 is focused on large customers via custom load curtailment plans with monthly reservation incentive payments during Winter and Summer seasons, and event-based incentives for shifting their energy

Activity	Energy Partner on Demand (Schedule 26)
	<p>consumption during seasonal Peak Time Events. Energy Partner Schedule 26 provides firm capacity and will evolve to provide intra-hour grid services.</p> <p>In its current form, Schedule 26 customers can elect to participate in up to 20, 40, or 80 hours of events per season and customize their participation schedule by selecting one or more event windows such as 7-11 AM (winter), and 11 AM to 4 PM, 4-8 PM, 8-10 PM (summer and winter).</p> <p>The program is operated with technical sales and engineering staff (provided by our third-party implementer) who work on-site with customers to identify opportunities for and create a load curtailment plan. Unlike residential DR efforts leveraging a “mass market” approach, business customers require individualized, ongoing focus to ensure their operations are not disrupted by DR events (e.g., nominations may require adjustments, and questions may arise as to how to optimize participation during events). This program offering is technology agnostic and flexible, with a mix of behavioral/manual participants and other customers who opt for direct load control.</p> <p>The energy storage component of the program⁶⁰ is managed in-house and does not utilize the third-party implementor other than for minor operational tasks such as sending earned incentive checks to customers.</p>
Product Phase	The Energy Partner Schedule 26 transitioned from pilot program to a fully implemented program status effective January 1, 2022. ⁶¹
Target Market	This program targets large commercial and industrial customers. Given the high variation and large end use loads this program, and similar to energy efficiency programs, targets are set by MW and measured by customer curtailment nominations. Current there are 117 customers across approximately 274 sites enrolled in the program. Program growth trends point to new enrollments coming from the addition of new sites and increase in customer curtailment nominations.
Coordination	As the opportunities within the large customer market begin to plateau, there is a need to be able to offer a Flex Load program engagement opportunity which allows for technology-agnostic demand response as well as the flexibility to offer engagement paths regardless of the specific tenant to building ownership situation. PGE has been engaging in new customer marketing and recruitment activities targeted at small and medium businesses with our Energy Partner Smart

⁶⁰ Energy storage continues to be a small but emerging non-residential market, and PGE is taking steps to improve the technical functionalities through new dispatch strategies and to continue to support market education and awareness. These efforts will be dispatched through Schedule 26 and funded from Schedule 135 deferral as in the past, however due to the nascent nature of this technology within the larger more mature portfolio, Energy Storage efforts will be kept as a separate segment until they are more mature. See also [Section 4.1.2](#).

⁶¹ PGE (2021). *UM 2141 Flexible Load Multi-Year Plan 2022-202, Appendix B*. Retrieved from <https://edocs.puc.state.or.us/efdocs/HAD/um2141had16243.pdf>.

Activity	Energy Partner on Demand (Schedule 26)
	Thermostat pilot in order to continue the growth of the resource while retaining current customers by increasing event performance.
Changes since last filing, if applicable	The program did not meet its 2023 41.1 MW target but continues to grow, albeit at a slower rate than in previous years primarily due to its maturity within the current market. PGE is focused on engagement and participation. We have enhanced the approach to seasonal readiness meetings and outreach tactics. See Section 2.2.1 for detail on standardization of seasons and holidays across the Flex Load portfolio
Objectives	This program is currently not in the demonstration/ pilot phase as it has transitioned into a program as January 2022.
Evaluation	At the conclusion of each event year, the Energy Partner On Demand Program is evaluated by an independent firm.

Table 33. Energy Partner on Demand: Flex Load Acquisition (MW)

Flex Load Acquisition (MW)	2023	2024 Forecast	2025 Forecast	2026 Forecast
Summer	36.4	38.8	41.3	43.8
Winter	29.0	31.5	33.5	35.5

Table 34. Energy Partner on Demand: Customers Served ⁶²

Customers Served	2023	2024 Forecast	2025 Forecast	2026 Forecast
Energy Partner on Demand	n/a	n/a	n/a	n/a

⁶² Energy Partner on Demand (Sch 26) target market is large C&I customers, with extended enrollment cycles which may not align with calendar year. As such, PGE measures program MW rather than enrollments.

