



Portland General Electric

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October 15, 2026

Via Electronic Filing

Public Utility Commission of Oregon
Attention: Filing Center
PO Box 1088
Salem, OR 97308-1088

Re: Docket No. UM 2141, Portland General Electric 2027-2028 Virtual Power Plant Multi-Year Plan

To the Commission:

Portland General Electric (PGE or the Company) submits its 2027–2028 Virtual Power Plant Multi-Year Plan (Plan) for the Public Utility Commission of Oregon (Commission or OPUC) review and budget approval of the funding and program actions requested in the Plan. PGE is filing both confidential and non-confidential versions of the Plan. The confidential version is submitted pursuant to the General Protective Order No. 23-132.

The Plan describes PGE’s strategy to operate and expand an integrated Virtual Power Plant portfolio of customer and distributed energy resources. It presents PGE’s proposed 2027–2028 Flexible Load activities, portfolio investments, performance measures, and funding requests.

Through this filing, PGE requests approval of \$35.3 million in deferred funding for applicable Flexible Load programs, Smart Battery, and VPP portfolio-support activities. PGE also proposes actions necessary to transition the Smart Battery and Time of Day pilots into ongoing programs, continue the Energy Partner Smart Thermostat pilot through 2028, expand Smart Battery participation to qualifying small nonresidential customers, and conclude the existing Multi-Family Water Heater Pilot.

PGE’s filing provides a transparent, holistic view of the broader VPP portfolio and associated costs that are addressed through other regulatory mechanisms. The Plan is intended to support continued customer value, affordability, reliability, and scalable VPP operations.

Please contact Shadia Duery at 503-467-8229 if you have questions or require further information.

Please direct all formal correspondence and requests to pge.opuc.filings@pgn.com.

Thank you,

/s/ *Jay Tinker*

Jay Tinker
Senior Manager, Rates and Regulatory Affairs

ATTACHMENT

Cc: UM 2141 Service List
Peter Kernan
Sarah Hall



Virtual Power Plant Multi-Year Plan

2027-2028



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A Message from the President and CEO

Meeting growing demand for electricity is not simply about building more infrastructure. It is also about deriving more value from the energy system we already have. That principle is at the heart of Portland General Electric's Virtual Power Plant (VPP).

PGE's VPP is built on a simple idea: customers should be able to realize additional value from the energy technologies they have already purchased to serve their homes and businesses. Through programs for smart thermostats, electric vehicles, battery storage, or rooftop solar, PGE offers a robust portfolio of voluntary opportunities for customers to access and be compensated for the flexibility those resources provide to the grid.in

PGE customers have responded to these offerings with nation-leading enthusiasm. While the contribution of any individual device may be small, these resources can be aggregated into a significant and reliable source of capacity. Coordinated together, they help manage peak demand, support grid reliability, defer or extend infrastructure investments, and provide critical system support during extreme weather events and transmission constraints.

As Oregon's electricity needs continue to grow, PGE is pursuing an "All resources, wherever they are found" strategy that values both traditional utility investments and customer-owned resources. Long before virtual power plants became a common industry focus, PGE recognized the potential of behind-the-meter technologies to deliver benefits to participating customers and the grid.

Through investments in customer programs as well as technologies enabling visibility, interconnection and real-time management, PGE has developed one of the country's most advanced portfolios of distributed energy resources. Today, those resources provide a valuable and cost-effective tool for addressing a range of energy challenges, especially balancing increasing variable wind and solar generation.

Today, PGE coordinates approximately 600 MW of distributed capacity across a quarter of our customer base. This VPP Multi-Year Plan continues to expand customer participation while improving the transparency of available flexibility, including location, performance, and effectiveness. PGE is working to make participation easier, improve coordination across programs, and promote continued adherence to regional and national reliability standards.

As our industrial customer base grows, we are working with a number of large customers, especially data centers, on significant levels of dispatchable standby generation and flexible energy use programs, ensuring that these customers are contributing to grid reliability and stability.

By 2030, our goal is that customer and distributed resources contribute 25% of our capacity needs. We are well on our way and quickly accelerating. On behalf of everyone at PGE, thank you to our customers, communities, and partners.

Maria Pope, President and Chief Executive Officer
Portland General Electric

Acronyms

Acronym	Meaning	Acronym	Meaning
ADMS	Advanced Distribution Management System	EDAM	Extended Day-Ahead Market
AIC	Aid in Construction	ELCC	Effective Load-Carrying Capacity
AMI	Advanced Metering Infrastructure	EMS	Energy Management System
AutoDR	Automated Demand Response	EPOD	Energy Partner on Demand
BCR	Benefit-Cost Ratio	ETO	Energy Trust of Oregon
BYOT	Bring Your Own Thermostat	EULF	End-Use Load Flexibility
C&I	Commercial and Industrial	EV	Electric Vehicle
CAISO	California Independent System Operator	EVSE	Electric Vehicle Supply Equipment
CAPEX	Capital Expenditures	GRC	General Rate Case
CBRE	Community-Based Renewable Energy	GW	Gigawatt
CEP	Clean Energy Plan	HB	House Bill
CIS	Customer Information System	HVAC	Heating, Ventilation, and Air Conditioning
CSPM	California Standard Practice Manual	IJJA	Infrastructure Investment and Jobs Act
DER	Distributed Energy Resource	IRA	Inflation Reduction Act
DERMS	Distributed Energy Resource Management System	IRP	Integrated Resource Plan
DR	Demand Response	ITC	Investment Tax Credit
DRAG	Demand Response Advisory Group	kW	Kilowatt
DRMS	Demand Response Management System	kWh	Kilowatt-hour
DSP	Distribution System Plan	LFA	Load Forecast Adjustment
DSG	Dispatchable Standby Generation	MFWH	Multi-Family Water Heater

Acronym	Meaning	Acronym	Meaning
MMC	Monthly Meter Charge	PSPS	Public Safety Power Shutoff
MW	Megawatt	PTC	Production Tax Credit
MWh	Megawatt-hour	PTR	Peak Time Rebates
MYP	Multi-Year Plan	PV	Photovoltaic
NEEA	Northwest Energy Efficiency Alliance	RA	Resource Adequacy
NPV	Net Present Value	RIM	Rate Impact Measure Test
NWS	Non-Wires Solution	ROWE	Regional Organization for Western Energy
O&M	Operations and Maintenance	RSE	Resource Sufficiency Evaluation
ODOE	Oregon Department of Energy	RTF	Regional Technical Forum
OEM	Original Equipment Manufacturer	SEM	Strategic Energy Management
OPUC	Oregon Public Utility Commission	SGTB	Smart Grid Test Bed
PAC	Program Administrator Cost Test	V2G	Vehicle-to-Grid
PCEF	Portland Clean Energy Community Benefits Fund	V2X	Vehicle-to-Everything
PCT	Participant Cost Test	VPP	Virtual Power Plant
PGE	Portland General Electric	WEIM	Western Energy Imbalance Market
PLM	Product Lifecycle Management		

Reader's Guide: Important Terms

PGE's Virtual Power Plant Multi-Year plan brings together customer programs, distributed resources, technology platforms, grid operations, planning, and regulatory mechanisms that have historically been discussed separately. This Plan describes those activities as an increasingly integrated portfolio. The terms below provide context for several distinctions that are important to understanding the Plan.

Virtual Power Plant

PGE defines its Virtual Power Plant (VPP) as the orchestration of distributed energy resources through integrated customer and grid technology platforms to provide energy, capacity, and grid services.

The VPP is not one program, technology, or software platform. It is the capability to understand and coordinate the deployment of distributed resources based on customer participation, resource capabilities, and system needs.

Flexible Load and the Broader VPP

Flexible Load is a key component of PGE's broader VPP portfolio: customer electricity use that can be reduced, shifted, or shaped through resources such as smart thermostats, behavioral demand response, managed EV charging, time-varying rates, and commercial and industrial flexibility.

Within PGE's 600 MW portfolio of VPP resources, this MYP forecasts the Flexible Load portfolio to reach 140.4 MW summer and 74.4 MW winter by the end of 2028.

Orchestration

Orchestration is what allows individual distributed resources to operate as a portfolio. Resources have different customer requirements as well as locational, response time, durational, availability, and operating constraints. However, a well-integrated VPP portfolio does not require every resource to behave the same way. PGE's objective is to continue to improve our understanding of those characteristics and how to effectively coordinate the resource or combination of resources appropriate to the system need.

Capacity and Capability

MW can be used to describe different views of a VPP resource. Enrolled capacity is the number of MW available from participating resources; forecasted capacity is what PGE reasonably expects to respond ahead of the event, while delivered capacity is the number of MW actually provided.

As its VPP matures, PGE is increasingly focused on **dependable** capability: the amount of available flexibility PGE can reasonably plan around to meet a service requirement.

Dispatchability may take different forms depending on the resource, including automated device control, aggregator coordination, customer response to a dispatch instruction, or behavioral participation.

Customer and Grid capabilities

Operating the VPP requires both Customer and Grid capabilities. Customer capabilities include eligibility, enrollment, consent, communications, billing, compensation, and participant experience. Grid capabilities include resource visibility, forecasting, location, grouping, dispatch, telemetry, performance measurement, and integration with system conditions. Continually improving its ability to integrate these capabilities allows PGE to operate a larger and more diverse portfolio while preserving applicable customer and program requirements.

Energy, capacity, and grid services

Different VPP resources deliver different forms of value to PGE's customers and grid. Energy services change when electricity is consumed or delivered. Capacity services help PGE meet peak demand and other system resource needs. Grid services can include contingency and frequency response, localized distribution support, and other operating needs.

Not every resource can or should provide every service. Continual maturation of its VPP portfolio allows PGE to evaluate resources based on the capabilities they can reliably provide rather than assuming that all VPP resources are interchangeable.

Local flexibility and non-wires solutions

Local flexibility uses customer or distributed resources to address a need at a specific location on the electric system.

A Non-Wires Solution (NWS) evaluates whether flexible load, distributed resources, or other nontraditional approaches can reliably and cost-effectively address an identified distribution system need as an alternative or complement to traditional infrastructure investment. Note that the presence of participating customers in an area does not create an NWS by default; location, availability, duration, performance, persistence, and cost all matter.

Executive Summary

PGE's VPP is an operating portfolio of customer and distributed resources that provides significant value to customers and the electric system today. PGE currently coordinates approximately 600 MW of distributed capacity across more than 250,000 enrolled customers, reflecting nation-leading participation in customer flexibility programs. PGE's VPP portfolio currently includes Flexible Load, customer-sited solar and storage, managed transportation load, and Dispatchable Standby Generation resources.

PGE forecasts its VPP portfolio to grow by nearly 50%, to 958 MW, by the end of 2028. That forecasted total includes approximately

- 140 MW of Flexible Load
- 408 MW of Solar and Storage
- 410 MW of Dispatchable Standby Generation and related large-load flexibility.

These resources provide different types of capability, rather than interchangeable MW; together, they demonstrate the increasing scale and diversity of customer and distributed resources available to PGE. During periods of system need, PGE can already coordinate customer flexibility at a scale comparable to the electric demand of a city the size of Gresham.

This 2027-28 MYP represents the next stage in PGE's transition from operating successful individual programs and distributed resources to a more integrated and dependable VPP portfolio. PGE's strategy is organized around three interconnected pillars: Customer Value, Affordability, and Reliable & Scalable. During the 2027-28 biennium, PGE will continue growing resources that demonstrate value while:

- Making participation easier for customers
- Improving resource availability and dispatchability
- Strengthening forecasting and performance measurement
- Reducing operating fragmentation
- Increasing coordination among Customer, Grid Operations, and Power Operations systems.

PGE is also recommending a number of program-lifecycle decisions. PGE proposes to transition Smart Battery and Time of Day from pilots to programs, expand Smart Battery participation to eligible small nonresidential batteries, continue the Energy Partner Smart Thermostat pilot while testing additional delivery approaches, and conclude the existing Multi-Family Water Heater pilot. PGE's 2027-28 VPP strategy will also advance Non-Wires Solution, Vehicle-to-Grid, large-load, agricultural, irrigation, cold-storage, and other emerging flexibility work.

These decisions reflect a disciplined approach to innovation: scale what works, integrate useful capabilities and learnings, continue targeted testing where uncertainty remains, and conclude activities that do not demonstrate a viable path to customer and system value.

The VPP provides PGE with another resource option for meeting rapidly-evolving customer and system needs. Participating customers receive value for the flexibility they choose to provide, while all customers benefit when VPP resources reduce exposure to higher-cost energy periods,

support reliability, improve utilization of existing infrastructure, or help address local grid needs. The VPP complements and in some case reduces, but does not replace, PGE generation, transmission, and distribution investments necessary to serve growing customer demand.

This MYP provides a holistic view of PGE's 2027-28 VPP portfolio costs, including both funding requested for approval through this filing and costs addressed through other regulatory mechanisms. The holistic portfolio cost is \$63.3 million, of which \$35.3 million is requested through this MYP; \$28 million is addressed through other regulatory mechanisms. The \$35.3 million is a modest increase from the 2025-2026 funding request of \$34.3 million - the increase supports the inclusion of the Smart Battery program along with the growth of customer programs. The growth of programs supports a cost-effective portfolio with benefits provided are higher than costs: forward-looking Total Resource Cost benefit-cost analysis of 2.25 and a Rate Impact Measure of 1.64.

PGE's operating experience demonstrates how the VPP is becoming a more capable system resource. In 2023, customer demand response helped manage a transmission contingency, and in 2025 PGE demonstrated that targeted VPP resources could also support a localized distribution need. During the July 21, 2026 heat event, PGE took another step forward, coordinating seven VPP resources in staggered waves across five hours and reducing system demand by more than 128 MW at the strongest point of the event. Rather than dispatching every resource simultaneously, PGE sequenced resources according to their operating characteristics and the shape of the system need.

These experiences illustrate the next stage of VPP maturity. Enrollment and MW remain important measures of scale, but they do not fully describe the VPP's characteristics as an operating resource. During the 2027-28 biennium, PGE will increasingly focus on the amount of **dependable** capability it can reasonably forecast, coordinate, dispatch, measure, and put to work for customers and the grid.

PGE's 2026 Clean Energy Plan and Integrated Resource Plan (CEP/IRP) identifies continued VPP growth as a foundational element of PGE's resource strategy and directs PGE to pursue all available cost-effective flexible load and dispatchable distributed resources. This MYP provides the near-term implementation roadmap for that direction through customer programs, operating improvements, technology investments, and program-lifecycle decisions.

PGE's long-term aspiration is for customer and distributed resources to be capable of contributing capacity equivalent to approximately 25% of peak system needs by 2030. The precise composition of that portfolio will continue to evolve with customer adoption, economics, technology, performance, system needs, and regulatory outcomes.

The purpose of this MYP is to take the next practical step toward that future: grow resources that provide demonstrated value, improve the dependability of the portfolio, make disciplined decisions about programs and pilots, and build the operating capabilities necessary to coordinate customer and distributed resources at increasing scale.

Chapter 1 The Virtual Power Plant is an Operating Resource

1.1 PGE's VPP Today

Portland General Electric operates a Virtual Power Plant that provides customer and system value and can meet up to 13% of peak needs today. It is a grid-integrated resource that PGE dispatches into daily operations, and it has been part of how PGE serves customers for years.

PGE orchestrates the VPP with approximately 600 megawatts of capacity from more than 250,000 participating customers, roughly 25% of PGE's customer base. That participation rate is about four times the national average for residential demand response programs. On the highest-demand days of the year, the VPP delivers peak reduction equivalent to the electricity demand of approximately 120,000 homes.

The Virtual Power Plant is not a single program. It is a utility operating capability that allows PGE to coordinate customer and distributed resources alongside traditional infrastructure to provide energy, capacity, and grid services. It includes:

- **Flexible Load:** Smart thermostats, behavioral demand response, managed electric vehicle charging, time-varying rates, and commercial and industrial flexibility
- **Customer-Sited Solar and Storage:** Net metering service, residential and small commercial batteries, community-based renewable energy
- **Dispatchable Standby Generation:** Customer-sited generation PGE calls for resource adequacy, together with large-load flexibility PGE controls through the Integrated Operations Center (IOC).

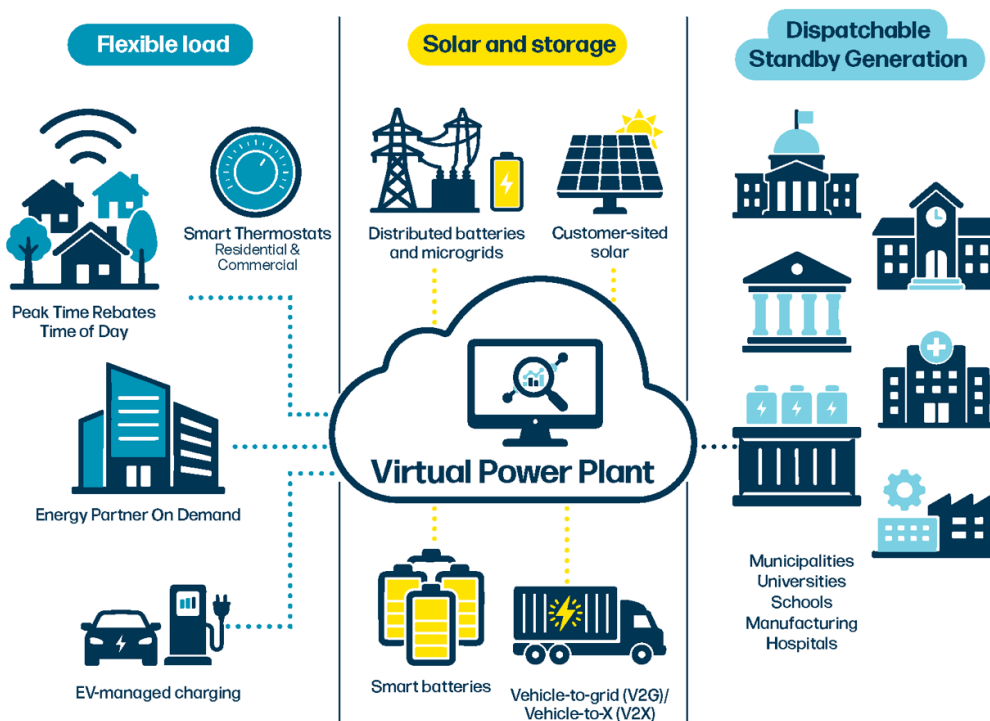


Figure 1. VPP Portfolio Overview

These resources provide diversified capabilities with respect to response time, duration, location, and availability, and are dispatched in coordination with system needs. PGE's VPP grew from approximately 2,300 Flexible Load customers in 2015 to more than 250,000 participating customers in 2025, a hundredfold increase over a decade.

PGE is forecasting that its **VPP portfolio will grow to over 950 MW by the end of 2028** – a total that includes approximately 140 MW of Flexible Load, 408 MW of Solar and Storage, and 410 MW of Dispatchable Standby Generation and related large-load flexibility. PGE's VPP strategy calls for customer and distributed resources to contribute approximately 25% of peak system needs¹ by 2030, driven by investments in customer outreach and adoption, control technologies, as well as evolving system economic and performance requirements.