4.2.5 Multi-family Water Heating

Regulatory Reference	Capacity (forecasted for end of year 2026)	Proposed Funding (2025-2026)	Cost Effectiveness (TRC)
Schedule 4 Multifamily Water Heater (Deferral UM 1827)	Summer 2.3 MW Winter 2.8 MW	\$3,941,330 (Admin 84%, Incentives 16%)	0.16 (2023) 0.28 (2024) 0.29 (2025)

Table 35. Multi-family Water Heating: Budget

Category	2024 (previously approved)	2025 (forecasted)	2026 (forecasted)	2025-2026 (current funding request)
██████████	██████████	██████████	██████████	██████████
██████████	██████████	██████████	██████████	██████████
██████████	██████████	██████████	██████████	██████████
██████████	██████████	██████████	██████████	██████████
Total	\$1,656,500	\$1,170,250	\$2,771,080	\$3,941,330

Subsequent to the approval of 2024 budget, the decision was made to continue to operate the pilot in "maintenance mode" (see [Table 36](#) for detail).

Table 36. Multi-family Water Heating: Overview of Activity

Activity	Multi-family Water Heating
Connection to PGE's Flex Load Strategy	<p>The Multifamily Residential Demand Response Water Heater Pilot aligns with PGE's strategic goal to plan, serve, and manage Flex Load. By integrating demand response technology into multifamily residences, the pilot enhances grid reliability and efficiency while supporting significant reductions in emissions. This initiative enables multifamily buildings to participate in demand response programs, contributing to PGE's flexible DER goals.</p> <p>PGE remains committed to maintaining an efficient and effective seasonal dispatch of the existing fleet.</p>
Description	<p>The Multi-family Residential Demand Response Water Heater pilot aims to retrofit existing water heaters in multifamily residences with demand response enabled technology. Launched in 2018, this pilot focuses on electric resistance water</p>

Activity	Multi-family Water Heating
	<p>heaters with a communication interface supporting Direct Load Control Events or a retrofitted device with a control switch in the power supply.</p> <p>Property managers receive annual incentives of \$20 per installed device for five years.</p> <p>The program provides capacity and intra-hour energy flexibility, supporting reliability.</p> <p>Multi-family Property Owners can enroll their properties in this opt-out pilot, automatically enrolling residential customers unless they choose to withdraw. Notifications and instructions for opting out are provided at installation or when the resident moves in.</p>
<p>Product Phase</p>	<p>PGE launched the pilot in 2018. The pilot has been in design transition since 2022. Since January 2023, the pilot has been in maintenance mode, closed to new participants. PGE continues to operate the fleet of Wi-Fi and cell-enabled switches. Maintenance includes supporting currently enrolled participants and program management and dispatch of the existing fleet. PGE continues to test and assess learnings from dispatch strategies.</p> <p>PGE proposes to continue to operate the pilot in maintenance mode until such time as the pilot has been approved for re-opening to new enrollments on the following rationale:</p> <p>This pilot operates as an integral part of PGE’s demand response portfolio. As one of the only programs able to provide consistent daily dispatch, the Pilot provides capacity as well as intra-hour energy and lays the foundation for PGE’s DR programs to offer intra-hour grid services to support reliability.</p> <p>This program also provides Flexible Load resources in a way that is unobtrusive to the customer. Water heaters are ubiquitous and, unlike other DERs such as batteries, thermostats, and rooftop solar, are rarely monitored or adjusted by the owner. This pilot enables residents of multi-family buildings to participate in energy programs that are often not available due to the limitations of renters to make investments in equipment or building shell improvements.</p> <p>The combination of a dispatchable Flex Load resources that is unobtrusive to the customer and daily dispatch is of increasing value as PGE dispatches its Flex Load portfolio in response to energy conditions during multi-day weather events.</p> <p>In line with the Pilot objectives PGE will conduct efforts to better understand the energy consumption that is being shifted with the current fleet. PGE will also continue to evaluate dispatch strategies for the current fleet. These efforts, combined with testing underway by PGE’s Smart Grid Testbed as well as regional efforts underway, will inform development of an expanded water heater program.</p>
<p>Target Market</p>	<p>At the onset of the pilot, PGE conducted an in-depth analysis of the residential water heater market, estimating an 87% market share for electric water heaters in multifamily residential buildings. This stability is due to property owners' and</p>