[Table 1](#) and [Table 2](#) summarize PGE's forecasted VPP portfolio capacity by major resource category for the summer and winter seasons. Program-level capacity forecasts and performance measures are provided in the [Metrics and Reporting](#) section of this Plan.

Table 1. VPP Portfolio Summer MW Growth, 2025-28²

VPP Portfolio	2025 Actuals	2026 Forecast	2027 Proposed	2028 Proposed
Flexible Load	117.3	124.5	132.2	140.4
Solar and Storage	317.4	348.4	394.3	407.6
Dispatchable Standby Generation	130.0	146.3	181.1	410.0
Total VPP Portfolio	564.6	617.2	707.6	957.9

Note that VPP resource capability varies by season; Flexible Load resources may provide different summer and winter capacities based on customer equipment, end use, operating conditions, and program design. [Table 2](#) provides an overview of PGE's forecasted winter portfolio MW growth through 2028.

Table 2. VPP Portfolio Winter MW Growth, 2025-28³

VPP Portfolio	2025 Actuals	2026 Projected	2027 Proposed	2028 Proposed
Flexible Load	62.8	66.9	70.8	74.4

¹ 4,498 MW historic peak load, August 2023

² Portfolio MW values reflect the applicable capacity or planning measure for each resource category. See Reader's Guide: Capacity and Capability.

³ Portfolio MW values reflect the applicable capacity or planning measure for each resource category. See Reader's Guide: Capacity and Capability.

VPP Portfolio	2025 Actuals	2026 Projected	2027 Proposed	2028 Proposed
Solar and Storage	317.4	348.4	394.3	407.6
Dispatchable Standby Generation	130.0	146.3	181.1	410.0
Total VPP Portfolio	510.1	561.6	646.2	892.0

PGE's projected rate of growth is based on in-house assessments of the market potential of programs, Integrated Resource Plan strategic direction, and the integration of new technologies to support growth.

PGE evaluates potential VPP investments from both the portfolio cost and customer value perspectives. The 2027–28 VPP portfolio model evaluates the total cost of PGE's VPP (\$63.3 million over two years), against the resulting benefits, estimated at 1.64 to 2.25 times the portfolio cost. This plan distinguishes between the holistic costs of the VPP evaluated in this Plan and the subset of funding for which PGE seeks Commission approval through this MYP (\$35.3 million) – a modest increase from the OPUC-approved funding level in the 2025-26 Flexible Load MYP. PGE funds the remaining \$28 million via other regulatory mechanisms. PGE's current forward-looking analysis estimates a portfolio TRC of 2.25 and RIM of 1.64; refer to [Chapter 4](#) for detailed information regarding portfolio budget, cost-effectiveness results, and funding and cost recovery pathways.

This 2027-28 MYP advances PGE's maturation from individual demand response and distributed energy resource programs to a well-integrated VPP serving customer, grid, and market needs.

1.2 Virtual Power Plant Strategy

PGE's VPP strategy is built on three interconnected pillars – Customer Value, Affordability, and Reliable and Scalable – that inform every PGE investment, program, and lifecycle assessment decision.

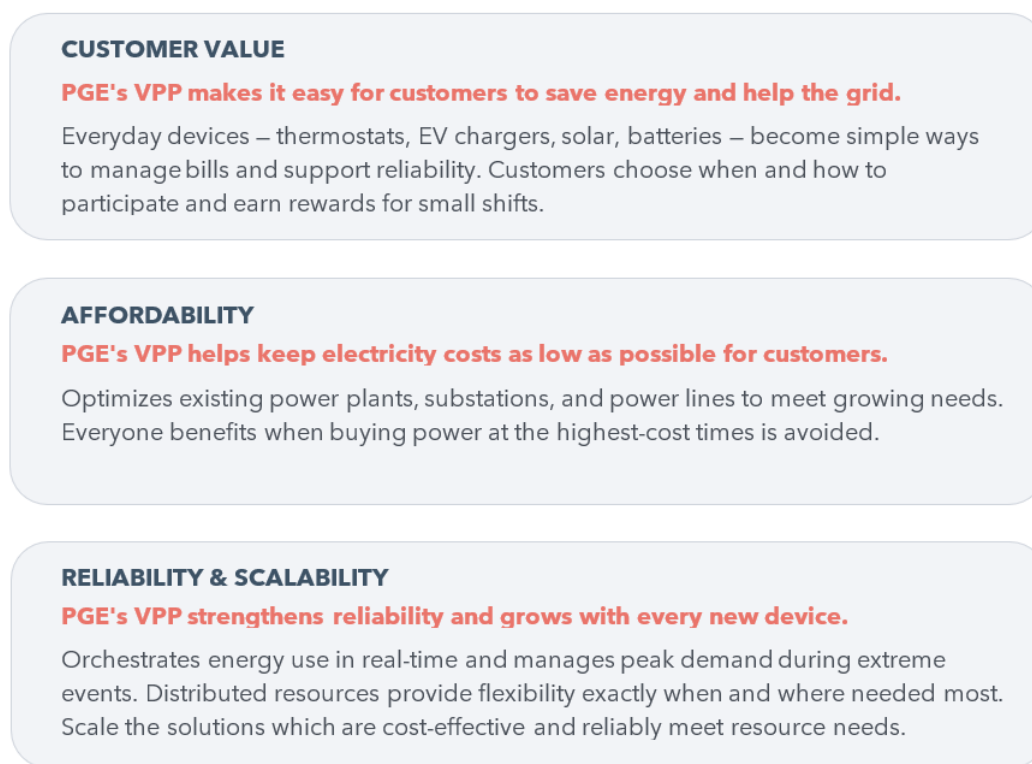


Figure 2. Strategic Principles of PGE's VPP Program

1.2.1 CUSTOMER VALUE

Customers power the VPP through technology they have already purchased for their own reasons: thermostats purchased to enhance comfort and efficiency, battery backup systems, chargers purchased to power vehicles. Participation is voluntary and customers are compensated for their participation through direct financial incentives, bill savings, greater control over their energy use, resilience benefits, and/or other forms of compensation based on how they choose to participate.

PGE's VPP provides quantifiable benefits to both direct participants and PGE ratepayers overall. When VPP resources shift demand away from a high-cost period, support reliability, provide contingency capability, or help address a local grid constraint, the resulting system value benefits all PGE customers. For this reason, PGE evaluates VPP resources from both the program participant and the broader system perspectives. Customer compensation and program costs fall well within the parameters that provide value relative to available alternatives.

To maximize enrollment, participation in PGE's VPP portfolio must be as simple and streamlined as possible. During the 2027-28 planning period, PGE will continue simplifying enrollment through the technology roadmap, modernizing incentive structures, and improving the customer experience across the portfolio. The objective is to preserve customer choice while making it easier for customers to discover, enroll in, and participate in the programs that best match their needs.

1.2.2 AFFORDABILITY

PGE invests in generation, transmission, and distribution infrastructure on behalf of its customers. Maximizing the value and utilization of those assets helps reduce the need for additional infrastructure as electricity demand grows. In PGE's VPP strategy, this principle is known as **unlock before build**.

"Unlock before build" means that distributed resources are used to complement traditional infrastructure. PGE's current strategic approach calls for continued investments in generation, transmission, and distribution facilities to serve our growing customer base, but whenever possible, PGE will explore enhanced utilization of existing utility and customer resources before pursuing additional infrastructure. As localized system needs emerge, PGE seeks to unlock customer flexibility to defer, reduce, or complement traditional investments while maintaining reliability.

Where distribution planning identifies a localized need, PGE's Non-Wires Solutions program can help evaluate whether existing and incremental customer flexibility can address some or all of that need in combination with traditional infrastructure alternatives. [Section 3.8.2.1 \(Non-Wires Solution Strategy\)](#) provides additional detail regarding PGE's 2027-28 local flexibility strategy. Ongoing stakeholder engagement through Distribution System Plan workshops provides additional context regarding PGE's initial NWS demonstration and framework development.

1.2.3 RELIABLE AND SCALABLE

As an operating resource, the VPP provides dependable capability, meaning flexibility that Grid Operations and Power Operations can plan on and deploy with confidence. PGE manages enrolled capacity, forecasted response, and actual performance to verify that the VPP portfolio reliably delivers the expected capability.

The VPP serves a meaningful role in meeting customer needs and is scalable as those needs evolve. PGE's portfolio approach helps the VPP grow organically as customers adopt new technologies such as smart thermostats, batteries, electric vehicles, and other connected devices. Each participating technology expands the available resource while diversifying performance across customer segments and use cases.

In the 2025-2026 Flexible Load Multi-Year Plan, PGE transitioned two pilots to programs after proving their ability to scale cost-effectively: Smart Thermostats and Peak Time Rebates. During the 2027-2028 biennium, PGE proposes to transition two additional pilots to programs based on their demonstrated customer and system value and path to scalable operation: Time of Day and Smart Battery. These programs will allow customers to more confidently invest in technology and lifestyles that provide grid services benefitting all customers. PGE is currently demonstrating multiple technologies to determine whether they can scale cost-effectively.

During the 2027-2028 planning period, PGE will continue strengthening the operational foundations required to support dependable capability at increasing scale, including improvements in visibility, forecasting, dispatchability, measurement, and coordination across customer, grid, and market systems.

By combining operational discipline with broad customer participation, PGE has made its VPP a resource that can be integrated into system planning, dispatched repeatedly, and expanded over time to deliver additional value to customers and the grid.

1.3 Operating a High-Performance Virtual Power Plant

PGE dispatches VPP resources more than 500 times annually in support of energy shifting, locational support, and reliability-driven operations, including contingency and frequency response protocols. Dispatch of the VPP is now a routine part of PGE's operational protocols, with most events occurring seamlessly in the background to support a positive customer experience.

Operating a VPP effectively requires more than the ability to dispatch individual devices. It requires PGE to coordinate a diverse portfolio of resources with different locations, response times, durations, customer requirements, and operating constraints. On any given day, PGE determines which resources, or combination of resources, are best suited to the system condition at hand. Distinguishing between what a resource could theoretically provide and what it will reliably provide on a given afternoon is the core operating discipline of a VPP.

The July 2026 heat event illustrates what this discipline looks like in practice. During the event, PGE coordinated seven VPP resources in staggered waves across five hours, reducing system demand by more than 128 MW at the peak of the event. PGE did not dispatch every available resource simultaneously. Instead, resources were sequenced according to their operating characteristics, and the shape of the system need, holding some resources in reserve for the hours when need would be greatest and calling on others earlier when their duration was best matched to the load profile. Sequencing dispatch of the portfolio is what turns distributed devices into operating resources. [Figure 3](#) provides a visual representation of PGE's July 2026 sequenced dispatch of VPP resources.

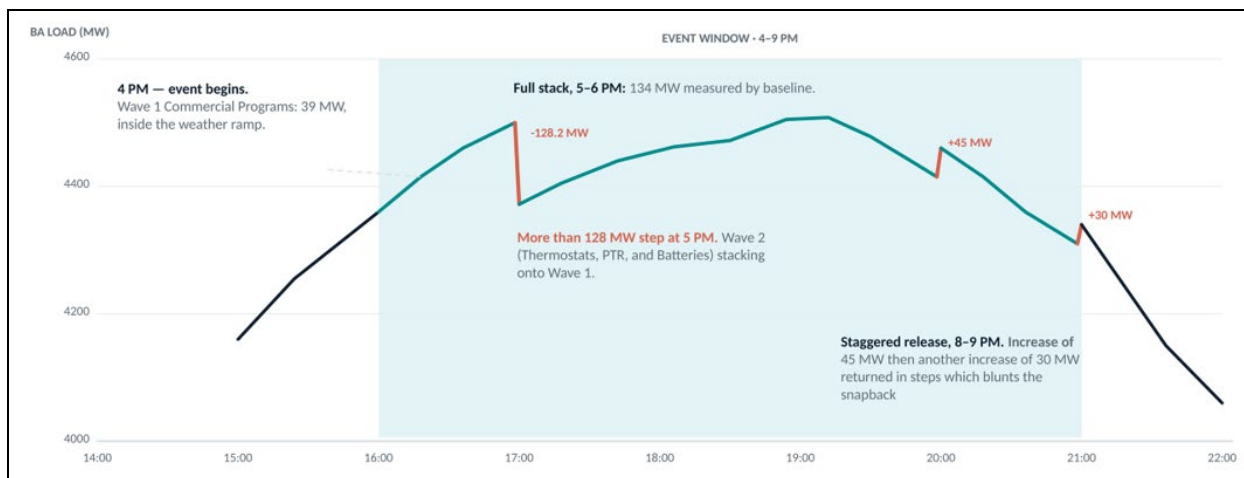


Figure 3. Sequenced VPP Dispatch July 2026 Example

PGE operates the VPP through two integrated technology layers:

- The **Customer Platform** manages eligibility, enrollment, consent, communications, billing, compensation, and participant experience.

- The **Grid Platform** manages resource visibility, forecasting, location, grouping, dispatch, telemetry, performance measurement, and integrates these factors with current system conditions.

Together, these platforms allow PGE to deploy customer flexibility as a coordinated operating resource rather than a collection of individual programs.

PGE has contracted with Kraken Tech to modernize PGE's Customer and DERMS platforms, replacing legacy customer and flexibility systems with a platform built to deliver the enrollment volumes, device diversity, and dispatch frequency required for a portfolio at this scale⁴. PGE is integrating this platform with its Advanced Distribution Management System and using artificial intelligence to improve operating outcomes, forecasting, and verification. The platform also enables PGE to manage a growing portfolio of customers, devices, programs, and distributed resources through a common operating framework, supporting continued expansion of its VPP portfolio. Refer to [Section 3.1, 2027-28 VPP Operations and Technology Direction](#), for additional details.

Additional VPP-related strategic insights include:

- **Forecasting is an increasingly important capability.** PGE uses AdopDER, a bottom-up distributed energy resource adoption and load forecasting model, to better understand customer technology adoption and available flexibility across the system. The model reduces reliance on third-party forecasts and informs load forecasting, resource planning, and distribution planning decisions.
- **PGE is investing in process automation to support continued portfolio growth.** PGE currently receives more than 6,000 applications for customer-sited solar each year. To support this growth, PGE's Net Metering Assessment capability automates system verification and transformer loading analysis for residential applications, which comprise approximately 90% of weekly application volume. PGE is developing additional automation enhancements to enable same-day application approvals and same-day inspection request documentation validation. This accelerates customer solar interconnection while supporting continued growth in the solar and storage resources participating in PGE's VPP.
- **PGE measures what the portfolio delivers.** PGE verifies performance using interval meter data, device telemetry, generator output, battery data, statistical baselines, and other validated measurement approaches. Independent third-party evaluations validate resource performance and inform program design, forecasting, and planning. PGE serves as the portfolio orchestrator and remains accountable for VPP performance.

The results demonstrate that customer flexibility can be amalgamated into a dependable operating resource. PGE exceeded both of its 2025 Flexible Load commitments, achieving 101% of its summer target and 103% of its winter target, and is on track to achieve 2026 targets of 125 MW summer and 68 MW winter capacity. The portfolio has also demonstrated capability across multiple classes of system need. In addition to daily dispatch and the July 2026 heat event

⁴ Further described in the [Integrated VPP Operations and Technology Roadmap](#) in [Chapter 3](#).

described above, PGE has used its VPP to support management of transmission contingencies and localized distribution needs.

The significance of these results extends beyond individual events. They demonstrate that customer flexibility can be forecast, measured, dispatched, and relied upon as a routine component of grid operations. As PGE addresses large load growth, regional market integration, and evolving customer technologies, this capability becomes increasingly important.

1.4 PGE's VPP Eases Significant Customer Challenges

Much of PGE's current load growth is concentrated in large facilities and is arriving faster than traditional infrastructure can be built to accommodate it. This reality is reshaping PGE's approach to system planning and increasing pressure to meet accelerating customer demand by identifying and integrating operational flexibility. It is no longer enough to ask how much capacity customers will need – PGE planners are also taking into account when the load will occur, where, how quickly it will develop, and what portion of it can be made flexible.

The purpose of this MYP is to guide the growth of individual programs, while also integrating flexibility assessments into PGE's electric system planning and operational processes. As customer technologies, market structures, and system needs evolve, PGE will continue to expand the role of flexibility across large-load service, regional market participation, transportation electrification, non-wires solutions, vehicle-to-grid applications, irrigation, commercial and industrial operations, and other emerging use cases.

1.5 Large Loads and Flexibility

As large loads, industrial facilities, and commercial charging depots connect to PGE's system at an accelerating pace, the scale and concentration of those loads create significant new energy and grid requirements as well as additional opportunities for these resources to provide operational flexibility. PGE evaluates customer flexibility to develop a detailed understanding of how significant new load will interact with the system:

- What portion must be continuously served?
- What portion may be shifted or reduced?
- How can that flexibility be reliably provided?
- What are the potential benefits to PGE customers as well as other grid participants?
- How will costs be allocated?

This work is occurring within a new regulatory framework. Oregon's POWER Act (House Bill 3546, 2025) directed the OPUC to establish a classification of service for large energy use facilities capable of using 20 MW or more. Through OPUC Orders and General Rate Case Proceedings,

PGE has established a pathway for large-load customers to enter a defined service queue and fund the studies PGE needs to evaluate the system improvements required to serve them.⁵

PGE has already begun to integrate flexibility into service agreements. PGE has contracted for approximately 430 MW of incremental large load through 2030; this total includes a variety of flexible resources, including [BEGIN CONFIDENTIAL] [REDACTED]

[REDACTED] [END CONFIDENTIAL]. These contracts conform to the Power Act and UM2377 and [BEGIN CONFIDENTIAL] [REDACTED]

[BEGIN CONFIDENTIAL]

The same technology PGE uses to monitor and control Dispatchable Standby Generation is used to integrate large-load flexibility, increasing dispatch reliability for large-load flexibility orchestrated by PGE through existing programs, customer agreements, and operating requirements.

1.6 Regional Markets

PGE joined the California Independent System Operator's Extended Day-Ahead Market (EDAM) on October 1, 2026. EDAM expands regional coordination into the day-ahead timeframe, when utilities commit resources and make decisions about how customer demand will be served the following day. Participation in EDAM allows PGE to optimize generation, transmission, storage, and demand-side flexibility across a broader regional footprint while improving reliability and reducing overall system costs.

EDAM increases the value of VPP flexibility, as well as the precision with which PGE must forecast it. In a day-ahead market, customer flexibility becomes a planned and committed resource that must meet defined performance requirements consistent with schedules and commitments made the day before. This increases the importance of effective forecasting, measurement, dispatch integration, and performance management.

For PGE's VPP, EDAM represents an important evolution from event-based dispatch toward market-integrated operations. The more accurately PGE can forecast, measure, and manage customer flexibility, the greater the opportunity to capture value for customers through participation in regional markets. This is a principal reason PGE is emphasizing dependable, forecastable capability and investing in the operational capabilities required to turn customer flexibility into a reliable grid and market resource.

1.7 Grid-Enhancing Technologies

PGE's "Unlock before build" approach to system infrastructure and customer resources has fast-tracked PGE's adoption of grid-enhancing technologies (GETS) such as dynamic line rating, advanced conductors and conductor coating, as well as the integration of these capabilities into

PGE's Energy Management System for use in planning and executing day-to-day operations. To date, PGE has installed 106 dynamic line rating sensors across 13 transmission lines to allow us to identify and incorporate real-time weather variables such as wind cooling and unlock additional flexible transmission capacity during favorable weather conditions.