Activity	Multi-family Water Heating
	<p>managers' preference for decentralized systems, which allow them to avoid carrying utility costs and invoice tenants through their rent.</p> <p>Initially, PGE targeted owners and property managers of large multifamily buildings with 50 or more units for enrollment. As the pilot progressed and technology evolved, the focus expanded to include owners and builders of new construction multifamily properties. However, as noted in PGE's 2023 deferral filing⁶³:</p> <p><i>... due to continuous delays in the effective date of the CTA-2045 code, the Pilot extended cellular retrofits through 2022, with code finally taking effect in July 2023.</i></p> <p><i>Faced with persistent delays of the planned code change making CTA-2045-enabled water heaters the new baseline, the Pilot entered maintenance mode in 2023, focusing on managing the existing fleet."</i></p>
<p>Coordination</p>	<p>PGE deployed this pilot with a third-party implementor. Throughout the pilot, PGE has collaborated with switch manufacturers to identify necessary capabilities, integrate communication features, and ensure proper functionality to achieve targeted demand reductions without inconveniencing customers. Our efforts have also included working with water heater manufacturers to integrate communication modules into more affordable units. Initially, only high cost "smart" water heaters had these capabilities, but technological advancements now offer broader connectivity options.</p> <p>PGE remains dedicated to evaluating the pilot in conjunction with a program redesign. Collaboration is key, and we prioritize engagement with stakeholders such as OPUC Staff and the Northwest Energy Efficiency Alliance to ensure a thorough evaluation and inform our program redesign based on technical insights and market channel learnings. Future program design may include expanding to both multi-family and single-family water heaters, and we plan to test these approaches within the PGE Smart Grid Testbed to gather more insights.</p> <p>One of the primary benefits of the pilot has been the opportunity to forge close partnerships with property and maintenance managers of participating properties. These relationships are essential for effective collaboration and successful program implementation.</p>
<p>Changes since last filing, if applicable</p>	<p>Our impacts have stabilized at approximately 0.20 kW per controlled device, indicating consistent performance. Notably, the removal of properties with low-connectivity Wi-Fi devices has significantly improved our outcomes.</p> <p>Despite these improvements Wi-Fi device connectivity challenges have continued to persist with the aging Wi-Fi fleet and we are actively collaborating</p>

⁶³ PGE (2023). UM 1827 PGE's Application to Reauthorize Deferred Accounting of Incremental Costs Associated with the PGE Demand Response Water Heater Pilot. Retrieved from <https://edocs.puc.state.or.us/efdocs/HAQ/um1827haq325933054.pdf>.

Activity	Multi-family Water Heating
	<p>with properties and stakeholders to address these connectivity issues. The deployment of more devices during events has resulted in higher kW impacts, demonstrating the efficacy of our strategies.</p> <p>We have continued to manage the existing fleet of both Wi-Fi and cellular connect switches and have made additional attempts to reset Wi-Fi routers at properties with ongoing connectivity problems. Some properties with persistent issues have been unenrolled since the beginning of the year.</p> <p>Additionally, we have been working with Grid Operations to determine the best dispatch strategies, particularly in relation to the “snapback effect” on the grid, to avoid spikes in load after a DR event. This work continues and will inform future dispatch strategies.</p> <p>In 2024, PGE performed a sensitivity test for MFWH cost-effectiveness to assess its economic viability and identify potential adjustments for future scalability. PGE continues to operate the pilot in lower cost maintenance mode as we seek additional means to reduce costs while still supporting grid stability and energy shifting objectives.</p>
<p>Objectives</p>	<p>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 supporting Direct Load Control Events or retrofitted with a control switch in the power supply to the tank. The pilot aims to further inform the design of a comprehensive water heater demand response program, determine appropriate incentive levels for multifamily property owners and residential customers, integrate and test various technologies, and implement different demand response dispatch strategies. Through these efforts, the pilot seeks to enhance the effectiveness and scalability of demand response initiatives for multifamily residences.</p> <p>In line with the Pilot objectives PGE will conduct efforts to better understand the energy consumption that is being shifted with the current fleet. PGE will also continue to evaluate dispatch strategies for the current fleet. These efforts, combined with testing underway by PGE’s Smart Grid Testbed as well as regional efforts underway, will inform development of an expanded water heater pilot.</p>
<p>Evaluation</p>	<p>The impact evaluation provided a comprehensive assessment of DR impacts and informed future program improvements. Demand reductions from events in Summer 2022 and Winter 2022-23 have stabilized at 0.20 kW per controlled device as the program has matured. PGE continues to implement changes based on key findings and recommendations identified in the evaluation. These recommendations will inform the future implementation of a water heater program. Key points include addressing Wi-Fi connectivity issues, assessing cost-effective approaches for installation and maintenance, considering alternative delivery methods such as midstream incentives to promote CTA-2045 water heaters, and surveying existing customers for future design insights.</p>