PGE is increasing the incorporation of advanced conductors into existing and planned transmission rebuild projects to augment the baseline capacity of its existing transmission assets. PGE is also incorporating specialized coatings to improve transmission line energy transfer properties. In addition to GETS, PGE uses predictive congestion forecasting at both the flow-gate and conductor level to identify potential congestion due to regional interconnection flows. Through AI-driven modeling of existing system capacity, PGE identified more than 80 MW of usable headroom in 2026⁶. PGE has also pursued advanced conductor demonstrations to increase ampacity without physical infrastructure upgrades.

Because dynamic line rating, advanced conductors, and conductor coating are grid-enhancing and grid-adjacent technologies, rather than distributed energy resources, PGE addresses them through its transmission and distribution planning processes rather than in this MYP. They are referenced here because they share PGE's VPP planning philosophy: maximize the value of existing assets before investing in new ones.

Grid-enhancing technologies and the VPP are complementary tools used to inform PGE's strategic approach to Transmission operations and planning.. One unlocks flexibility from the grid, while the other unlocks flexibility from customer resources. Used in tandem, they:

- Expand available system capability
- Improve asset utilization
- Support load growth affordability by extracting additional value from investments PGE customers have already made.

By simplifying participation, strengthening dependable capability, and integrating flexibility more deeply into system planning and operations, PGE will continue expanding the value that distributed resources provide to customers, the grid, and the communities we serve.

1.8 VPP Value Aligns With Benefits Provided

PGE's Virtual Power Plant is no longer an experimental concept. It is a routine part of how PGE operates the electric system today and an increasingly important tool for serving customers in a period of dynamic growth and change.

In the course of maturing its VPP portfolio, PGE has learned that some forms of flexibility are more valuable than others. For example, a resource that is available for deployment at any time is more valuable than a resource owned by a customer who only occasionally responds to a behavioral prompt. An automated resource has different operating characteristics than a manually controlled load reduction measure. Duration, response time, availability and other

⁶ GridCare announcement, October 8, 2025: [Portland General Electric and GridCARE Accelerate Hundreds of Megawatts of Data Center Power in Leading U.S. Market](#)

performance parameters, and resource location can all impact the operational value of individual VPP resources.

PGE's operating experience demonstrates how the role of customer flexibility has expanded over time. During an extreme heat event in August 2023, PGE used demand response to help manage a transmission contingency. Participating customers reduced system load by approximately 96 MW, reducing the overload and mitigating the need for additional actions, including potential load shed.

PGE demonstrated a more localized VPP use case in 2025. During a September heat event, distribution engineers identified elevated loading on the Harrison WR1 transformer and requested a targeted dispatch of VPP resources in the affected area.

The dispatch reduced transformer loading below the 80% threshold identified by Distribution system planning. This precisely-targeted response improved power quality, reduced stress on the transformer, extended the service life of the asset, and supported reliability for more than 4,500 customers served by the transformer. This event demonstrated that the same VPP portfolio used for system peak management can also provide targeted local grid value.

The July 2026 event example listed in [Section 1.3](#) shows VPP operating as a portfolio in today's world. At the peak of the event, PGE used its VPP portfolio to reduce system demand by more than 128 MW. Just as importantly, PGE did not simply call on every program simultaneously; the VPP portfolio was sequenced by design, with resources entering and exiting according to their operating characteristics and the system load curve, including a staggered return to avoid creating a secondary evening peak.

Chapter 2 Why the VPP Matters

PGE customer demand is growing and changing shape, more energy resources are being installed behind the meter at customer locations, and regional markets are changing how utilities plan and operate their systems. At the same time, affordability and reliability remain crucial customer priorities.

2.1 The Energy System Is Changing

PGE is planning for an electric system that is changing on both sides of the customer meter. Customer demand is increasing as customers electrify transportation, buildings, and other end uses, peak needs are becoming more pronounced, and the market, policy, and infrastructure environment continues to evolve. PGE's 2026 Clean Energy Plan/Integrated Resource Plan (CEP/IRP) reflects significant changes in expected load, customer-sited solar development, regulatory landscape, and the resources PGE is using to evaluate a range of futures.

Large-load growth may require additional generation and grid investment, but can also create opportunities to design flexibility into new load as it connects. The 2026 CEP/IRP recognizes both the scale of emerging large-load demand and the opportunity for flexible-load and VPP integration as part of PGE's planning for that growth.

Flexible large loads, often paired with on-site generation, can be an important resource to manage reliability and improve the cost-effective utilization of the power system. Expected load growth provides a significant opportunity for PGE planners to assess not only how much capacity or electricity customers will need, but also when and where the load will occur, how quickly it will develop, and what portion of the load can reliably be shifted, reduced, or otherwise managed. PGE planners are now routinely assessing VPP resources alongside traditional generation options; the question is no longer whether or when customer and distributed resources will be available for real-world deployment in the future. They already are.

2.2 The VPP Within PGE's Planning Framework

PGE does not plan its VPP portfolio in isolation. The VPP sits at the intersection of resource planning, distribution planning, transportation electrification, technology demonstration, and day-to-day grid operations. PGE's CEP/IRP, Distribution System Plan (DSP), and VPP Multi-Year Plan (MYP) provide an integrated planning roadmap for VPP development.

The CEP/IRP identifies PGE's long-term energy and capacity needs and evaluates resource options that can help meet those needs on a least-cost, least-risk basis. The DSP identifies needs on the distribution system and evaluates the investments and capabilities required to serve customers reliably, including both traditional infrastructure and opportunities for non-wires solutions. The VPP MYP describes how PGE will develop and operate the customer and distributed resource capabilities that can contribute to system and grid needs.

2.2.1 DISTRIBUTION SYSTEM PLAN

PGE's Distribution System Plan (DSP) describes a strategy for building a modern distribution system that supports reliability, affordability, electrification, and decarbonization. A central

element of that strategy is increased visibility into and coordination of distributed energy resources as the grid becomes more dynamic.

The DSP recognizes that meeting future distribution needs will require a combination of traditional infrastructure, grid modernization, and customer and distributed resources. This VPP MYP complements the DSP by developing flexible resources and operating capabilities that can ultimately increase PGE's utilization of the existing traditional infrastructure and customer-sited flexible resources.

This coordination is crucial to PGE's affordability and reliability strategy pillars. Where flexibility can perform reliably and cost-effectively, its availability gives PGE another option to manage constraints, improve asset utilization and defer additional grid investments that impact customer rates. That is the connection between the DSP's grid-modernization strategy and the "Unlock before build" approach described in the [Virtual Power Plant Strategy](#) section.

2.2.2 CLEAN ENERGY PLAN/INTEGRATED RESOURCE PLAN

PGE's CEP/IRP provides the system-level resource planning framework within which the VPP competes and contributes. It evaluates forecasted customer demand, existing resources, resource adequacy, emissions requirements, costs, transmission availability, and potential future resources to develop a least-cost, least-risk portfolio for customers.

The 2026 CEP/IRP advances the integration of VPP resources into generation planning. PGE directly models VPP resources within its portfolio analysis while recognizing that their value extends beyond capacity alone. Flexible customer resources may also reduce exposure to high-cost market purchases, improve utilization of existing infrastructure, support transmission and distribution constraint management, and create additional opportunities for customers to participate in grid operations.

2.2.3 CLEAN ENERGY AND INTEGRATED RESOURCE PLAN – 2032 ACTION PLAN FOR VPP

PGE's 2026 CEP/IRP⁷ identifies continued growth of the VPP as a foundational component of PGE's resource strategy. Portfolio analysis evaluates Flexible Load and DSG in tandem with supply-side resources, while customer-sited solar is represented through the load forecast.

Section 2.2.2 of the CEP/IRP directs PGE to implement two near-term VPP actions: pursue any available cost-effective flexible load and dispatchable distributed resources that customers choose to provide, and maximize the resource value of customer-sited solar, with emphasis on increased VPP capabilities.

The planning analysis supporting those actions identifies substantial incremental VPP resource potential through 2032, including:

⁷ Portland General Electric, 2026 Clean Energy Plan and Integrated Resource Plan, Oregon Public Utility Commission Docket LC 88 (filed Sept. 3, 2026). Available online: <https://apps.puc.state.or.us/edocketsSearch/eDocketsResults/DocketsResult?OrganizationID=32&SearchType=DocketsAll&sortBy=FileDate>.

- All available growth of currently cost-effective existing large-scale Flexible Load programs, estimated to provide approximately 43 MW of incremental summer capability and 21 MW of incremental winter capability by 2032.
- Growth of existing smaller-scale programs and pilots, estimated to provide approximately 8 MW summer and 5 MW winter of incremental capability.
- Quantifiable growth of forward-looking VPP measures with high technical and market potential, estimated at approximately 3 MW summer and 4 MW winter.
- Approximately 219 MW of incremental DSG resources.
- Additional flexibility associated with the integration of large loads.
- Continued growth of customer-sited solar, with approximately 9 MWa of reference-case forecast growth during the Action Plan horizon.

The CEP/IRP separately addresses Community-Based Renewable Energy (CBRE) in Section 2.2.3. Portfolio analysis identifies up to 27 MW of CBRE additions through 2032, depending on scenario, while the Action Plan emphasizes acquisition of cost-competitive projects and development of additional projects where community benefits and/or supplemental funding support customer value.

The CEP/IRP does not establish a single fixed MW acquisition requirement for PGE's VPP. Rather, it directs PGE to pursue available cost-effective resources and recognizes that annual acquisition volumes will depend on the evolving cost-effectiveness, customer adoption, technology performance, and demonstration outcome metrics reflected in VPP Multi-Year Plans and applicable program filings.

This 2027–2028 VPP MYP provides the near-term implementation pathway for the CEP/IRP's VPP strategy. The capacity forecasts in [Table 1](#) and [Table 2](#) describe PGE's expected portfolio growth during the biennium, while the program and technology sections of this MYP identify platform solutions and emerging-resource activities intended to advance the longer-term CEP/IRP resource strategy.

Because the CEP/IRP and VPP MYP use different planning horizons and resource representations, the portfolio totals in this MYP should not be interpreted as a direct one-to-one reconciliation of the incremental VPP resource additions shown in CEP/IRP portfolio modeling. The VPP quantities selected in CEP/IRP portfolio modeling represent incremental resource additions within the planning model and are not the same as the total operating VPP portfolio reflected in this MYP.

2.2.4 TRANSPORTATION ELECTRIFICATION PLAN

PGE's Transportation Electrification Plan (TE Plan) provides the planning and funding pathway for PGE's "Plan, Serve, and Manage" transportation load growth strategy. As EV adoption continues to increase across PGE's service territory, managed charging creates an important connection between transportation electrification and the VPP: new electric load can also become flexible load when customer needs, technology, and program design allow it.

PGE's Residential Smart Charging pilot demonstrates the potential benefits of that relationship. By the end of 2025, enrolled vehicles represented approximately 2.10 MW of managed charging

capacity. PGE has also used the TE Plan to advance commercial and multifamily managed charging, vehicle-to-grid demonstrations, and other approaches intended to evaluate how best to manage growing transportation load while efficiently serving customer transportation needs.

The TE Plan and VPP MYP have complementary roles. The TE Plan is the pathway through which PGE obtains approval for future TE demonstration, pilot and program plans and expenditures, including the continued development of managed-charging capabilities. This VPP MYP includes TE opportunities within the broader portfolio of customer and distributed flexibility resources.

2.3 Market and Policy Evolution

This section focuses on the strategic implications of changing market and policy frameworks for the VPP. Detailed market mechanics are provided in [Appendix C, WEIM, EDAM, Resource Adequacy & Market Materials](#), while regulatory and filing history is summarized in [Appendix B, Regulatory, Tariff, & Filing Crosswalk](#).

The VPP operating environment is evolving rapidly in tandem with the physical grid. Regional energy markets are moving toward greater day-ahead coordination, resource-adequacy frameworks are continuing to evolve, and State and Federal policy changes are impacting both the adoption of customer technologies and the requirements placed on distributed resources.

For PGE, these developments reinforce a key VPP concept: simply enrolling MW is not enough. Resources become more useful as PGE can forecast availability, commit resources with confidence, measure performance, and incorporate them into increasingly sophisticated grid and market operations.

2.3.1 WESTERN ENERGY IMBALANCE MARKET

PGE's experience in the Western Energy Imbalance Market (WEIM) provides a real-world example of how Flexible Load can contribute to regional market operations. PGE currently represents demand response through the California Independent System Operator's Load Forecast Adjustment framework, allowing expected customer load reductions to be incorporated into PGE's market load forecast while PGE retains responsibility for customer-resource dispatch.

PGE's WEIM experience reinforces the importance of resource availability, forecast accuracy, and demonstrated performance to VPP effectiveness. As Flexible Load becomes more operationally integrated, PGE needs to understand both underlying customer load and the effect of the flexibility that PGE dispatches intentionally. Refer to [Appendix C](#) for additional details regarding current WEIM operating mechanics and demand-response representation.

2.3.2 EXTENDED DAY-AHEAD MARKET

The EDAM expands regional energy-market coordination into the day-ahead timeframe. PGE joins the EDAM market on October 1, 2026. For PGE's VPP, this places increased emphasis on PGE's ability to accurately forecast the customer and distributed resources needed before the operating day.

Flexible Load and storage can both provide value in day-ahead operations, although their operating characteristics and applicable participation requirements differ. Many existing

demand-response programs were designed for utility-directed peak or reliability events rather than day-ahead economic commitments. PGE therefore expects market integration to develop by resource type as market rules, forecasting, measurement, and telemetry continue to evolve.

PGE continues to be an active participant in regional stakeholder processes addressing demand-side and distributed-resource EDAM participation. Additional information on EDAM operating mechanics, demand-response representation, resource adequacy, and related stakeholder work is provided in [Appendix C](#).

2.3.3 Federal and State Legislation and Policy Impacts

Policy has long influenced the development of PGE's distributed resource portfolio, but the policy environment is increasingly focused not only on how many distributed resources are installed, but also how those resources interact with the grid.

At the state level, HB 2021 established Oregon's long-term emissions reduction requirements and reinforced the importance of local and customer resources within the clean-energy transition. Subsequent legislative and regulatory activity involving storage, microgrids, interconnection, large loads, and VPPs demonstrates continued interest in expanding the role of distributed resources.

The 2025 Oregon Energy Strategy similarly identifies customer technologies and VPPs as tools for managing demand, supporting resilience, and controlling long-term system costs. PGE is advancing these objectives through Time of Day rates, managed EV charging, thermostat and battery programs, commercial and industrial demand response programs that allow participating customer resources to be used and compensated for support of grid needs.⁸

PGE supports the underlying objective of maximizing the utility of distributed resources to customers and the grid. PGE also believes that VPP policy should build on existing utility programs and regulatory processes, preserve customer choice, establish clear performance accountability, and consider costs and benefits for all customers. Effective policy should enable resources to compete based on the grid services they provide rather than prescribing a particular technology or aggregation model.

Federal policy also materially affects the VPP ecosystem because tax incentives, grants, technology standards, and Federal funding influence the economics and adoption of solar, storage, EVs, connected devices, and other customer resources. Federal policy has changed since PGE's prior MYP, creating both uncertainty and transition in portions of the distributed-resource market.

2.3.3.1 Federal Policy Impacts to VPP

⁸ Oregon Department of Energy, Oregon Energy Strategy (November 2025), Clean Electricity Policy 2b, pp. 58, 61–62. Policy 2b recommends enabling customers to support grid needs by shifting electricity use from flexible loads, including EVs, water heaters, and larger commercial and industrial loads. Available online: <https://www.oregon.gov/energy/data-and-reports/Documents/Oregon-Energy-Strategy.pdf>

Federal policy affecting distributed energy resources changed materially in 2025. The Infrastructure Investment and Jobs Act (IIJA) and Inflation Reduction Act (IRA) provided funding, tax incentives, and other support for customer adoption and integration of solar, storage, electric vehicles, and other distributed technologies. Federal legislation enacted in 2025 modified or accelerated the expiration of several of those incentives, changing the economics and timing of some customer and developer investments.

Among these changes, H.R. 1 modified the Production Tax Credit (PTC) and Investment Tax Credit (ITC), available to certain wind and solar projects and established new eligibility and placed-in-service timelines. Wind and solar projects seeking to preserve eligibility under the prior credit structure generally face earlier construction and completion deadlines than under previous Federal law. Federal tax incentives available to some residential and small-scale customer energy investments were also reduced or scheduled to expire earlier.⁹

These changes affect the pace and timing of distributed solar and storage adoption in PGE's service territory. PGE observed increased interconnection activity in late 2025 as some customers and developers sought to complete projects while federal incentives remained available. Over the longer term, reduced federal support may moderate adoption, particularly for residential, small commercial, and community-scale projects, although actual market impacts will depend on equipment costs, state and local incentives, customer preferences, financing conditions, and other market factors.

PGE will continue monitoring these changes as part of its VPP planning because Federal policy can affect both the number of distributed resources customers adopt and the economics of integrating those resources into PGE programs and grid operations.

Despite the reduced scope of the PTC and ITC, PGE expects third-party solar installation to continue, even in the residential and small commercial space. Customer education is needed to protect participants, ensure that they receive the benefits they were promised, and verify that non-participants are not impacted by cost shifting. Oregon passed HB 4029 to provide contract elements, timelines, and warranty transfers to support and protect customers exploring solar with salespeople.

PGE has leveraged Federal funding, including the Department of Energy's Connected Communities Smart Grid Advanced Load Management and Optimized Neighborhood (SALMON) grant, to advance grid-interactive technology through its Smart Grid Test Bed (SGTB, UM 1976¹⁰). More details on the grant and SGTB outcomes are in [Section 3.9.1, Learnings from](#)

⁹ Internal Revenue Service, Notice 2025-42, Internal Revenue Bulletin 2025-36. Available online: https://www.irs.gov/irb/2025-36_IRB. See also Internal Revenue Service, FAQs for Modification of Sections 25C, 25D, 25E, 30C, 30D, 45L, 45W, and 179D under Public Law 119-21. Available online: <https://www.irs.gov/newsroom/faqs-for-modification-of-sections-25c-25d-25e-30c-30d-45l-45w-and-179d-under-public-law-119-21-139-stat-72-july-4-2025-commonly-known-as-the-one-big-beautiful-bill-obbb>

¹⁰

Oregon Public Utility Commission, Docket UM 1976, PGE Deferral of Expenses Associated with Demand Response Testbed Pilot. Available online: <https://apps.puc.state.or.us/edockets/docket.asp?DocketID=21662>

[the Last MYP](#). The capabilities funded complement PGE's Distribution System Plan and Non-Wires Solutions framework (UM 2005).

2.3.3.2 VPP-Related State Legislation

Oregon policy has increasingly focused on the role DERs can play in supporting grid reliability, affordability, resilience, and clean-energy goals. Recently enacted legislation has addressed key concepts relevant to PGE's VPP, including expansion of the Solar and Storage Rebate Program through SB 827, establishment of new microgrid pathways through HB 2065 and HB 2066¹¹, and additional residential solar consumer protections through HB 4029. These actions affect the market, interconnection, customer-protection, and operating environment in which distributed resources participate.

The Oregon Legislature has also demonstrated sustained interest in VPP-specific policy. VPP proposals were introduced in consecutive legislative sessions through HB 3609 in 2025 and SB 1582 in 2026. Neither proposal was enacted, but both contemplated a more formal role for utilities in procuring grid services from distributed energy resources. PGE supported the underlying objective of expanding the usefulness of customer and distributed resources while raising concerns about approaches that could duplicate existing utility programs and regulatory processes or create unnecessary costs for customers. The recurrence of these proposals nevertheless demonstrates growing legislative attention to the value VPPs can provide.

That policy direction is also reflected in the Oregon Energy Strategy, published in November 2025. The Strategy identifies flexible load, electric vehicles, water heating, batteries, rooftop solar, and other customer technologies as tools for managing demand, supporting resilience, and controlling long-term system costs, and describes VPPs as a pathway for coordinating those capabilities. Governor Kotek's Executive Order 25-29 subsequently directed state agencies to prioritize implementation of the Strategy.

PGE's VPP strategy is already advancing many of these objectives through time-varying rates, managed charging, thermostat and battery programs, commercial and industrial demand response, distributed-resource integration, and the Customer and Grid capabilities needed to coordinate participating resources. PGE will continue monitoring legislative and regulatory developments while building on existing programs, preserving customer choice, maintaining performance accountability, and evaluating resources based on the customer and system value they provide.

2.3.3.3 AR 681 - Microgrid Rulemaking

Oregon's AR 681 rulemaking implements HB 2065 and HB 2066 and mandates the development of a regulatory framework for microgrid interconnection, roles and responsibilities, operating

¹¹ Oregon Legislative Assembly, House Bill 2065 (2025), enrolled measure. Available online: <https://olis.oregonlegislature.gov/liz/2025R1/Downloads/MeasureDocument/HB2065>. See also House Bill 2066 (2025), enrolled measure. Available online: <https://olis.oregonlegislature.gov/liz/2025R1/Downloads/MeasureDocument/HB2066/Enrolled66>

requirements, and cost and valuation.¹² The current work is focused primarily on Level 2, or campus-style, microgrids – configurations in which a single customer or owner may coordinate multiple buildings and distributed resources through a common point of connection to the grid.

These configurations are relevant to PGE’s VPP because they can combine storage, controllable load, on-site generation, and resilience capabilities at a single location. When grid-connected, those resources may be capable of providing peak management, localized distribution support, or other grid services, subject to the operating and compensation framework established by the OPUC. Implementation of AR 681 makes campus microgrids a potential bridge between individual behind-the-meter resources and complex community-scale configurations.

For PGE, the value of AR 681 lies in its potential to establish more precise requirements for interconnection, operating authority, telemetry, compensation, and cost allocation so that qualifying microgrid resources can be integrated seamlessly and consistently into future VPP operations. PGE will continue participating in the rulemaking and will use the resulting framework, together with operating experience from its existing battery and microgrid projects, to inform future resource integration and customer offerings.

AR 681 also builds on earlier Oregon interconnection modernization efforts under UM 2111, AR 667, and AR 668. As shown in [Figure 4](#), these proceedings reflect the progression of Oregon’s interconnection framework toward complex distributed-resource configurations and more flexible study pathways, while preserving utility review of safety, protection, and system impacts.

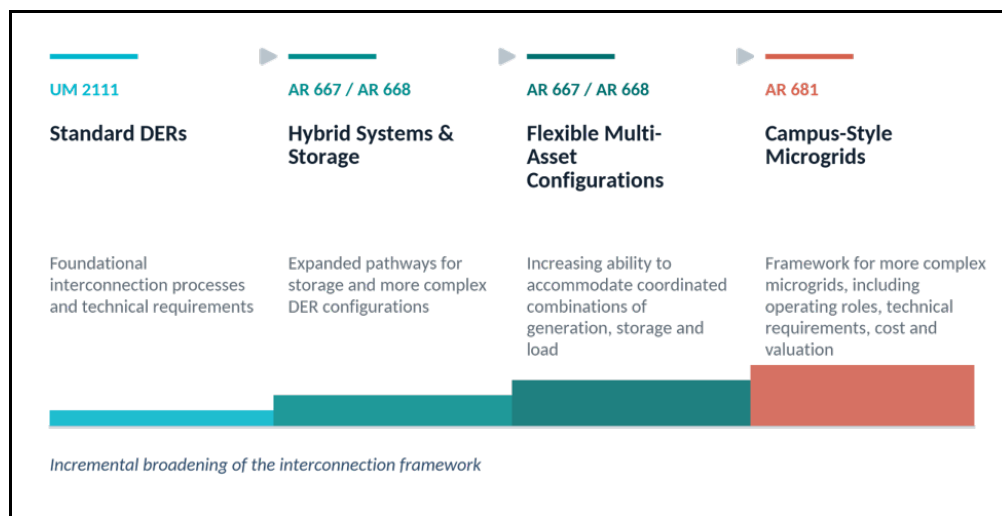


Figure 4. Evolution of Oregon’s DER Interconnection Framework

2.3.3.4 ODOE Grants for Clean Energy

Oregon’s Community Renewable Energy Grant Program, established through HB 2021, supports community renewable energy and resilience projects, including solar, storage, EV charging, and

¹² Oregon Public Utility Commission, Docket AR 681, Microgrid Framework Rulemaking implementing HB 2065 and HB 2066. Available online: <https://apps.puc.state.or.us/edockets/DocketNoLayout.asp?DocketID=24813>

microgrids. These investments can help expand the market and operating experience for technologies relevant to PGE's VPP.

One example is the community energy resilience project the City of Salem is developing in partnership with PGE, which combines solar, battery storage, and EV charging to support critical loads and community resilience during outages. PGE will continue to coordinate with grant-funded projects where they provide practical opportunities to advance distributed resource integration and VPP learnings.¹³

¹³ Oregon Department of Energy, Community Renewable Energy Grant Program. Available online: <https://www.oregon.gov/energy/Incentives/Pages/CREP.aspx>. See also Oregon Department of Energy, 2026 Round 4 award announcement, "Oregon Department of Energy Grants Support Renewable and Resilient Energy Development from Canyonville to Cascade Locks." Available online: <https://energyinfo.oregon.gov/blog/2026/2/5/oregon-department-of-energy-grants-support-renewable-and-resilient-energy-development-from-canyonville-to-cascade-locks>

Chapter 3 VPP 2027-28 Direction

As its VPP portfolio matures, PGE will continue to streamline VPP resource growth through greater standardization of resource information, forecasting, grouping, dispatch, measurement, and connections between its Customer, Grid Operations, and Power Operations systems. This requires both ongoing maturation of programs and streamlined adoption of VPP technologies and operating models.

3.1 2027-28 VPP Operations and Technology Direction

PGE has been developing and enhancing customer flexibility for more than a decade; initial Flexible Load efforts were focused primarily on foundational questions such as, will customers participate? Can their equipment or operations respond when called? Can PGE acquire enough participation to create meaningful system capability?

The answer to those questions is increasingly yes. PGE Flexible Load participation has grown from 2,300 customers in 2015 to over 250,000 enrolled customers in 2025. By the end of 2025, PGE had exceeded both of its annual Flexible Load capacity targets, achieving 101% of its summer goal and 103% of its winter goal. PGE forecasts Flexible Load reaching 125 MW summer and 68 MW winter by the end of 2026.

As its portfolio has matured, the questions PGE must answer have also changed. Enrollment and MW remain important, but an operating VPP must also answer:

- Is the resource available when needed?
- Can PGE forecast the resource's expected performance for the operating period?
- Can PGE coordinate or dispatch the resource under the applicable program and operating requirements?
- Where is the resource located?
- How long can it perform and how frequently?
- What did the resource actually deliver?
- What energy, capacity, or grid service did that performance provide?

These questions guide PGE's 2027-28 operating priorities, particularly the Reliable & Scalable strategic pillar. During the upcoming biennium, PGE will continue acquiring resources that demonstrate customer and system value, transition pilots when evaluation shows repeatable performance, customer acceptance, viable economics, and scalable operating requirements, conclude activities without a viable path forward, and build the forecasting, dispatch, measurement, and system-integration capabilities needed to increase dependable flexibility available to operations.

3.1.1 MATURATION OF PGE'S VPP

Over the next two years, PGE's maturation strategy will move the VPP from a portfolio that can successfully dispatch individual programs toward a portfolio that can increasingly select and coordinate resources based on situational requirements. PGE will advance each of these

capabilities over the next two years, with some elements of the target operating model slated to continue beyond the biennium.

PGE's near-term maturation efforts will focus on establishing common resource-status data across program and enterprise systems, incorporating historical performance and resource availability into forecasting, comparing expected and delivered performance, and automating selected dispatch and operating processes. More advanced capabilities, including broader feeder- and substation-level orchestration and more robust integration with PGE's Advanced Distribution Management System (ADMS) and Enterprise Distributed Energy Resource Management System (DERMS), will continue to mature as dependent technology projects are completed.

PGE's 2027-28 priorities include:

- **Resource Status Visibility:** PGE is developing common definitions and data fields to identify whether a resource is enrolled and available, as well as the integrations required to make that information accessible to the systems and operating teams that require it.
- **Improved Forecastability.** Historical performance, weather, customer behavior, device status, battery conditions, and other resource characteristics can help PGE better estimate how much flexibility is likely to be available for a particular operating period.
- **More Dynamic Dispatchability.** Resources that today are grouped primarily by program can increasingly be organized by capability, duration, or location. Integration with distribution topology creates the potential for feeder- or substation-level use, while integration with PGE's Energy Management System (EMS) and Power Operations supports system-wide reliability and peak-management applications.
- **Stronger Measurement and Performance Feedback** allows PGE to compare what was forecasted against what was actually delivered, and to use that information to improve subsequent planning and operations.

[Table 3](#) further displays the current state of the VPP capabilities, the direction provided in 2027-2028 to enable advanced future use cases.

Table 3. Current and Planned VPP Capabilities

Capability	Current	MYP Direction	Advanced Use Enabled
Visibility	Program/resource visibility through multiple systems	Common customer, resource, eligibility, availability, and location data accessible across participating systems	Locational operation, NWS
Forecastability	Program-specific forecasting and historical performance	Forecasts informed by historical event performance, weather, customer behavior, device status, and resource availability	Day-ahead operations, planning, markets

Capability	Current	MYP Direction	Advanced Use Enabled
Dispatchability	Multiple program-specific dispatch pathways, often manual procedures	Common dispatch interfaces and increased automation across program-specific dispatch pathways	Coordinated, automated, locational and market-aware dispatch
Measurement & Verification	Resource-specific measurement and evaluation	Expected-versus-delivered performance reporting with results incorporated into forecasts and planning values	Greater operational reliance and accountability

PGE's current VPP was built through multiple program-specific vendors, technologies, integrations, and operating processes. During the 2027-28 biennium, PGE will continue to implement standardized resource information, improved connections among Customer and Grid systems, common interfaces with platforms and aggregators, and stronger integration with Power Operations.

The purpose of these investments is to reduce manual coordination and operations, improve visibility into resource availability and performance, and make it easier to add qualified resources without re-creating PGE's internal operating processes each time a new technology, manufacturer, or aggregator enters the portfolio. More information is listed on the changes in [Section 3.1.4, Integrated VPP Operations and Technology Roadmap](#).

3.1.2 PGE AS PORTFOLIO ORCHESTRATOR

Although PGE serves as the VPP portfolio orchestrator, customers, device manufacturers, aggregators, installers, program implementers, and technology providers also perform important roles in this process:

Table 4. VPP Deployment Tasks by Role

Role	VPP Deployment Tasks
PGE - VPP Portfolio Orchestrator	Identify system and grid needs; determine which VPP resources are appropriate for the required service; coordinate dispatch with Grid Operations and Power Operations; measure delivered performance; compensate customers under applicable program requirements; and remain accountable for portfolio performance.
Manufacturers	Provide grid-enabled equipment and customer interfaces
Aggregators and Implementers	Enroll customers, manage device fleets, respond to PGE signals to execute events as needed

Role	VPP Deployment Tasks
Installers	Make participation easier at the point equipment is purchased or installed
Technology Providers	Enable communication, telemetry, forecasting, and dispatch and ability to integrate across systems for advanced grid and market services.

This operating model allows PGE to enlist the expertise of specialized partners without transferring accountability for the resource. As VPP capabilities are further integrated into system planning and operations, PGE remains accountable for the performance of the VPP as reported to customers, system planners, operators, and the Commission.

3.1.3 REDUCE OPERATING FRAGMENTATION

PGE's current VPP was built through multiple program-specific vendors, technologies, integrations, and operating processes. During the 2027-28 biennium, PGE will continue to implement standardized resource information, improved connections among Customer and Grid systems, common interfaces with platforms and aggregators, and stronger integration with Power Operations.

The purpose of these investments is to reduce manual coordination and operations, improve visibility into resource availability and performance, and make it easier to add qualified resources without re-creating PGE's internal operating processes each time a new technology, manufacturer, or aggregator enters the portfolio.

3.1.4 INTEGRATED VPP OPERATIONS AND TECHNOLOGY ROADMAP

PGE uses multiple technology layers to operate the VPP, including DERMS, ADMS, Enterprise DERMS, manufacturer and aggregator application programming interfaces (APIs), PGE's Energy Management System (EMS), and systems supporting market participation. Each performs a distinct function.

The roadmap below describes how these technologies operate today, as well as the changes PGE expects to make during the 2027-28 biennium to support greater integration. PGE's current VPP was developed resource-by-resource; individual programs often rely on separate device integrations, Edge DERMS platforms, program-management processes, and operating workflows.

That structure has allowed PGE to develop and scale resources over time, but it also creates increasing operational complexity as the number of technologies, vendors, customers, and use cases grows. [Figure 5](#) illustrates the multiple DERMS systems PGE has selected in the past to manage specific devices or technologies.

Current Edge DERMS Platforms

How utility operations, market signals, DERMS platforms and customer devices connect today.

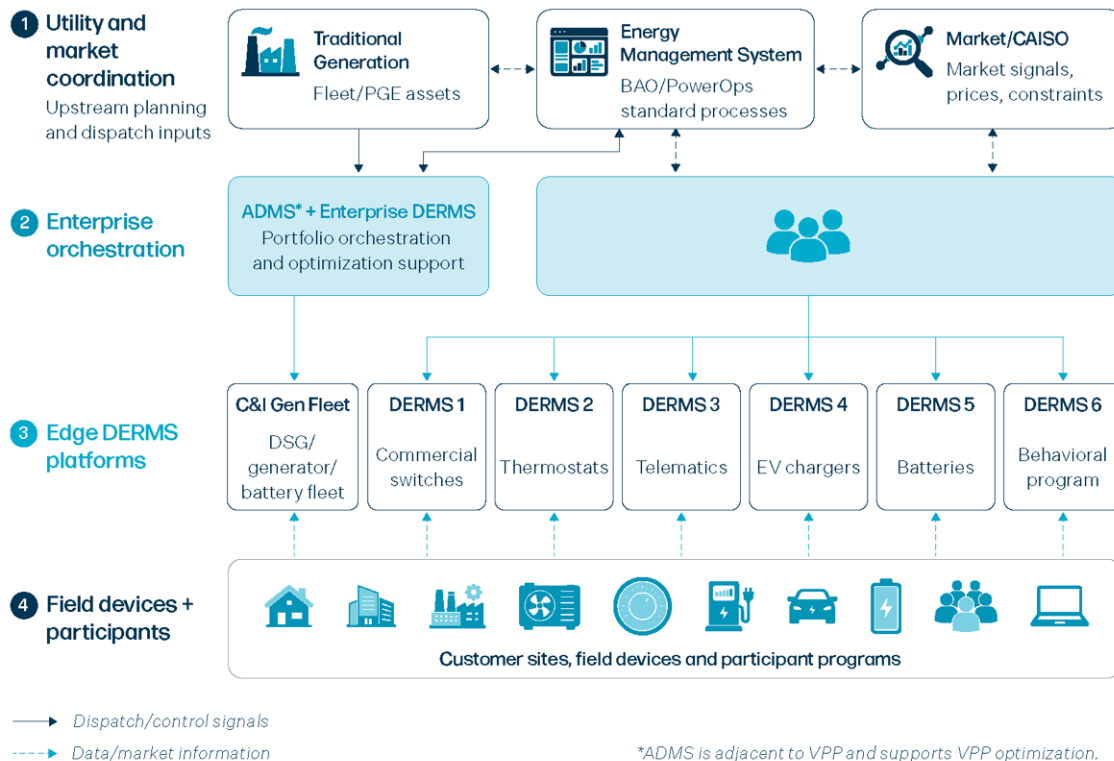


Figure 5. Current-State Edge DERMS Technologies

PGE has visibility into VPP resources today through customer and program systems, advanced metering infrastructure (AMI), existing demand response management systems (DRMS), and Edge DERMS, aggregators, and device-level data where available as shown in [Figure 5](#). During the 2027-28 biennium, the Next Generation Customer Information System (CIS) & Flex project will help reduce unique operating pathways and standardize customer and resource information, creating a stronger foundation for integration with ADMS and Enterprise DERMS as those capabilities mature as shown in [Figure 6](#).

PGE's technology roadmap is intended to reduce fragmentation by connecting distributed-resource operations more consistently with PGE's Customer, Grid Operations, and Power Operations systems. The objective is not a single application or a single vendor. It is a common integrated architecture that augments standard interfaces and operating processes with resource, grid condition, customer eligibility, dispatch, telemetry, and performance information.

PGE recently evaluated technology options to streamline the system and plans to move to a consolidated Edge DERMS aggregator, Kraken, by the end of 2028, facilitating future integrations with the ADMS and Enterprise DERMS platforms and expanding grid services for PGE's Flexible Load and Smart Battery programs. [Figure 6](#) illustrates PGE's anticipated future state once Edge DERMS systems have been consolidated and integrated into the ADMS.