Table 37. Multi-family Water Heating: Flex Load Acquisition (MW)

Flex Load Acquisition (MW)	2023	2024 Forecast	2025 Forecast ⁶⁴	2026 Forecast
Summer	2.0	2.0	2.0	2.3
Winter	2.5	2.5	2.5	2.8

Table 38. Multi-family Water Heating: Customers Served

Customers Served	2023	2024 Forecast	2025 Forecast	2026 Forecast
Multi-family Water Heating	10,895	10,254	10,844	11,910

⁶⁴ Note that the Multi-Family Water Heating pilot’s 2025 summer and winter capacity may vary by ~0.2 MW from that used in cost effectiveness calculations due to estimates of enrollment, unit savings, and attrition.

4.2.6 Energy Partner Smart Thermostat (Sch 25)

Regulatory Reference	Capacity (forecasted for end of year 2026)	Proposed Funding (2025-2026)	Cost Effectiveness (TRC)
Schedule 25 Nonresidential Direct Load Control Pilot (Deferral UM 1514)	Summer 2.8 MW Winter 0.7 MW	\$2,995,460 (Admin 81%, Incentives 19%)	0.22 (2023) 0.12 (2024) 0.64 (2025)

Table 39. Energy Partner Smart Thermostat (Schedule 25): Budget

Category	2024 (previously approved)	2025 (forecasted)	2026 (forecasted)	2025-2026 (current funding request)
██████████	██████████	██████████	██████████	██████████
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██████████	██████████	██████████	██████████	██████████
██████████	██████████	██████████	██████████	██████████
Total	\$1,280,000⁶⁵	\$1,422,000	\$1,573,460	\$2,995,460

⁶⁵ Note the 2024 MYP Supplemental reflected a 2024 budget of \$1,280,000; this updated to \$1,700,000 for the subsequent deferral to account for incremental incentives, a DERMS integration for the BYOT channel, and significant increase in evaluation costs. The difference is mitigated by savings in year-to-date pilot operations. PGE (2023). UM 1514 PGE’s Application for Reauthorization of Deferral of Incremental Costs Associated with Non-Residential Direct Load Control Pilot. Retrieved from <https://edocs.puc.state.or.us/efdocs/HAQ/um1514haq325935054.pdf>.

Table 40. Energy Partner Smart Thermostat: Overview of Activity

Activity	Energy Partner Smart Thermostat (Schedule 25)
<p>Connection to PGE’s Flex Load Strategy</p>	<p>The Nonresidential Direct Load Control Pilot embodies PGE’s strategic imperatives to electrify, perform, and decarbonize. It enhances grid reliability and efficiency, supports significant emissions reductions, and engages customers in the transition to a cleaner energy future. By integrating demand response into its operations, PGE can better manage its clean energy resources, meet regulatory targets, and continue to lead in innovative, sustainable energy solutions. The Energy Partner Smart Thermostat program is critical to this effort, enabling commercial and industrial customers and small-to-medium business (SMB) customers, which typically use more energy than residential customers, to contribute to PGE’s VPP goals.</p>
<p>Description</p>	<p>The Direct Load Control Pilot targets HVAC load curtailment using smart thermostats for commercial customers. Launched in 2017 and redesigned in 2022, Energy Partner Smart thermostats (Schedule 25) complements Energy Partner on Demand (Schedule 26), recruiting customers and installing qualified smart thermostats directly. This pilot allows small and medium-sized businesses to participate in demand response through a turnkey approach.</p> <p>Participants let PGE manage their thermostats during events, with the option to opt out. To qualify, customers need a qualifying rate schedule, a PGE network meter, an internet-connected thermostat, and a suitable heating or cooling system (ducted heat pump or electric forced air heating for winter; central air conditioning or ducted heat pump for summer).</p> <p>Event Limits: Up to two events per day, not exceeding five hours per day.</p> <p>Event Seasons: Events occur only during designated seasons, not on holidays, with a cap of 150 event hours per season.</p> <p>Incentives: Participants receive a free thermostat upon signing up through direct installation. They can earn up to \$60 per site per season (up to \$120 per year). Payments are made via ACH, check, bill credit, or gift card. To qualify for payment, thermostats must participate in at least 50% of event hours per winter and/or summer season.</p> <p>The Energy Partner Smart Thermostat program extends impact to commercial businesses, many of whom already participate in a residential demand response pilot or program. This program helps businesses reduce costs and earn incentives.</p> <p>Customers can get a free smart thermostat with professional installation from PGE and explore ways to save money, time, and energy. In May 2024, PGE launched the BYOT channel, offering a \$100 reward for businesses enrolling with a qualifying thermostat. Customers in the direct installation channel receive a free thermostat but are not eligible for the \$100 BYOT incentive.</p>
<p>Product Phase</p>	<p>Pilot in Design Transition (for detail, see “Changes since last filing, if applicable” section of this table)</p>

Activity	Energy Partner Smart Thermostat (Schedule 25)
<p>Target Market</p>	<p>The primary target market for the Direct Load Control Pilot are commercial customers with eligible heating and cooling equipment who either have or are willing to purchase a qualified smart thermostat. The introduction of the BYOT channel has leveraged industry OEM experience to engage customers who already own a qualified device. The program continues to grow steadily as we focus on increasing retention and adding new participants.</p> <p>There are over 69,000 eligible commercial customers based on Commercial SPIDs on Rates 32, 38, 47, 49, 75, 83, 85, 89, and 90. Applying a 20% awareness factor, consistent with best practices for managed accounts and those with qualifying heating or cooling systems, the addressable market includes at least 28,000 sites.</p> <p>At the end of 2023, PGE reported 2,250 thermostats enrolled. Our goal is to enroll at least 2,800 new thermostats per year. However, this has been challenging due to the economic effects of inflation. To boost enrollments, we eliminated the customer co-pay in 2024 and introduced the BYOT delivery channel. These changes are part of our expanded recruitment efforts to align the program with broader outreach strategies and increase participation.</p>
<p>Coordination</p>	<p>We will continue working closely with our third-party implementer to deploy thermostat incentives through the BYOT channel, alongside enhanced outreach and education efforts to engage commercial customers. The latter includes a holistic customer experience, direction outreach, and OEM marketing.</p> <p>Collaboration with the Energy Trust of Oregon is crucial to ensure installations meet energy efficiency eligibility requirements, thereby offsetting thermostat and installation costs. This coordination aims to eliminate the co-pay for commercial customers, which has previously hindered program growth. We plan to continue cost-sharing into 2025 with the Energy Trust, enhancing cost-effectiveness and reducing expenses for customers.</p>
<p>Changes since last filing, if applicable</p>	<p>In 2024, PGE filed a tariff update, incorporating a BYOT option for commercial customers. We pursued OEM integrations with our provider to eliminate costly and time-intensive customizations, expanding the number of qualified devices from 2 to 15, including prevalent communication-enabled commercial thermostats. This is expected to accelerate Flex Load enrollment.</p> <p>By aligning implementation and delivery channels with customer segments and technology, PGE aims to lower implementation costs and attract additional customers to the pilot.</p> <p>PGE expects additional efficiencies with an implementation RFP in Q3 2024. As program growth continues, the limited availability of qualified thermostats in the commercial space are expected to lead to higher direct costs for thermostats in the direct install segment. Another important thing to note is that the discontinuation of the ecobee EMS-si will necessitate replacement thermostats for Direct Install customers as early as 2025, as they will no longer be supported for demand response dispatch after losing ecobee support.</p>