Future Edge DERMS Platforms

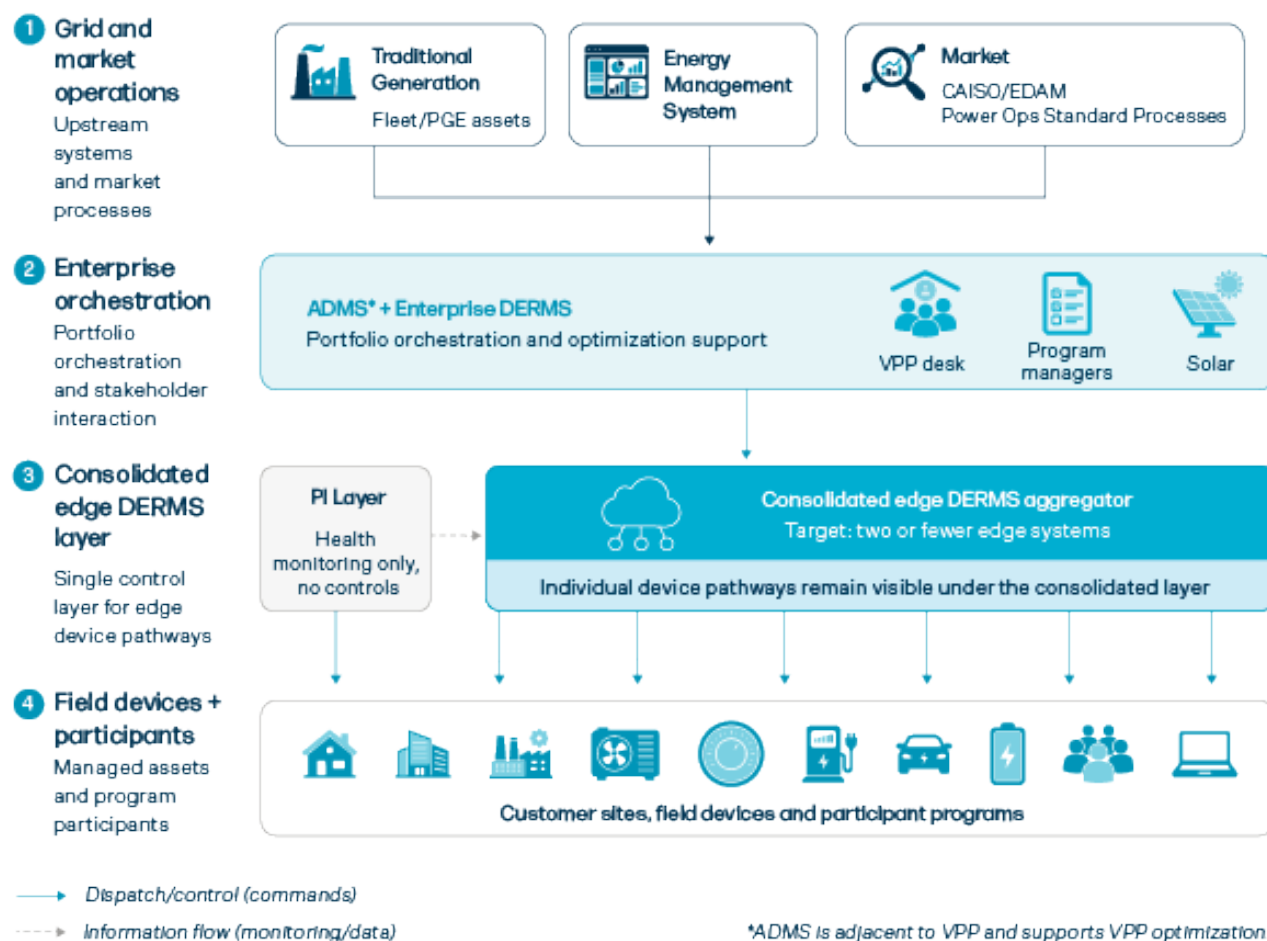


Figure 6. Future-State VPP Technologies

These current-state and target-state diagrams illustrate a shift in how PGE expects to operate an increasingly diverse VPP.

Today, many resource pathways connect to operations through separate Edge DERMS platforms and program-specific processes. Program managers play an important role in coordinating dispatch and translating between customer programs, device platforms, and Power Operations. Customer-sited generation and larger energy assets also follow different operational pathways.

The future target state integrates programs with Enterprise DERMS within PGE's ADMS and enables standardized interfaces between enterprise operations and customer devices. This creates a common orchestration layer without eliminating the specialized manufacturers, aggregators, or program functions required to manage individual resources.

The purpose of these activities is to reduce the number of unique operational pathways PGE must manage while improving consistency in resource information, grouping, dispatch, monitoring, and performance feedback. Individual components can continue to evolve without requiring PGE to rebuild operating processes whenever a new device, OEM, aggregator, or resource type is added.

3.1.4.1 ADMS and Enterprise DERMS

PGE's ADMS and Enterprise DERMS provide the distribution-level foundation for increasingly grid-aware VPP operation. PGE selected Emerson-DGM's ADMS and DERMS platforms following extensive market evaluation and cost-benefit analysis. ADMS provides awareness of distribution topology, system conditions, and operating constraints, while Enterprise DERMS connects those conditions with the distributed-resource portfolio by identifying eligible resources, organizing them into appropriate groups, and supporting dispatch based on the service required.

The target architecture does not require Enterprise DERMS to directly manage every individual device. Edge systems, aggregators, and OEM platforms can continue performing device-level functions, while Enterprise DERMS provides a common orchestration layer for portfolio and grid operations.

Distribution system planning identifies where localized needs or constraints may emerge; ADMS and Enterprise DERMS can help translate those needs into operational resource groupings and dispatch actions. Rather than dispatching resources only by program or broad system need, improved integration can support increasingly targeted use based on location, capability, duration, and current grid conditions.

3.1.4.2 Device Monitoring and Data Integration

Ongoing VPP operational maturation requires PGE to understand not only which resources are enrolled, but whether they are connected, available, responding, and performing as expected. PGE's enterprise monitoring and data-integration capabilities are intended to make resource telemetry and performance information available to the systems and operators that need it. AVEVA PI and related enterprise data capabilities can support collection and visualization of operational information across distributed resource platforms.

These capabilities provide a feedback loop between dispatch and performance, helping operators understand current conditions, helping program and portfolio teams evaluate what occurred during an event, and enabling the use of performance information to improve forecasting, resource planning, maintenance, and future dispatch decisions.

The level of monitoring required varies by resource and service. A DSG asset providing contingency capabilities has different telemetry needs than a behavioral demand response resource. The objective is not identical telemetry across the portfolio, but sufficient visibility to support the operating service being provided.

3.1.4.3 Edge DERMS and Aggregator Layer

PGE's Edge DERMS and aggregator platforms provide the interface between PGE's enterprise systems and the OEM, device, or customer platforms that manage distributed resources.

Today, PGE operates through multiple Edge DERMS platforms. The target architecture retains an Edge layer but reduces the need for operating teams to interact differently with each individual device platform. Standardized interfaces can allow Enterprise DERMS to communicate the required service or dispatch request while the Edge layer translates that request into the appropriate device-level action. This allows PGE to continue working with multiple

manufacturers, aggregators, and technologies without creating a completely separate enterprise operating model for each one.

3.1.4.4 DER Registry

PGE needs a reliable source of information describing the distributed resources available in VPP operations. The DER Registry is intended to support information such as resource type, customer or device relationship, location, technical capability, enrollment and eligibility status, and other characteristics needed by DERMS and related systems.

A common registry also facilitates consistent resource information across individual programs or vendor systems, providing a stronger foundation for planning, operations, reporting, and performance evaluation.

3.1.4.5 Integration with Customer and Grid Systems

An integrated VPP requires both customer and grid information. **Grid** systems identify the operating need: system conditions, distribution topology, constraints, reliability requirements, and other information relevant to when and where flexibility is valuable. **Customer** systems identify whether a resource can participate and provide information regarding enrollment, eligibility, customer consent, applicable program rules, communications, billing, and compensation.

PGE's future-state technology roadmap connects these two layers. A resource should not be dispatched simply because it is technically capable; it must also be eligible and authorized under the applicable customer arrangement. Likewise, customer enrollment alone does not determine operational value; PGE must understand whether the resource is available and appropriate for the grid need at hand.

Integration with PGE's EMS allows VPP actions to connect with broader Transmission and Power Operations needs. Integration with customer information systems helps synchronize customer participation and program requirements with operational use. The result is a PGE VPP operating model in which grid conditions determine what is needed, resource and customer information determine what can respond, and performance information confirms what was delivered.

3.1.4.6 Regional Market Integration

Regional energy markets create additional potential uses for VPP resources that can meet applicable forecasting, scheduling, telemetry, measurement, and performance requirements. PGE's target VPP architecture is intended to preserve the ability to connect qualifying resources with PGE's market and merchant processes, while recognizing that not all VPP resources will participate directly in regional markets. Additional discussion of WEIM, EDAM, and VPP market integration is provided in [Section 2.3, Market and Policy Evolution](#), and [Appendix C, WEIM, EDAM, Resource Adequacy & Market Materials](#).

3.2 VPP Program Changes 2027-28

PGE's VPP portfolio is forecasted to grow significantly through 2028 across Flexible Load, Solar and Storage, and Dispatchable Standby Generation, as shown in [Table 1](#) and [Table 2](#). The 2027-

28 VPP program changes described below are designed to facilitate growth in alignment with PGE's three strategic pillars: Customer Value, Affordability, and Reliable & Scalable. The program changes described in this section translate those pillars into five implementation priorities for the 2027-28 MYP:

- Grow dependable flexible capacity.
- Increase the dispatchability of enrolled resources.
- Expand into customer segments and end uses with potential for cost-effective scale.
- Enable more locational and market-informed use of VPP resources.
- Evolve incentives and customer value to better reflect the services individual resources provide.

[Table 5](#) describes how each implementation priority will guide portfolio and program activity over the next two years.

Table 5. PGE 2027-28 VPP Implementation Priorities

VPP Objective	What it means for 2027–2028
Grow dependable flexible capacity	Grow summer Flexible Load capacity from approximately 124.5 MW in 2026 to 140.4 MW by the end of 2028 while improving the quality, availability, and performance of enrolled MW.
Move from enrollment to dispatchability	Increase automation, telemetry, readiness scoring, DERMS integration, and event performance visibility so resources are more useful to Grid Operations and Power Operations.
Expand into new customer and end-use markets	Develop pathways for agricultural pumping, water/wastewater, refrigeration, cold storage, municipal facilities, industrial process loads, commercial controls, multifamily properties, and customers not currently served at scale.
Enable locational and market-informed dispatch	Build the data, targeting, and platform capabilities needed to dispatch resources where and when they provide the greatest system, distribution, resource adequacy, or market value.
Modernize incentives and customer value	Modify compensation structures to pay customers for the actual value they provide, including capacity, event performance, automation, daily shifting, faster-response capability, and future locational value.

These objectives reflect a practical reality: PGE cannot reach a mature 2030 VPP by simply extending its current program design. The portfolio must continue to grow, but PGE must also make it easier for customers to join, easier for operations to use, and easier for regulators to understand as a cost-effective resource strategy.

The following section describes PGE's planned approach to growing dependable flexible capacity through pathways that span multiple portfolios.

3.2.1 CUSTOMER CHOICE AND EASE

Customer Choice and Ease supports PGE's "Grow dependable flexible capacity" and "Strengthen customer value" implementation priorities. Streamlining the process through which customers identify and enroll in the participation option that best fits their needs helps PGE convert customer interest into durable VPP capability. During the 2027-28 biennium, PGE will use customer information, coordinated outreach, guided recommendations, digital tools, and enrollment pathways connected to equipment purchases and installations to help customers identify forms of participation appropriate to their circumstances.

PGE's customer research indicates substantial interest in energy shifting beyond the customers who participate today. After receiving an explanation of energy shifting and its benefits, 79% of non-participants indicated they were open to changing when they use electricity. Customers also identified reliability, outage prevention, and affordability as important motivations for participating, reinforcing the value of helping customers identify participation options that align with their needs and preferences.¹⁴

Customer participation can also deepen over time as equipment and energy needs change. A customer may begin with a behavioral offering such as Peak Time Rebates and later add a smart thermostat, EV, battery, or another grid-enabled technology. PGE has already observed this progression: in 2025, approximately 2,600 Peak Time Rebates enrollments migrated to the Residential Smart Thermostat program, demonstrating how a broad participation pathway can lead to additional automated flexibility over time.

3.2.2 CUSTOMER ENGAGEMENT IS AN OPERATING CAPABILITY

Customer engagement is a cross-cutting operating capability that supports several of PGE's 2027-28 VPP implementation priorities. A resource cannot support the grid if a customer does not complete enrollment, a device does not remain connected, an event communication does not reach the participant, or the customer does not participate when PGE expects the capability to be available. Customer acquisition, enrollment, education, communications, and retention therefore affect both program participation and the reliability and availability of the VPP resource itself.

During the 2027-28 biennium, PGE will increasingly use customer and performance information to improve those outcomes. Targeted Peak Time Rebates outreach, for example, has produced up to six times greater load shifting among selected customer groups than non-targeted outreach. Targeted Energy Partner Smart Thermostat campaigns have also produced higher customer satisfaction than general outreach, while integrating program participation into equipment purchase and installation pathways can reduce the steps between customer interest and enrolling a grid resource.

¹⁴ Portland General Electric, Market Insights Quantitative Study (Aug. 2025) (internal research).

As it continues to mature its VPP portfolio, PGE will increasingly evaluate customer-engagement activities based on the dependable flexibility they ultimately create, rather than enrollment numbers alone.

3.2.3 EXPAND WHERE FLEXIBILITY CAN PROVIDE VALUE

PGE will continue expanding the circumstances under which customer and distributed resources can provide value by evaluating locational flexibility, emerging customer segments, managed transportation load, and large-load opportunities. During the 2027-28 biennium, PGE will test these applications through Non-Wires Solutions, agricultural and irrigation load, cold storage, transportation electrification, and large commercial and industrial customers.

These efforts are intended to identify where flexible resources can provide dependable, cost-effective system or local grid value and to determine which opportunities should advance through PGE's Product Lifecycle Management process.

3.2.4 MODERNIZE INCENTIVE STRUCTURE

PGE is also reassessing its incentives structure. Current incentives were designed around early program growth, customer recruitment, and event-based participation. A mature 2030 VPP requires a compensation structure more closely correlated to the different values flexible resources provide. A customer that provides seasonal capacity, a customer that allows automated control, a customer that can respond quickly, a customer that can shift load daily, and a customer located on a constrained part of the system, all provide different forms of value. PGE's tariff and incentive structures must evolve to reflect those differences while remaining understandable and fair to customers.

3.2.5 PGE+ AND PGE+ MARKETPLACE

PGE+ and the PGE+ Marketplace provide complementary pathways to scale VPP participation by connecting customer adoption of grid-enabled technologies with applicable incentives and enrollment opportunities. PGE+ supports project-based customer services, such as EV charger installation, while the PGE+ Marketplace provides a direct product-purchase pathway for eligible technologies such as smart thermostats. Together, these channels can connect equipment adoption more directly with applicable PGE programs.¹⁵

These platforms mitigate a common source of enrollment friction: asking customers to purchase or install eligible technology and then complete a separate process to participate in an applicable PGE offering. PGE's experience with EV charging and smart thermostats has demonstrated the value of integrating program participation more closely with each customer's purchase and installation journey.

¹⁵ Oregon Public Utility Commission, Docket UE 442, PGE Schedule 343 / PGE+ and PGE+ Marketplace. Available online: <https://apps.puc.state.or.us/edockets/DocketNoLayout.asp?DocketID=24256>. See also Oregon Public Utility Commission, Docket RE 207, PGE+ Annual Report. Available online: <https://apps.puc.state.or.us/edockets/docket.asp?DocketID=24868>.

During the 2027-28 biennium, PGE will continue evaluating opportunities to use PGE+, the Marketplace, contractors, installers, manufacturers, and other customer channels to connect adoption of eligible grid-enabled technologies with relevant VPP participation opportunities.

3.2.6 2027–2028 PROGRAM AND RESOURCE DIRECTION

The preceding sections describe cross-cutting approaches that support VPP growth across multiple programs and resources. [Table 6](#) summarizes the current role and 2027-28 direction of the individual programs and resources that make up PGE's VPP portfolio.

Table 6. PGE VPP Programs and Resources

Program/Resource	What It Provides Today	2027-28 Direction
Flexible Load Portfolio		
Energy Partner on Demand (Schedule 26)	Large, customized commercial and industrial summer and winter load flexibility.	Continue capacity acquisition; expand automation and performance visibility; evaluate agriculture, irrigation, cold storage, and other controllable loads.
Energy Partner Smart Thermostats (Schedule 25)	Automated commercial heating, ventilation, and air conditioning (HVAC) flexibility.	Add customers and sites through Bring Your Own Thermostat (BYOT), trade-ally, original equipment manufacturer (OEM), and proprietary-control pathways; replace at-risk devices; and increase performance visibility.
Residential Smart Thermostat	Mature automated HVAC resource providing repeatable summer and winter flexibility.	Continue capacity acquisition; maintain device connectivity; incorporate availability and historical performance into forecasting; and prepare for more targeted dispatch.
Multi-Family Water Heater	Legacy controlled-water-heating flexibility allowing for daily energy shifting.	Discontinue the existing pilot and technology pathway while continuing to evaluate future multifamily flexibility through more integrated approaches.
Peak Time Rebates	Broad behavioral participation and customer peak response.	Maintain broad participation; target outreach toward customers with demonstrated load-shifting potential; automate event communications; and evaluate hybrid pathways with Smart Thermostat.

Program/Resource	What It Provides Today	2027-28 Direction
Time of Day	Rate-based customer load shifting.	Transition from pilot to program and continue evaluating sustained customer behavior and bill impacts.
Residential Smart Charging	Shifts transportation load while preserving customer transportation needs.	Continue enrollment through the Transportation Electrification Plan and integrate managed-charging data and dispatch pathways with broader VPP operations.
Solar and Storage Portfolio		
Rooftop Solar	Changes customer net load, distribution conditions, and system forecasting; existing stand-alone solar is generally not dispatched by PGE.	Continue reducing interconnection processing time and support solar-paired storage or other flexible configurations where customers adopt qualifying technologies.
Community-Based Renewable Energy	Emerging distributed renewable and storage configurations consistent with OPUC direction.	Continue procurement and reporting through applicable regulatory processes; clarify how qualifying operating capabilities interact with the VPP.
Distributed Batteries & Microgrids	Operating experience with storage, resilience, local grid services, and emerging resource configurations.	Continue operation and learning; apply results to future battery, DSG, microgrid, and customer pathways.
Smart Battery	Dispatchable customer-owned storage.	Transition from pilot to program through the applicable tariff and regulatory pathway; expand eligibility to qualifying small nonresidential batteries; retain performance-based dispatch and compensation.
Dispatchable Standby Generation (Schedule 200)	More than 120 MW of customer-sited generation and storage supporting contingency,	Maintain dependable Schedule 200 capability; add qualifying generation and storage resources; standardize telemetry and readiness requirements; coordinate

Program/Resource	What It Provides Today	2027-28 Direction
	frequency response, reliability, and other operating needs.	qualifying resources with broader VPP operations.

3.3 Flexible Load Changes 2027-28

3.3.1 FLEXIBLE LOAD

PGE requests OPUC approval of 2027-28 funding for continued operation, growth, and modernization of PGE's existing Flexible Load portfolio. This request supports the acquisition of approximately 16 MW of incremental summer Flexible Load portfolio capacity.

Table 7. Flexible Load Portfolio: Forecasted Capacity

Period	2025 Actual	2026 Forecast	2027 Forecast	2028 Forecast
Summer MW	117.3	124.5	132.2	140.4
Winter MW	62.8	66.9	70.8	74.4

During the 2027-28 biennium, PGE plans to increase its Flexible Load portfolio from 124.5 MW of summer capability in 2026 to 140.4 MW by 2028, while also implementing program-lifecycle decisions and operating changes intended to make that capacity more forecastable, dispatchable, and measurable.

3.3.1.1 Complete Program Lifecycle Decisions

To continue to mature its VPP portfolio, PGE must make decisions about whether or not to turn pilots into programs. During the 2027-28 biennium, PGE proposes to transition Residential Smart Battery from pilot to program and extend participation to eligible small nonresidential batteries. PGE also proposes to transition Time of Day from pilot to program.

PGE also proposes discontinuing its existing Multi-Family Water Heater pilot, based on the limitations of legacy technology, connectivity, and operating model, rather than a conclusion that multifamily customers lack flexibility potential. PGE will continue evaluating more integrated property-level approaches involving efficiency, controls, water heating, managed EV charging, storage, and other controllable loads where customer and system value can be demonstrated. The same discipline applies across PGE's innovation portfolio: scale, integrate, continue focused testing, or conclude. Below is a summary of actions across the Flexible Load Portfolio which will be described in further detail in the sections following the summary table.

Table 8. Summary of Flex Load Programs and Pilot Activities 2027-28

Program or Pilot	2027-28 Activities
Residential Smart Thermostat	- Prepare for and launch locational dispatch of thermostats via Edge DERMS. Locational dispatch could be used to ease distribution system stress or avoid calling events in known outage areas or Public Safety Power Shutoff (PSPS) locations. - Improve enrollment and unenrollment automation to simplify customer enrollment and more quickly enable dispatchable assets. - Evaluate PGE's incentive structure to address thermostat end of life and disruptions from manufacturer changes, helping preserve asset dispatchability.
Peak Time Rebates	- Continue targeted outreach to customers with meaningful load-shifting potential, particularly customers that are not well suited to direct device-control programs because their equipment is not eligible or controllable, their load does not fit a standard device pathway, or they prefer to retain direct control of their energy use. - Fully automate event notification and enrollment processes, add mobile app as a notification channel and offer more personalized participation messaging. - Explore program- and portfolio-level improvements by evaluating PGE's incentive structure and designing a hybrid Smart Thermostat/PTR offering to support customer value and grid needs.
Energy Partner on Demand (Sch 26)	- Increase access to high-quality, dispatchable MW by targeting customer segments that have repeatable operational flexibility, including agriculture/irrigation, municipal facilities, water/wastewater, refrigeration, cold storage, and industrial process loads. - Increase automation and performance visibility through automated demand response (AutoDR), EMS-enabled controls, telemetry, readiness scoring, and improved event performance monitoring. - Evaluate incentive and tariff changes that better align customer compensation with capacity, event performance, controls-based participation, and potential faster-response grid services.

Program or Pilot	2027-28 Activities
Time of Day	• Shift recruitment toward customers that could achieve bill savings through modest changes in when they use electricity, increasing the opportunity for both customer savings and incremental system load shifting, while continuing to serve natural savers where appropriate. • Develop internal targeting models to improve conversion rates, customer experience, and enrollment effectiveness. • Create processes to identify and reengage customers who move to a new location within PGE's service territory and may be eligible to re-enroll.
Multi-family Water Heating	• Proposal: Close the existing Multi-Family Water Heater Pilot by December 31, 2026. • Do not install additional water heater switches or migrate the currently enrolled switches to replacement DERMS or OEM platforms. PGE will operate the currently enrolled switches only through the remaining availability of the existing DERMS platform and complete pilot closeout activities through the end of 2026. • Preserve pilot learnings and continue evaluating future water-heating flexibility opportunities informed by PGE operating experience, Smart Grid Test Bed learnings, Northwest Energy Efficiency Alliance (NEEA) market transformation work, and updated cost-effectiveness analysis.
Energy Partner Smart Thermostats (Sch 25)	▪ Proposal: continue pilot through 2028 to test effectiveness of collaborative approaches. ▪ Expand BYOT enrollments through trade ally-supported installations, third-party implementer outreach, and continued coordination with Energy Trust of Oregon. ▪ Continue proactive outreach to customers with thermostat models slated for discontinuation by manufacturers to preserve long-term dispatchability and MW reliability. ▪ Assess opportunities to expand qualified thermostat pathways, including proprietary commercial HVAC systems and multi-site customers such as school districts.

3.3.2 PROGRAM STATUS AND 2027-28 ACTIVITIES

3.3.2.1 Residential Smart Thermostats

Regulatory Reference: Sch 5 Residential Direct Load Control Pilot (Deferral UM 2234)¹⁶

Table 9. Program Snapshot and VPP Planning Summary

Program Attribute	Residential Smart Thermostat Program
Product Phase (Pilot/Program)	Program
Primary VPP Role	Residential HVAC direct load control and flexible capacity.
Target Customers	Residential customers with eligible HVAC systems and qualifying smart thermostats.
Portfolio Contribution	Forecasted to provide 53.66 MW of summer capacity and 13.59 MW of winter capacity during the 2027-28 period.
Future Program Evolution	Continue evolving a mature residential HVAC flexibility resource through expanded qualified device pathways, adjusted customer incentives, better visibility into device availability and event performance, and incremental background VPP capacity.
Evaluation	Third-party impact evaluation using matched comparison group and difference-in-differences modeling.

The Residential Smart Thermostat program is one of PGE's most mature, scalable, and reliable residential Flexible Load resources. The program has matured from its pilot phase to become a repeatable, well-evaluated, and dispatchable resource that PGE can plan for during both the summer and winter seasons.

The program enrolls and operates qualified, connected residential thermostats to adjust a eligible HVAC system, such as a ducted heat pump, electric forced-air furnace, or central air conditioning system, and a qualifying smart thermostat. Customers may participate by purchasing a new qualifying thermostat through the PGE+ Marketplace or another retailer, or by enrolling an existing qualifying thermostat connected to an eligible HVAC system. Customers

¹⁶ Oregon Public Utility Commission, Docket UM 2234, Portland General Electric Application for Deferral Related to Flex Load Plan. Available online: <https://apps.puc.state.or.us/edockets/DocketNoLayout.asp?DocketID=23208>. See also Portland General Electric, Schedule 5, Residential Direct Load Control Pilot. Available online: <https://portlandgeneral.com/about/info/rates-and-regulatory/tariff>

receive an enrollment incentive and seasonal participation incentive when they participate in at least 50% of event hours in a season, while retaining the ability to opt out of individual events.¹⁷

As PGE improves DERMS integration, expands qualified thermostat pathways, and strengthens event performance visibility, thermostat capacity becomes more useful for everyday VPP operations, rather than only for isolated peak events. As the VPP continues to evolve, this program will help PGE unlock additional flexible capacity already present on the system, reducing the need for new infrastructure. New generation, transmission, and distribution investments will still be needed in the future, but residential HVAC flexibility can increase the utilization and value of existing customer-sited capacity, reduce exposure to high-cost energy periods, and support Grid Operations and Power Operations.

Since the last MYP, PGE has made several changes to preserve and expand the program's value, adding Trane/American Standard smart thermostats to the qualified product list and allowing customers with high-efficiency ducted heat pumps to participate without replacing the proprietary thermostat required to operate their HVAC system. This reduces customer friction for enrolling new high-efficiency HVAC systems which can contribute value to the PGE system.

PGE is also responding to changes in Energy Trust of Oregon's residential smart thermostat incentives. Energy Trust retired its incentive for residential customers with electrically heated homes in 2026.

Because that incentive helped reduce the upfront cost of purchasing a smart thermostat, PGE increased the one-time enrollment incentive for customers with electric forced-air furnaces and ducted heat pumps who enroll through the PGE+ Marketplace. This adjustment contributes to increased program costs, but it is an intentional customer protection and market continuity strategy that helps preserve participation for future PGE customers.

In addition to traditional program enrollment, PGE will acquire incremental MW through a third-party background aggregation product. Aggregation products provide load reductions from eligible thermostat customers who have enabled a background VPP functionality but are not enrolled in the Smart Thermostat program. During the 2027-28 forecast period, this background aggregation contributes 3.78 MW of summer capacity and 1.76 MW of winter capacity, demonstrating how customer-sited flexibility can be acquired through multiple pathways and showcasing PGE's direct partnership with aggregators.

Effective coordination remains crucial to program success. PGE will continue working with Energy Trust through the Utility-Specific Action Plan (USAP) process to monitor measures that affect the program, including smart thermostats, heat pumps, ducted heat pumps, and other measures that influence residential HVAC load and customer adoption. PGE will also continue working with thermostat manufacturers, OEMs, and third-party aggregation partners to maintain eligible device pathways, preserve customer incentives, improve dispatch readiness, and enable thermostat capacity to be clearly tracked, evaluated, and represented in VPP planning.

¹⁷ Customers who previously enrolled through the direct installation delivery channel received a free or discounted professionally installed smart thermostat. That channel closed to new enrollment in May 2022, and those customers are not eligible for BYOT enrollment or seasonal participation incentives.

Table 10. Residential Smart Thermostats Objectives and Key Performance Indicators (KPIs)

Objective	Attribute (What to Measure)	Metric (How/What to Measure)	Threshold (Definition of Success)
Demonstrate Continued Value	Cost Effectiveness	TRC	TRC of ≥ 1.0 Actual = 1.26

Table 11. Residential Smart Thermostats Flex Load Acquisition (MW)

Flex Load Acquisition (MW)	2025 Actuals	2026 Forecast	2027-28 Forecast
Summer	45.2	48.7	49.9
Winter	10.0	11.0	11.8
Summer background aggregation			3.8
Winter background aggregation			1.8

Table 12. Residential Smart Thermostats Funding Sources

Funding	2025-26 MYP Approved	Forecasted for 2027-28
Deferral	\$7,800,000	\$9,726,000
O&M		\$626,783
Total	\$7,800,000	\$10,352,783

Table 13. Residential Smart Thermostats Forecasted Expenditures

Category	2025-26 MYP Approved	Forecasted for 2027-28
Incentives [BEGIN CONFIDENTIAL]		
Program Operations		
Evaluation		
Education and Outreach		[END CONFIDENTIAL]
Total	\$7,800,000	\$10,352,783

3.3.2.2 Peak Time Rebates

Regulatory Reference: Sch 7 Flex 2.0 (Deferral UM 2234)

Table 14. Program Snapshot and VPP Planning Summary

Program Attribute	Peak Time Rebates Program
Product Phase (Pilot/Program)	Program
Primary VPP Role	Broad-based residential behavioral load shifting and customer entry point into the VPP.
Target Customers	Most residential customers, with targeting focused on customers most likely to successfully shift load during events.
Portfolio Contribution	Approximately 19% of PGE customers currently participate. Enrollment is forecasted to increase by approximately 9%, from 163,945 customers in 2026 to 178,645 by the end of 2028.
Future Program Evolution	Mature behavioral DR offering with strong enrollment growth, improved targeting, and continued role as a gateway to deeper VPP participation.
Evaluation	Third-party seasonal impact evaluation, process evaluation, customer experience measurement, and ongoing customer feedback.

Peak Time Rebates (PTR) is one of PGE's most accessible flexible load programs. Unlike device-based programs, this program does not require a customer to purchase equipment, install a connected device, or allow direct control of a device. Instead, it gives customers a simple, voluntary way to participate in the VPP by shifting or reducing energy use during Peak Time Events and earning bill credits when they are successful.

Customers may participate by adjusting thermostats, appliances, EV charging, batteries, or other household usage and remain in control of how they respond. That simplicity is what makes PTR a critical entry point into PGE's broader VPP strategy: it brings a broad residential customer base into the flexible load portfolio and creates a first step toward deeper engagement with PGE's energy-shifting products and services.

PTR helps normalize event-based load shifting, builds customer familiarity with the value of flexible energy use, and creates a pathway to other options such as Smart Thermostats, Time of Day, Smart Battery, Residential EV Charging, and future residential flexible load offerings.

The program has matured into a sizeable and consistent residential resource. Approximately 19% – just under 157,000 – of PGE customers were enrolled in PTR at the end of 2025; enrollment is forecasted to continue growing, from 163,945 customers in 2026 to 178,645 customers in the 2027-28 forecast period, with a 2030 forecast of 189,670 customers.

PTR also supports PGE in both the summer and winter, with strong comparative winter performance. Events are typically called during summer and winter peak periods between 3:00 p.m. and 9:00 p.m., with winter morning events also possible between 7:00 a.m. and 11:00 a.m. Customers are notified before an event through email or text message and may receive a same-day reminder. After the event, customers receive personalized results including their earned incentive. Customers earn \$1.00 for every kWh shifted, with the rebate appearing as a credit on their next monthly bill. There is no penalty if customers use more energy than expected, which makes PTR a low-risk, “win-only” offer.

Since the last MYP, PTR has experienced stronger-than-expected enrollment growth, adding more than 33,000 new customers in 2024 and 2025. This growth was driven by stronger-than-expected performance from the customer contact center, PGE’s mobile app, direct mail, email, and other promoted customer outreach and enrollment campaigns.

PTR is now a mature, mass-scale program. Continued growth must balance overall enrollment volume, program performance, and customer experience. The program still requires sufficient recruitment to offset natural churn from customer moves and migration to other programs where cross-enrollment is not allowed. About 2,700 customers annually migrate from PTR to the Smart Thermostat program, which can reduce PTR enrollment but is a positive outcome for the broader VPP portfolio. Future PGE outreach efforts will specifically target customers most likely to successfully shift during events, improving portfolio value while creating a better experience for participating customers.

PTR captures load shifting from customers who do not have eligible devices, may not want to give PGE direct load control, or may prefer to participate by manually adjusting their usage during events. It also helps PGE evaluate customer responsiveness to event-based signals through event impact analysis, participation trends, and enrollment and notification channel performance. Those learnings support the broader VPP operating model by improving customer segmentation, event communications, cross-enrollment strategy, and the customer journey across programs.

For the 2027-28 biennium, PTR will continue as PGE’s broad residential participation offering within the VPP. It helps customers experience energy shifting with no penalty and no upfront equipment cost, contributes reliable behavioral load shifting during peak periods, and supports a more mature portfolio by helping PGE understand which customers respond to event-based signals and may benefit from other energy-shifting options over time. As PGE continues to mature its VPP’s everyday operational capabilities, PTR will remain an important bridge between customer awareness, customer action, and scalable residential flexibility.

Table 15. Peak Time Rebates Objectives and KPIs

Objective	Attribute (What to Measure)	Metric (How/What to Measure)	Threshold (Definition of Success)
Demonstrate continued value	Cost effectiveness	TRC	TRC of ≥ 1.0 Actual = 1.32

Table 16. Peak Time Rebates Flex Load Acquisition (MW)

Flex Load Acquisition (MW)	2025 Actuals	2026 Forecast	2027-2028 Forecast
Summer	18.5	19.0	20.7
Winter	14.3	14.9	16.3

Table 17. Peak Time Rebates Funding Sources

Funding	2025-2026 MYP Approved	Forecasted for 2027-2028
Deferral	\$5,880,715	\$6,355,638
O&M		\$439,725
Total	\$5,880,715	\$6,795,363

Table 18. Peak Time Rebates Forecasted Expenditures

Category	2025-26 MYP Approved	Forecasted for 2027-2028
Incentives [BEGIN CONFIDENTIAL]		
Program Operations		
Evaluation		
Education and Outreach		[END CONFIDENTIAL]
Total	\$5,880,715	\$6,795,363

3.3.2.3 Energy Partner on Demand (Sch 26)

Regulatory Reference: Sch 26 (Deferral UM 2234)

Table 19. Program Snapshot and VPP Planning Summary

Program Attribute	Energy Partner on Demand Program
Product Phase (Pilot/Program)	Program
Primary VPP Role	Large nonresidential dispatchable flexibility and customer-specific load reduction

Program Attribute	Energy Partner on Demand Program
Target Customers	Large commercial and industrial customers with sufficient load and operational flexibility to provide measurable, repeatable load reduction during applicable events
Portfolio Contribution	Forecasted to provide 52.66 MW of summer capacity and 42.1 MW of winter capacity by the end of 2028.
Future Program Evolution	Mature nonresidential DR platform moving toward higher-quality, more dispatchable, technology-agnostic flexible capacity
Evaluation	Annual third-party evaluation, including impact analysis, process evaluation, customer surveys, implementer interviews, and portfolio-level evaluation

Energy Partner on Demand is PGE's primary large nonresidential demand response program. The program gives large commercial and industrial customers a customized way to reduce or shift load during peak periods, while providing PGE with meaningful, customer-specific flexible capacity that can be planned, called, measured, and improved over time. Unlike mass-market residential offerings, this program depends on understanding how each customer operates and building a participation strategy that works for that site.

Schedule 26 is important because it helps PGE reach customers with large end uses and real operational capability. Energy Partner on Demand allows customers to participate through manual load reduction, operational changes, controls-based strategies, AutoDR, or other technology-enabled approaches where appropriate. That technology-agnostic structure is central to the value of the program and allows PGE to pursue flexible load across a wide range of business models, facilities, and end uses.

Energy Partner on Demand's value is tied to the quality and usability of the MW it delivers. Large-customer flexibility must be developed through site-specific planning, customer readiness, clear operating commitments, and ongoing performance management. As PGE continues to mature its VPP, Schedule 26 provides a structured way to turn customer-specific operational flexibility into a resource that can be forecasted, prepared for, dispatched, evaluated, and improved over time.

Since the last MYP, PGE has continued to mature and strengthen Energy Partner on Demand as the anchor of its nonresidential flexible load portfolio. The most significant operational change was the onboarding of Cascade Energy as the new third-party implementer effective January 1, 2025. This updated implementation model expanded support across technical sales and outreach, customer enablement, seasonal readiness, systems and integrations, and hardware and software support.

The program has also demonstrated meaningful growth and performance improvement. Energy Partner on Demand grew by 5.25 MW in 2025 and is on track for approximately 4 MW of

additional growth in 2026. In addition to enrollment growth, PGE improved summer 2025 seasonal realization by 12.9%, reflecting stronger customer readiness, improved season preparation, and better event performance.

PGE's current implementation structure also ties vendor performance to growth, retention, event realization, and operational KPIs, which is an important step toward managing the program as a dependable VPP resource rather than a static customer offering.

Over the 2027-28 biennium, PGE's focus will continue to enroll additional MW of capacity, with an expanded focus on adding the **right** MW. The program is forecasted to continue growing enrolled capacity, but the more important test will be the extent to which that capacity is dependable, dispatchable, and aligned with customer operations. This means improving seasonal readiness, increasing the use of AutoDR or controls-based strategies, addressing customer participation barriers, and continuing to improve event performance and realization.

PGE also sees growing value in coordinating activities with Energy Trust of Oregon and other market actors. Energy Trust's Strategic Energy Management customers may be strong candidates for demand response because they are already engaged in understanding and managing their energy use. Better coordination could help PGE identify customers with operational flexibility, align efficiency and flexibility conversations, and create a more seamless customer experience.

Table 20. Energy Partner on Demand Objectives and KPIs

Objective	Attribute (what to measure)	Metric (how/what to measure)	Threshold (definition of success)
Demonstrate continued value	Cost effectiveness	TRC	TRC of ≥ 1.0 Actual = 1.23

Table 21. Energy Partner on Demand Flex Load Acquisition

Flex Load Acquisition (MW)	2025 Actuals	2026 Forecast	2027-28 Forecast
Summer	43.4	45.8	52.7
Winter	34.0	36.5	42.1

Table 22. Energy Partner on Demand Funding Sources

Funding	2025-26 MYP Approved	Forecasted for 2027-28
Deferral	\$12,143,704	\$12,695,000
O&M		\$388,000
Total	\$12,143,704	\$13,083,000

Table 23. Energy Partner on Demand Forecasted Expenditures

Category	2025-26 MYP Approved	Forecasted for 2027-28
Incentives [BEGIN CONFIDENTIAL]		
Program Operations		
Evaluation		
Education and Outreach		[END CONFIDENTIAL]
Total	\$12,143,704	\$13,083,000

3.3.2.4 Residential EV Charging

Regulatory Reference: See Transportation Electrification Plan in UM 2033¹⁸

The Residential Smart Charging Pilot offers rebates to eligible residential customers for the purchase, installation, and/or integration of technologies that help manage load associated with EV charging. Customers may enroll with either a qualified Level 2 EV charger or qualified vehicle telematics system, as both technologies can pause charging to manage EV load.