Activity	Energy Partner Smart Thermostat (Schedule 25)
	See Section 2.2.1 for detail on the standardization of seasons and holidays for Schedules 5, 7, 8, and 25).
Objectives	The Direct Load Control Pilot aims to enroll and manage connected commercial thermostats to control electric heating and cooling loads, providing PGE with firm capacity. PGE is focusing on growth by collaborating with an additional demand response management system software vendor and introducing an additional 15 qualified thermostats, expected to drive increased enrollment due to Honeywell's substantial market share. The strategy includes shifting from prioritizing new installations to broader enrollment strategies, reducing costs, and leveraging existing customer equipment. Enhanced outreach and education efforts aim to boost total enrollment, informed by understanding customer drivers for thermostat adoption. Insights from these efforts will be used to improve program performance, with continued stakeholder collaboration ensuring efficiency savings contribute to organizational goals. By the end of Q3, PGE plans to reconfigure program resources and rebid third-party implementer services to support these initiatives.
Evaluation	The results of the evaluation (not yet filed) are inconclusive, with a downward bias. It is challenging to measure the load impacts of thermostats in commercial spaces due to the variation in configuration and uncertainty in load patterns compared to large commercial and industrial (C&I) DR programs. To address this, evaluation of this pilot relies on a statistical modeling approach to develop load impacts.

Table 41. Energy Partner Smart Thermostat: Flex Load Acquisition (MW)

Flex Load Acquisition (MW)	2023	2024 Forecast	2025 Forecast	2025-2026 Forecast
Summer	0.6	2.2	3.5	4.4
Winter	0.2	0.5	0.2	0.3

Table 42. Energy Partner Smart Thermostat: Customers Served

Customers Served	2023	2024 Forecast	2025 Forecast	2026 Forecast
Energy Partner Smart Thermostat	2,267	5,348	6,668	7,668

4.2.7 Residential EV Charging

Regulatory Reference	Capacity (forecasted for end of year 2026)	Approved Funding (2025) ⁶⁶	Cost Effectiveness (TRC)
Schedule 8 Residential Electric Vehicle Charging Pilot, funded via Transportation Electrification Plan (UM 2033)	Summer 3.3 MW Winter 3.5 MW	\$2,130,409 (Admin 53%, Incentives 47%)	N/A

PGE’s residential EV Smart Charging pilot offers qualifying residents of single-family homes a \$300 rebate towards the purchase and installation of qualified L2 at-home charger (\$1,000 income-qualified rebate) or a \$50 rebate for customers who enroll through a qualifying vehicle telematics provider. The pilot also offers a \$25 seasonal incentive (six-month season; Oct-Mar, Apr-Sep) for allowing PGE to pause EV charging during peak loads. In addition to the above, PGE’s Monthly Meter Charge funds panel upgrade rebates and trade ally network development.

4.3 Grants

The Smart Grid Advanced Load Management and Optimized Neighborhood (SALMON) is a regional collaboration with Energy Trust of Oregon, Community Energy Project, NEEA, and the National Renewable Energy Lab. The project was funded, in part, by a \$6.65M grant from the US DOE and seeks to demonstrate the value of distributed energy resources in grid operation. To accomplish this, the project aims to retrofit ~580 community buildings, with a mix of DERs, including efficiency measures, connected devices, distributed solar, energy storage, and smart charging, improving efficiency by an average of 10%, while building up to 1.4 MW of flexible load. The project is focused within the Overlook/Arbor Lodge area, a historically underserved community, and is being implemented within PGE’s Smart Grid Testbed Program portfolio.

The Flex Load resources developed through this project will be integrated into PGE’s Advanced Distribution Management System (ADMS)/Distributed Energy Resource Management System and optimized by the National Renewable Energy Lab (NREL) to demonstrate bulk services, including energy, capacity, and frequency response, as well as distribution services, including capacity relief, power quality, and Volt/Var optimization, including Conservation Voltage Reduction (CVR).

The results of this work will be shared regionally and could spur a realignment of utility planning and operation. In addition, the results could drive a market change for efficiency and load flexibility in the Pacific Northwest region by accounting for the full value of Distributed Energy Resources as an operational resource. This effort will also provide valuable insights into how utilities must plan for and

⁶⁶ Funding for Residential EV Charging pilot is provided through the Transportation Electrification Plan. We include a brief overview of the pilot here in the interest of presenting a holistic picture of Flex Load activity, to which the pilot contributes. Note also that since the funding cycles of the MYP and TEP differ, we only include 2025 pilot funding (2026 pilot funding has not yet been proposed). Further detail on the pilot can be found in PGE’s 2023 Transportation Electrification Plan (UM 2033).

integrate these assets; the co-benefits of efficiency and flexibility measure adoption; the challenges and solutions needed for contractors to participate in this new market; and how historically underserved communities can be effectively engaged in flexible load programs.

The project timeframe is June 2021–August 2027, with goals, objectives, and budgets approved on a roughly annual cadence. Learnings thus far include implementation of our ADMS at NREL's testbed facility; determining validity of community modeling and ability to estimate DER scenario impacts to the project area grid; testing program design elements and effectiveness of co-delivery strategy to drive customer participation.

4.4 Emerging Opportunities

PGE continuously assesses additional Flex Load opportunities. This section describes several opportunities under consideration and the factors which might inform a decision to pursue the activity.

4.4.1 Commercial Behavioral Demand Response

PGE continues to look for opportunities to increase both the percentage of C&I customers engaged in Flex Load programs as well as the MW of DR contributed. Some barriers to C&I enrollment which PGE has encountered thus far are the large variation of commercial system configurations, the complexity of the tenant-to-ownership relationships, and the ensuing difficulty establishing who can authorize device installation and/or changes required for dispatchable Flex Load integration.

One potential solution under consideration is a DR solution that does not require technology to participate. Under this concept, PGE would notify customers of an upcoming event and they would self-select their participation level and manually adjust HVAC and/or lighting level. PGE could pay for performance by measure participation by comparing interval data to baseline.

The target market under consideration would be small and medium non-residential customers who take service under Schedules 32, 83, and 85. PGE estimates a serviceable and addressable market size of 11,000.

A behavioral approach provides C&I customers who have control over their operations but not their building or building systems (e.g., a business in a multi-tenant space) a means to participate in demand response and decarbonization.

4.4.2 Standard Custom Commercial Offering

PGE has observed a growing number of distribution-sited resources which fall outside the bounds of current Flex Load programs, but which might be reached via a semi-custom engagement strategy. Examples include:

- Manufacturing facilities that have large thermal tanks and can effectively shift energy load, but are not good candidates for existing multi-hour programs given their time to dispatch and longer periods of load shift
- Campuses with central utility plants which could engage in prolonged and repeated thermal load shifting
- Real estate developments considering large, standalone battery systems as part of district-scale project

PGE could develop a consistent structure by which to value specific flexibility parameters such as the \$/kW paid for controls, the maximum paid per capacity avoidance, and the means by which energy reduction would be valued. While the structure of agreement could be established at a programmatic level, specific details such as dispatch limitations would be unique to each agreement.

Such an offering is best suited to large C&I customers, as well as developers and operators of assets offering flexibility at the distribution system level. As currently conceived, the offering could be applicable to both customers and property owners within PGE's service territory.

PGE will continue to monitor this emerging opportunity to assess the full market potential.

4.4.3 Single Family Water Heating

PGE will explore the development of a single-family water heater pilot based on results from NEEA's End Use Load Flexibility project. We will incorporate learnings from the Multifamily Water Heater Pilot, Smart Grid Testbed, and previous single-family water heater proposals. Pilot design is expected to begin in 2025, and a pilot proposal will be brought for review. As PGE identifies and assigns values to the grid services demonstrated from water heater we expect our assessment of cost effectiveness of water heater to demonstration a viable pathway for deployment. We will update Staff through the Demand Response Advisory Group.