All participants earn seasonal rewards for meeting participation requirements, including keeping their Level 2 EV charger, if applicable, online for at least 50% of the season. As of October 1, 2026, participants must also charge their vehicle during their PGE-set managed charging schedule at least 60% of the season.

Participating customers are eligible for the following upfront rebates:

- Customers may receive a \$300 rebate (\$1,000 for income-eligible customers) for the purchase and installation of a qualified Level 2 charger or non-qualified Level 2 charger with a qualified EV at their home. Customers who purchased and installed a qualifying Level 2 charger prior to it being added to the Qualified Products List or who did not purchase the charger themselves may be eligible to receive a \$50 rebate.
- Customers who require an electrical service upgrade to install a qualifying Level 2 charger may receive a \$1,000 rebate (\$5,000 for income-eligible customers) for upgrading their electrical service and main electric breaker panel.

Although funding for the pilot is approved through PGE's Transportation Electrification plan, we include it here because it contributes to PGE's flex load acquisition. For additional details regarding this pilot, please refer to PGE's 2026-2028 Transportation Electrification Plan.

¹⁸ Portland General Electric, 2026-2028 Transportation Electrification Plan, Oregon Public Utility Commission Docket UM 2033. Available online: <https://edocs.puc.state.or.us/efdocs/HAQ/um2033haq345941030.pdf>

Table 24. Residential EV Smart Charging Flex Load Acquisition

Flex Load Acquisition (MW)	2025	2026 Forecast	2027-28 Forecast	2030
Summer	2.1	2.8	3.3	4.0
Winter	2.4	3.2	3.5	4.3

[Table 25](#) reflects the broader Residential Smart Charging budget approved through the Transportation Electrification Plan. For purposes of the VPP portfolio cost and cost-effectiveness analysis in [Chapter 4](#), PGE includes approximately \$2.6 million of 2027-28 costs attributable to the managed-charging component of the pilot.

Table 25. Residential EV Smart Charging Funding Sources

Funding	2026-28 TEP Approved	2027-28 TEP Approved
MMC	\$10,179,240	\$7,026,163
O&M	\$361,855	\$244,784
Total	\$10,541,095	\$7,270,947

Table 26. Residential EV Smart Charging Forecasted Expenditures

Category	2026-28 TEP Approved	2027-28 TEP Approved
Incentives [BEGIN CONFIDENTIAL]	[REDACTED]	[REDACTED]
Program Operations	[REDACTED]	[REDACTED]
Evaluation	[REDACTED]	[REDACTED]
Education and Outreach	[REDACTED]	[REDACTED] [END CONFIDENTIAL]
Total	\$10,541,095	\$7,270,947

3.3.2.5 Energy Partner Smart Thermostats (Sch 25)

Regulatory Reference: Sch 25 Nonresidential Direct Load Control Pilot (Deferral UM 2234)

Table 27. Program Snapshot and VPP Planning Summary

Program Attribute	Energy Partner Smart Thermostat Pilot
Product Phase (Pilot/Program)	Pilot
Primary VPP Role	Commercial HVAC direct load control for small and medium-sized businesses
Target Customers	Commercial customers on eligible rate schedules with qualifying HVAC equipment and internet-connected thermostats
Portfolio Contribution	Forecasted to provide 3.59 MW of summer capacity and 0.63 MW of winter capacity by the end of 2028, with approximately 5,080 thermostats participating.
Future Program Evolution	Commercial thermostat pilot moving from direct-install-heavy delivery toward broader BYOT, trade ally, original equipment manufacturer (OEM), proprietary thermostat system, and DERMS-enabled enrollment pathways, including opportunities with Trane and other commercial HVAC platforms.
Evaluation	Annual third-party evaluation, including impact analysis, process evaluation, customer surveys, implementer interviews, and portfolio-level evaluation.

Energy Partner Smart Thermostat is PGE's commercial thermostat demand response offering, designed to reach customers whose primary flexible load opportunity is HVAC. The program complements Energy Partner on Demand by creating a pathway for small and medium-sized businesses that may not have large process loads, dedicated energy staff, or the operational flexibility needed to successfully implement a customized Schedule 26 load reduction plan. For these customers, HVAC control may be the most practical way to participate in PGE's VPP.

The program was launched in 2017 and redesigned in 2022 to better support commercial customer participation through a direct load control model. The per-site capacity may be modest, but the addressable market is large. PGE has identified more than 69,000 eligible commercial customers on qualifying rates, with an estimated addressable market of at least 28,000 sites after applying awareness and equipment assumptions. At the end of 2025, PGE had 3,330 thermostats enrolled, with a goal of enrolling at least 700 new thermostats per year.

The program remains in pilot because the delivery model is still evolving. Direct installation has helped reduce barriers for customers by providing professionally installed thermostats free of charge, but it also carries higher delivery costs and depends on the availability of qualified

equipment. PGE is shifting toward a broader enrollment strategy that includes BYOT, trade ally pathways, OEM marketing, and better use of existing customer equipment. This shift is important for cost discipline and long-term scalability.

PGE also sees an opportunity to grow the program by expanding eligibility for other proprietary commercial HVAC control systems. Many commercial customers, especially larger campuses and institutional customers, rely on proprietary thermostats that cannot be easily replaced without affecting system performance or customer operations. Expanding qualified device pathways for these systems would allow PGE to reach more customers without requiring them to remove equipment that already works for their facilities.

PGE will also look to deepen partnerships with larger customers that operate multiple smaller commercial sites, such as school districts and other public or community-serving institutions. These customers may not fit neatly into a single-site small business model or a customized Schedule 26 curtailment plan, but they can represent meaningful aggregated HVAC flexibility across multiple buildings. Improving access for these customers can help reduce energy use, lower operating costs, and expand participation in the VPP.

Since its last MYP, PGE has made several changes to reduce operational risk and improve this pilot's ability to scale. The most significant technology issue is the discontinuation of the ecobee EMS-Si thermostat, which was installed through the direct installation channel and will eventually no longer be dispatchable for Peak Time Events. Replacing those devices remains a priority because it protects long-term dispatchability and reliability for the existing enrolled fleet.

PGE also consolidated thermostat OEMs that had been spread across multiple DERMS into a single DERMS environment, improving process efficiency, reducing operational complexity, and strengthening dispatch reliability as the pilot has grown.

Energy Partner Smart Thermostat can help customers reduce energy use through scheduling, configuration, and more efficient control of occupied and unoccupied periods. The direct installation channel helps customers access those benefits without an upfront equipment cost, while BYOT enrollment and seasonal incentives create a financial benefit for customers that already have qualifying devices.

This is especially important for small businesses, minority-owned businesses, and community-serving organizations that may not otherwise have the resources or bandwidth to replace thermostats or pursue more customized demand response options.

Coordination with Energy Trust of Oregon remains important because commercial smart thermostat incentives can offset equipment and installation costs. PGE plans to continue cost-sharing with Energy Trust into the 2027-28 period, while also working with the third-party implementer, trade allies, OEMs, and internal teams to improve enrollment pathways and dispatch readiness. This coordination is necessary because the pilot depends on both customer acquisition and technical enablement; customers must have the right equipment, the equipment must be enrolled correctly, and the devices must be available when called.

The Energy Partner Smart Thermostat pilot is not yet at the maturity level of the residential thermostat program, but represents a meaningful opportunity. Over the next two years, PGE will continue to focus on replacing at-risk devices, expanding BYOT and trade ally enrollment,

improving cost-effectiveness, and proving that commercial thermostat control can become a reliable, scalable contributor to PGE's nonresidential VPP portfolio.

Table 28. Energy Partner Smart Thermostats Objectives and KPIs

Objective	Attribute (What to Measure)	Metric (How/What to Measure)	Threshold (Definition of Success)
Demonstrate continued value	Cost effectiveness	TRC	TRC of ≥ 1.0 Actual = 0.57

Table 29. Energy Partner Smart Thermostats Flex Load Acquisition (MW)

Flex Load Acquisition (MW)	2025 Actuals	2026 Forecast	2027-28 Forecast
Summer	2.4	2.5	3.6
Winter	0.38	0.41	0.63

Table 30. Energy Partner Smart Thermostats Funding Sources

Funding	2025-26 MYP Approved	Forecasted for 2027-28
Deferral	\$2,995,460	\$3,073,009
O&M		\$320,364
Total	\$2,995,460	\$3,393,373

Table 31. Energy Partner Smart Thermostats Forecasted Expenditures

Category	2025-26 MYP Approved	Forecasted for 2027-28
Incentives [BEGIN CONFIDENTIAL]		
Program Operations		
Evaluation		
Education and Outreach		[END CONFIDENTIAL]
Total	\$2,995,460	\$3,393,373

3.4 Time of Day Program

Regulatory Reference: Sch 7 Flex 2.0 (Deferral UM 2234)¹⁹

Proposal: Transition from pilot to program

Table 32. Time of Day Program Snapshot and VPP Planning Summary

Program Attribute	Time of Day Pilot
Product Phase (Pilot/Program)	Pilot; proposing transition to program during 2027
Primary VPP Role	Residential price-based load shifting and customer pathway to more advanced flexible load participation
Target Customers	Residential customers who shift usage away from on-peak hours, including flexible household load or EV charging
Portfolio Contribution	Forecasted to provide 5.58-6.49 MW of summer capacity in 2027-2028
Future Program Evolution	Transition to an ongoing voluntary time-varying rate program while improving customer targeting, enrollment tools, bill-impact visibility, and alignment of future rate design with evolving summer and winter system needs
Evaluation	Ongoing third-party evaluation of load impacts, customer experience, enrollment and attrition, bill impacts, and interaction with other VPP offerings to inform continued program improvement and future rate design

PGE's Time of Day pilot gives residential customers more choice and information to support how they manage their energy use and costs. Unlike event-based programs, Time of Day uses a standing price signal to encourage customers to shift usage away from on-peak hours, when power costs are typically higher and the system is more constrained. Time of Day is an important component of PGE's VPP portfolio because it helps customers understand that when they use energy is as important as how much energy they use.

PGE forecasts that Time of Day will contribute 5.58-6.49 MW of summer capacity during the 2027-2028 biennium. These values represent the forecasted reduction in customer demand during relevant summer peak conditions, rather than average seasonal load shifting. Time of Day

¹⁹ Oregon Public Utility Commission, Docket UM 2234, In the Matter of Portland General Electric Company, Application for Deferral of Costs Associated with the Flexible Load Demand Response Pilots. Available online: <https://apps.puc.state.or.us/edockets/DocketNoLayout.asp?DocketID=23208>. See also Portland General Electric, Schedule 135, available through PGE's current tariffs: <https://portlandgeneral.com/about/info/rates-and-regulatory/tariff>

provides flexibility through price-based load shaping, while PGE represents the resulting peak reduction as a capacity contribution for planning purposes.

PGE has not assigned a winter capacity value to Time of Day because the current rate has not yet been evaluated against winter peak conditions. PGE's winter system peaks can occur during morning hours, which do not align with the current Time of Day peak-price period. As winter peak needs evolve, PGE will evaluate whether future time-varying rate design could better align customer load shifting with those conditions.

This becomes relevant as electric heating and EV charging contribute to winter demand growth. Time-varying rates are expected to play a larger role as PGE scales the VPP because they can help customers shift flexible usage in response to system needs as part of day-to-day energy management, rather than only during called events.

Time of Day has now progressed sufficiently through the pilot phase for PGE to propose its transition to an ongoing program. The pilot has established customer interest in a voluntary time-varying rate, provided experience with customer targeting and enrollment, and demonstrated measurable summer peak-load impacts. PGE's proposed transition recognizes that continued operation no longer depends on resolving the foundational question of whether customers will participate and shift load in response to a standing price signal.

Transition to program status does not end evaluation or program development. PGE will continue evaluating customer bill impacts, enrollment and attrition, load-shifting performance, customer segmentation, and interaction with other Flexible Load offerings. Those findings will be used to improve the program and inform potential future time-varying rate designs, including whether rate periods should evolve to better align with changing winter needs.

The target market for the Time of Day offering is broad; the pilot has helped PGE significantly refine its customer enrollment strategy. All residential customers are eligible to participate, and about 4.7% of PGE residential customers are currently enrolled. PGE's rate modeling indicates that:

- Approximately 46% of residential customers could save at least 1% on their monthly bill without changing usage
- An additional 10% could save by shifting usage away from peak hours.
- This creates a serviceable obtainable market of approximately 430,000 customers, or about 56% of the eligible residential population within PGE's service territory.

Since the last MYP, PGE has continued to evolve its outreach and education strategy in response to pilot learnings. Initially, PGE focused on customers with the highest expected savings and the greatest likelihood of adopting a time-varying rate. PGE is now also focusing on customers who could save by changing their usage patterns; while this group may have higher potential savings, it also requires more education and behavioral change, which can result in lower enrollment conversion.

Time of Day also has an important customer affordability role. It can help customers lower bills when they are able to move flexible usage into lower-cost periods. This may be especially valuable for customers with electric vehicles, since charging is a significant load that can often be shifted to off-peak hours.

During the 2027-28 biennium, PGE's Time of Day coordination will continue to focus on how the rate works with the rest of the residential VPP portfolio. Time of Day can complement Peak Time Rebates, Residential Smart Thermostats, and EV charging, but PGE and the broader industry are still learning how best to combine or sequence these offers. PGE's goal is a streamlined and easy-to-navigate customer journey, rather than an intimidating maze of potential program offerings.

Evaluation will remain an important part of Time of Day as it transitions to program status. PGE's current third-party evaluation includes impact, process, benchmarking, and enrollment-trend analysis. PGE also plans to evaluate participant bill impacts and incorporate Time of Day more regularly into broader Flexible Load portfolio evaluation. These assessments will help PGE refine customer targeting, understand sustained load-shifting behavior, evaluate customer affordability outcomes, and improve how the program interacts with other residential VPP offerings.

Time of Day helps customers see the value of shifting usage, supports summer peak reduction, creates a platform for future time-varying offers, and may provide a pathway to better align customer price signals with winter peak needs over time. As PGE continues to mature its VPP, Time of Day will help bridge customer choice, affordability, and system value by making energy shifting a more routine part of how customers engage with the grid.

Table 33. Time of Day Objectives and KPIs

Objective	Attribute (what to measure)	Metric (how/what to measure)	Threshold (definition of success)
Demonstrate continued value	Cost effectiveness	TRC	TRC $\geq$ 1.0 Actual = 0.89

Table 34. Time of Day Flex Load Acquisition (MW)

Flex Load Acquisition (MW)	2025	2026 Forecast	2027-2028 Forecast
Summer	3.8	4.7	6.5
Winter	N/A	N/A	N/A

Table 35. Time of Day Funding Sources

Funding	2025-2026 MYP Approved	Forecasted for 2027-2028
Deferral	\$1,201,650	\$914,850
Total	\$1,201,650	\$914,850

Table 36. Time of Day Forecasted Expenditures

Category	2025-2026 MYP Approved	Forecasted for 2027-2028
Program Operations	\$286,650	\$165,000
Evaluation	\$180,000	\$224,850
Education and Outreach	\$735,000	\$525,000
Total	\$1,201,650	\$914,850

3.4.1.1 Multi-Family Water Heating

Regulatory Reference: Sch 4 Multi-family Residential Demand Response Water Heater Pilot (Deferral UM 1827)

Proposal: Sunset pilot by December 31, 2026

Table 37. Program Snapshot and VPP Planning Summary

Program Attribute	Multi-Family Water Heater Program
Product Phase (Pilot/Program)	Pilot: Recommended to sunset by December 31, 2026
Primary VPP Role	Multifamily water heating load flexibility, daily dispatch capability, and intra-hour energy shifting
Target Customers	Multifamily properties with eligible electric resistance water heaters, with participation coordinated through property owners and managers
Current Portfolio Contribution	1.4 MW summer capacity, 9,511 active switches as of May 2026, approximately 1% of PGE's VPP portfolio MW
Current Status	Currently-enrolled water heater switches continue to operate through legacy DERMS and OEM pathways. PGE expects dispatch capability through the current DERMS platform to end no later than late October 2026. No additional switch installations are planned.
PGE Recommendation	Document learnings achieved, close the existing MFWH Pilot by the end of 2026, and continue to evaluate market readiness for new communication options in the future.
Basis for Recommendation	Connectivity degradation, DERMS shutdown, fragmented vendor pathways, high migration cost, uncertain dispatch performance, and continued cost-effectiveness challenges.

Program Attribute	Multi-Family Water Heater Program
Evaluation	No additional evaluations planned.
Future Program Evolution	PGE is not recommending continuation of the existing MFWH Pilot but will preserve its operating and evaluation learnings for future water-heating flexibility opportunities using more scalable, grid-ready technologies and delivery approaches.

The Multi-Family Water Heater Pilot is PGE's dual-event, daily water heating flexibility option and has delivered meaningful, measurable flexible load value throughout its operating life. Since launch, the pilot has provided dispatchable capacity, supported frequent and repeated load shifting, and helped PGE understand how multifamily water heating can operate as part of a VPP. The pilot has also produced important lessons about device connectivity, customer and property-manager participation, dispatch performance, and technology requirements needed for future scale.

PGE recommends closing the existing MFWH Pilot by December 31, 2026. PGE does not plan to install additional water heater switches or migrate the currently enrolled switches to replacement DERMS or OEM platforms due to the high costs involved. Dispatch through the current DERMS platform is expected to end no later than late October 2026, with remaining customer and regulatory closeout activities completed by the end of the year.

This recommendation is not based on a lack of value from controllable water heating. Rather, the technology and operating model supporting the currently enrolled switches no longer provide a cost-effective or scalable path forward because of platform risk, connectivity degradation, fragmented technology pathways, and migration cost.

The Pilot currently includes 9,511 enrolled water heater switches and contributes approximately 1.4 MW of summer capacity. Peak enrollment reached 11,624 switches in 2021, but the number of reliably available switches has declined as connectivity issues and device attrition have reduced reliable device availability. The currently enrolled switches are now split across two legacy technology pathways. One pathway has low and volatile online availability, with approximately 1,709 (39%) of 4,331 activated switches online. The other pathway includes approximately 5,180 switches requiring firmware updates and migration to a new platform. Continuing with either pathway will entail significant risk and additional cost.

PGE's review and analysis of Multi-Family Water Heater Pilot financial and performance data does not support transitioning this pilot to Program status. PGE currently pays about \$37,000 per year for DERMS support associated with the currently enrolled switches. The identified transition path for one major portion of the currently enrolled switches would require approximately \$451,000 in one-time transition costs before performance is confirmed, followed by ongoing annual costs estimated at \$272,000 to \$392,000 per year.