4.4.4 Renter + Landlord Engagement

PGE understands that the split incentive between renter and landlord is a market issue which significantly hinders renters' participation in flexible load programs. Renters currently represent about 50% of residential customers in PGE's service area. PGE will be exploring requirements in 2025. Any offering must address customer data privacy, access, and use. Proposals to address the renter/landlord split incentive issue would be expected no earlier than Q1 2026.

4.4.5 Additional Means to Simplify and Expand Flex Load Participation

As PGE engages additional market segments, we will explore how to simplify Flex Load participation. PGE is evaluating whether a single, multi-faceted program might simplify customers' enrollment and participation experience. Additional research and an assessment of feasibility is required.

PGE will also explore alternatives to expand flex load participation such as gamification including points-based rewards/credits, as well as local "cooling partner" businesses during Flex Load events, other non-monetary rewards, or rewards outside of event participation.

Should PGE determine that these concepts are worthy of further exploration, we look forward to discussions with stakeholders in forums such as the DSP workshops and/or DRAG meetings in Q2 2025 or later.

4.5 Related Activity

4.5.1 Transportation Electrification

PGE's Transportation Electrification strategy is to plan, serve and manage EV load equitably.⁶⁷ PGE is currently conducting several pilots to manage EV charging. These pilots test PGE's ability to shift EV charging to off-peak time periods while still meeting customer's charging needs (e.g., timing of charge).

The Residential Smart Charging pilot (see [Section 4.2.7](#)) provides an upfront incentive to residential customers to shift EV charging via the customer's home Level 2 EV charger or via their vehicle through telematics.

PGE has also undertaken two TE demonstrations in the Smart Grid Testbed:

- An EV Charging Study (see [Appendix B.1](#)) to better understand how and when customers charge their vehicles and how PGE can collaborate with customers to optimize charging schedules with the needs of the distribution system.
- A Vehicle-to-Everything (V2X) demonstration (see [Appendix B.6](#)), which seeks to perform managed charging of electric vehicles using onboard telematics. It seeks to optimize vehicle charging around grid considerations and utilize the V2X capabilities to shift and reduce customer load during peak times and also provide advanced grid services during Peak Time Events. This demonstration runs from 2024 and early 2025. Past vehicle-to-grid (V2G) demonstrations of technical feasibility have shown the functionality is new and requires further technology advances in order to provide the services through a pilot. The learnings from the demonstrations will be utilized to determine the potential value of V2G and if a pilot would be beneficial to prove out the value further.

PGE is also testing the efficacy incentives for commercial EV fleet customers to shift their charging outside of on-peak time periods while still meeting their business needs. These tests will explore strategies such as time-of-use education, demand response, and optimized charge management. PGE understands that there won't be one-size-fits-all solution and expects to provide multiple future options to fleet customers due to the various fleet use cases of how vehicles are utilized to support their business needs.

PGE will also test the feasibility of shifting commercial managed charging to more grid-beneficial times for non-fleet use cases. PGE will investigate a commercial EV-specific time varying rates, workplace demand response, as well as continued research into how to manage and shift charging at multifamily sites.

PGE has determined to manage public charging through rate structures rather than programs. Many public charging sites will charge an off-peak and on-peak rate based on factors of electricity costs and charger availability. PGE owns seven fast charging sites and has started installing additional level 2 pole chargers in residential neighborhoods to support the TE transition for those customers without access to EV charging in their driveway or garage. PGE-owned chargers utilize Schedule 50 (see [Section 2.2.3](#)) to encourage customers to charge outside of peak timeframes. PGE will continue to assess commercial time varying rate schedules' effectiveness to incent non-PGE owned public charging to occur outside of peak timeframes.

⁶⁷ PGE (2023). *Transportation Electrification Plan*. Retrieved from <https://edocs.puc.state.or.us/efdocs/HAH/um2033hah15818.pdf>.