In part because those expenditures will not resolve the operational and reporting complexity associated with supporting the currently enrolled switches across multiple technology pathways, cost-effectiveness remains the primary long-term constraint. PGE's MFWH-specific closeout

scenario analysis estimates that the current path has a TRC of approximately 0.23. A best-case new-install scenario improves TRC to approximately 0.25 while increasing NPV costs by approximately \$5.8 million compared with the current path. Closing the current pilot limits future NPV exposure and avoids carrying forward platform costs that do not create a scalable program.

For these reasons, PGE recommends closing the existing MFWH Pilot in conjunction with the 2026 DERMS shutdown, preserving the pilot's operational and regulatory learnings, and applying those learnings to future VPP design.

3.4.1.2 Pilot Lessons and Future VPP Enablement

The MFWH Pilot delivered both grid value and learning value. Coordinated dispatch of electric resistance water heaters produced measurable load shifting with minimal burden on residents and demonstrated the value of frequent, repeated dispatch. In 2025, the Pilot provided 1,967 total hours of dispatch, giving PGE direct operating experience with event duration, device response, snapback, and the distinction between enrolled capacity and dependable, dispatchable capability.

The pilot also gave PGE valuable insights into technology performance. Experience demonstrated that wi-fi-connected devices are more vulnerable to property-specific conditions, including building layout, router access, and connectivity degradation over time. PGE stopped new wi-fi installations in 2019 and shifted toward cellular-connected devices.

Cellular communications improved some aspects of performance, but did not fully resolve cost, scalability, or long-term support concerns. PGE identified CTA-2045²⁰ as a more durable future pathway, but device availability, market readiness, firmware support, and integration maturity are not sufficiently mature to support migration of the currently enrolled devices into a new program platform.

The broader VPP lesson is that future Flexible Load programs should avoid expensive after-the-fact retrofits and instead prioritize grid-ready devices from time of purchase. When utility, customer, or public funding supports equipment that may become part of a flexible load resource, that equipment should have integrations ready and be capable of future utility program participation from the start. Enrollment should remain voluntary, and compensation should be based on measured value delivered. Grid-ready, in this context, simply means that the equipment preserves the customer's future option to participate.

For water heaters, that means future program design should prioritize CTA-2045, cellular-native, or other standards-compatible devices with verified telemetry and dispatch capability. Future programs also need clear technology ownership, consistent data flows, durable vendor support, and DERMS integration requirements from day one.

During the 2027-28 biennium, PGE will continue to monitor the market and demonstrations for technology and market maturation, grid-ready device availability, decreased software costs which support a cost-effective path to scale. Any future PGE water heater offering will require:

²⁰ CTA-2045 is an ANSI communications standard that creates a universal interface between electric appliances and utility or energy management systems.

- Verified dispatch performance
- Consistent telemetry and connectivity definitions
- Settlement logic that can withstand regulatory review
- A cost structure that improves with scale
- A customer/property-owner participation model that works for multifamily housing.

PGE's recommendation to sunset the existing Multi-Family Water Heater pilot applies to the legacy technology, connectivity, and operating model and does not foreclose future multifamily flexible-load opportunities. As described in the [Strategic Partnerships and Market Development](#) section, PGE is continuing to evaluate more coordinated property-level approaches with Energy Trust and other delivery partners that could combine efficiency and flexible-load opportunities where they provide customer and system value.

3.4.1.3 Migration Alternative Considered

PGE evaluated whether the existing switches could be maintained by moving switches to new technology platforms. Keeping the currently-enrolled switches available for dispatch would require rebuilding the program across multiple technology pathways. One cohort of PGE's currently-enrolled switches has low and volatile online availability; another cohort would require firmware changes and migration to a new platform. Even if both cohorts could be made operational, dispatch, telemetry, device status, reporting, and performance measurement would still need to be reconciled across multiple DERMS systems.

These technical changes would continue aging hardware, legacy firmware, fragmented technology pathways, and inconsistent definitions of availability, without creating a better long-term program structure. Significant investment would be required before PGE could confirm reliable dispatch performance or reportable load impact. For those reasons, PGE is not moving forward with a technology transition due to additional costs and complexity without creating a durable path to program scale.

3.4.1.4 Plan for Sunsetting Current Pilot

PGE plans to close the pilot in a way that preserves the regulatory record, avoids new obligations, gives participating properties clear notice, and protects the value of the data and lessons developed over the life of the pilot.

Participating property owners and property managers will receive written notice consistent with the agreements in place between PGE and each participating property at the time of enrollment or extension. Communications will explain that the pilot is ending, that PGE will no longer dispatch participating switches after the closeout date, and that the pilot's learnings will inform future program design. Widescale field removal of installed switches is not expected unless required for safety, operational, or property-specific reasons.

PGE expects dispatch capability through the current DERMS platform to end no later than late October 2026. Following final dispatch and data extraction, PGE will complete remaining customer communications, incentive reconciliation, data archiving, vendor closeout, and other

regulatory and administrative activities necessary to close the MFWH Pilot by December 31, 2026.

3.5 Solar and Storage Portfolio

Distributed solar and storage are complementary components of the distributed-resource ecosystem supporting PGE's VPP. Standalone solar is not currently a dispatchable resource, but its output reduces the amount of generation PGE needs to procure during daylight hours, impacts net load, and can be incorporated into forecasting and operational planning. PGE customers continue to enthusiastically adopt distributed solar technology; PGE ranked first among Pacific Northwest utilities for rooftop solar installations in 2025.²¹

Energy storage creates additional operating flexibility through its ability to change when energy is consumed or delivered. Customer batteries can be charged during periods of favorable system conditions, then discharged during higher-value periods, all while respecting customer-defined operating requirements and resilience needs.

PGE's experience with the Residential Smart Battery Pilot demonstrated that aggregated customer-owned storage can be used to respond to system peak events. PGE's Distributed battery and microgrid demonstration projects, supported through UM1856²², also yielded valuable insights into battery operability, grid services and market responsiveness.

During the 2027-28 biennium, PGE will support continued customer adoption of distributed solar through interconnection process improvements and targeted grid-readiness investments where increasing generation creates distribution constraints. In parallel, PGE will improve visibility into distributed resources and expand the qualification and integration of storage technologies that can provide dispatchable VPP capability. Together, these efforts allow PGE to better understand the effect of distributed solar on the grid while increasing our ability to coordinate storage based on customer and system needs.

3.5.1 ROOFTOP SOLAR

Rooftop solar is a significant distributed resource within PGE's service territory. As of January 2026, there were 311 MW of rooftop solar installed on PGE's system, a net-metered nameplate capacity equivalent to more than 7% of PGE's historic summer peak load. This resource helps reduce customers' net electricity purchases while exporting excess generation to the grid to serve broader system demand. Under PGE's current forecasts, rooftop solar is expected to grow to 355 MW by the end of the 2027-28 biennium.

Within the broader VPP portfolio, PGE views rooftop solar as a different type of resource from dispatchable battery, thermostat, or flexible load resources. The existing rooftop solar fleet

²¹ U.S. Energy Information Administration, Form EIA-861M, Monthly Electric Power Industry Report, Net Metering utility-level data (December 2025), <https://www.eia.gov/electricity/data/eia861m/>. Ranking reflects residential photovoltaic net-metering installations added during calendar year 2025, calculated as cumulative installations reported for December 2025 less those reported for December 2024, among utilities reporting service in Oregon, Washington, and Idaho.

²² Oregon Public Utility Commission, Docket UM 1856, PGE Energy Storage filings and reports. Available online: <https://apps.puc.state.or.us/edockets/docket.asp?DocketID=20913>

largely operates passively because PGE generally does not control when that generation occurs and cannot dispatch it during a VPP event.

Solar's near-term VPP relevance is primarily due to its operational visibility and effects on net load. As distributed generation continues to grow, better information about where solar resources are located and how much generation they are expected to produce can improve PGE's understanding of changing system conditions and help inform when and where other flexible resources may provide the greatest value.

3.5.1.1 Enabling Solar Growth Through Grid Modernization Improvements

PGE has also made investments to improve the customer and operational processes supporting rooftop solar. These investments have reduced the length of the average internal PGE interconnection process from 32 days in 2023 to 15 days by the end of 2025. Beginning in 2023, PGE undertook a multi-phase effort to address customer concerns about long interconnection timelines and limited process visibility. This work included

- Improved integration among customer and interconnection systems.
- Additional automation intended to reduce manual processing and support increasing volumes of rooftop solar installations.
- Expanded over-the-air meter capabilities.
- Establishing the foundation to support DER processes at greater scale.

PGE is implementing a program to enhance bi-directional power flow readiness on substations and distribution feeders with high levels of net-metered and small generation resources. The program upgrades protection, monitoring, and sensing equipment at locations where distributed generation can exceed local load and create backfeed conditions on distribution infrastructure originally designed for one-way power flow.

PGE tracks affected substations and feeders and advances upgrades where system conditions warrant. PGE has completed upgrades at multiple locations to maintain system reliability and safety while supporting continued distributed resource integration.

PGE expects rooftop solar to remain an important part of the distributed-resource landscape and an input to load forecasting, distribution planning, and future VPP capability development. As technology, interoperability, customer adoption, and PGE's operating systems continue to evolve, additional opportunities to coordinate solar-paired resources may emerge. PGE will evaluate those opportunities based on demonstrated customer and system value.

3.5.2 COMMUNITY-BASED RENEWABLE ENERGY

Community-Based Renewable Energy (CBRE) resources were established under HB 2021²³ and are intended to provide direct community benefits through qualifying renewable-energy projects and associated resource configurations. PGE has been developing CBRE resources through the

²³ Oregon Legislative Assembly, House Bill 2021 (2021), Chapter 508, Oregon Laws 2021. Available online: <https://olis.oregonlegislature.gov/liz/2021R1/Measures/Overview/HB2021>

CBRE Request for Offer (RFO) that ran through 2025, assessing their potential relationship to distributed solar, storage, and VPP operations.

PGE's 2023 IRP Action Plan identified regional CBRE potential and included a targeted procurement strategy to both acquire resources and gain market insight into this emerging resource category. The process included multiple procurement rounds, structured feedback to bidders, and opportunities for proposal refinement. The CBRE RFO resulted in seven unique bidders submitting 22 bid options representing 43.7 MW of solar and 72.9 MW of battery storage. As interconnection study results became available, bidders revised or withdrew a portion of that capacity based on updated feasibility and cost information, leaving 12.95 MW of solar and 52.96 MW of storage actively proposed at that stage of the process.

PGE subsequently proposed a project shortlist and pilot through UM 2141. In Order 26-147²⁴, the Commission adopted Staff's recommendations to acknowledge the CBRE shortlist and expanded shortlist, denied PGE's proposal to include the CBRE pilot in the Flexible Load MYP, directed PGE to report on CBRE procurement and operation through the MYP, and directed PGE to begin additional CBRE procurement, including testing additional procurement approaches. Consistent with that direction, PGE reports on CBRE procurement and implementation progress in this MYP.²⁵

PGE is advancing negotiations for long-term Power Purchase Agreements and/or Storage Capacity Agreements with five shortlisted bidders representing six project suites and 14 individual resources – six solar and eight storage – totaling 48.7 MW across six Oregon communities. PGE anticipates that these projects will go live during the 2027-2031 period, subject to successful contract execution and project development.

During the 2027-28 biennium, PGE will continue executing the current procurement process, reporting progress consistent with OPUC direction, and pursuing additional procurement approaches as directed. As these resources advance toward commissioning and deployment, PGE will continue to define how best to integrate their visibility, storage capability, and operating characteristics within the broader VPP architecture.

3.5.3 MICROGRIDS, DISTRIBUTED BATTERIES, AND THE PATH TO AN INTEGRATED VPP FRAMEWORK

PGE's work with microgrids and distributed batteries reflects a broader evolution toward integrating customer- and utility-sited distributed resources into a common VPP operating framework. Oregon's emerging microgrid rules will help define how increasingly complex distributed-resource configurations can interconnect, operate, and provide value, while PGE's

²⁴ Oregon Public Utility Commission, Order No. 26-147, Docket UM 2141, Portland General Electric Company, Flexible Load Plan (Apr. 29, 2026). Available online:

<https://apps.puc.state.or.us/orders/2026ords/26-147.pdf>

²⁵ Portland General Electric, 2023 Clean Energy Plan and Integrated Resource Plan, Oregon Public Utility Commission Docket LC 80. Available online:

<https://apps.puc.state.or.us/edockets/Docket.asp?Child=servlist&DocketID=23636>

battery demonstrations and programs provide practical experience with dispatch, controls, resilience, performance, and grid services.

The sections that follow describe the distinct roles of the Smart Battery Program and PGE's Distributed Battery projects. Together, these efforts help PGE understand how storage resources can support customer resilience and site-specific needs while also contributing energy, capacity, and grid services when connected to the broader VPP.

3.5.4 SMART BATTERY PROGRAM

Regulatory References: UM 1856 (pilot and evaluation); UM 2078 (current deferred-accounting treatment). PGE proposes to align ongoing Smart Battery program cost recovery with UM 2234 and Schedule 135 following applicable Commission authorization.²⁶

PGE's Smart Battery Pilot was launched in 2020 under UM 1856 to determine how customer-owned residential batteries could be incorporated into PGE's power operations while also evaluating customer acceptance, program design, technology integration and operating performance. The pilot is currently operating under UM 1856 while PGE completes the regulatory transition described below.

As of August 2026, 661 households were participating in the Smart Battery Pilot, representing approximately 9.2 MWh of nominated battery capacity and approximately 2.1 MW of realized dispatchable grid capacity. Approximately 33% of homes with qualifying batteries participated in the pilot, providing strong evidence that customers are willing to make a portion of their battery capacity available to PGE as long as the program preserves the resilience value the batteries were originally purchased to support.

Based on this operating experience, PGE proposes to extend the Smart Battery Pilot while completing the tariff and regulatory steps necessary to establish an ongoing Smart Battery program. Following Commission authorization, PGE would transition participating resources to the new program and expand eligibility to qualifying small nonresidential batteries. The transition reflects the fact that the pilot provided the following key learnings:

- Customers are willing to participate in a utility-managed battery offering.
- Aggregated customer batteries can be dispatched as a coordinated resource.
- Scheduled peak-management and demand-response applications can provide measurable system capability.
- Compensation can be tied to the actual performance of the battery.

²⁶ Oregon Public Utility Commission, Docket UM 1856 (<https://apps.puc.state.or.us/edockets/docket.asp?DocketID=20913>), PGE Energy Storage filings and reports; Docket UM 2078 (<https://apps.puc.state.or.us/edockets/docket.asp?DocketID=22381>), PGE Application for Deferral of Costs Associated with the Residential Battery Energy Storage Pilot; and Docket UM 2234 (<https://apps.puc.state.or.us/edockets/DocketNoLayout.asp?DocketID=23208>), PGE Application for Deferral Related to Flex Load Plan. See also Portland General Electric, Schedule 135, available through PGE's current tariffs.

3.5.4.1 Proven Customer Experience

One fundamental question was whether customers would accept utility control of an asset purchased primarily for the customer's home resilience. The pilot demonstrated customers are willing, as approximately one-third of qualifying battery owners agreed to participate. Event opt-out rates remained below 2%, and 81% of surveyed participants rated their satisfaction with the pilot as either a four or a five on a five-point scale.

Customer experience also informed the proposed design of PGE's Smart Battery program. Battery owners consistently value retaining stored energy for backup power, so PGE's use of the battery will continue to respect customer-defined resilience requirements. Customers also benefit from a simplified enrollment process, as PGE has integrated Smart Battery outreach with the interconnection process for qualified batteries, rather than requiring customers to independently discover and navigate a separate program enrollment path.

During the 2027-2028 biennium, PGE will continue to:

- Streamline the Smart Battery enrollment pathway and interconnection-based outreach.
- Maintain a qualifying product list.
- Improve the connection between battery installation, eligibility and VPP enrollment through coordination with manufacturers and the Energy Trust of Oregon.

PGE's Smart Battery pilot also tested different approaches to customer compensation. PGE found that performance-based compensation creates a stronger connection between what the customer receives and the actual grid capability delivered. PGE's proposed program transition strategy retains that principle while moving toward a monthly incentive based on average kW delivered during dispatched events. This structure is intended to support more regular battery utilization and compensate customers based on demonstrated performance without creating a separate payment for every individual event.

3.5.4.2 Lessons Learned from Dispatch

The pilot demonstrated that aggregated customer batteries can be reliably dispatched for scheduled peak reduction and demand response. It also reinforced an important VPP lesson: battery nameplate capacity, nominated energy, and dispatchable MW are not the same measures. Actual Smart Battery capability varies based on:

- Battery state of charge
- Capacity reserved for customer resilience
- Event duration
- Device response and connectivity
- Manufacturer operating characteristics

For this reason, PGE's planning and operating assumptions are based on actual capacity delivered, rather than assuming that 100% of installed battery capacity is available for grid use.

PGE also learned that battery dispatch needs to account for the finite energy available from each device and differences across manufacturers. A group of batteries may have the same general

program eligibility, but differ in how much capacity dispatched, how long the response can be sustained, and how the OEM platform communicates with PGE’s DERMS.

Continued improvement in device status, state-of-charge information, OEM integration and performance measurement will allow PGE to better forecast the amount of battery capability available for a particular operating period.

UM 1856 also tested applications beyond scheduled peak management, including contingency reserve and autonomous frequency response. The pilot also tested Volt/VAr (on PGE-owned batteries) and intended to test distribution use cases with customer-owned batteries but was unable to induce enough locational density to measure impact with batteries alone.

These demonstrations produced technical and operating learnings, while manufacturer software, device functionality, and the limited number of qualifying batteries constrained broader deployment of these services. PGE does not propose making those capabilities a requirement for the scaled Smart Battery Program. Instead, PGE will continue focused demonstrations while scaling the peak-management and demand-response applications that have demonstrated broader readiness.

3.5.4.3 2027–28 Program Direction

During its transition to program status, PGE will build on the proven elements of the Smart Battery pilot. PGE forecasts the Smart Battery program growing from 2.1 MW of dispatchable capability to 4.6 MW by the end of 2028, including expansion to eligible small nonresidential customers with residential-scale battery systems.

The program will continue to use direct-battery dispatch through qualified OEM and DERMS integrations, preserve customer resilience requirements, compensate customers based on delivered performance, and increase the opportunity to use batteries throughout the year rather than only during a small number of peak events.

Transitioning Smart Battery to a program establishes an ongoing pathway for capabilities that have demonstrated customer acceptance, operational performance, and a path to scale, while preserving an innovation pathway for additional services where technology, customer adoption, grid need, and cost-effectiveness support their use.

Table 38. Smart Battery Program Snapshot and VPP Planning Summary

Program Attribute	Smart Battery Program
Product Phase (Pilot/Program)	PGE proposes transition to an ongoing program in 2027 following applicable tariff and Commission authorization.
Primary VPP Role	Dispatchable customer-owned battery capacity for peak management and demand response while preserving customer resilience.
Target Customers	Residential and eligible small nonresidential customers with qualifying interconnected batteries capable of PGE dispatch.

Program Attribute	Smart Battery Program
Portfolio Contribution	As of August 2026, the pilot had demonstrated 2.1 MW of dispatchable capability. PGE's portfolio model forecasts 4.6 MW by the end of 2028.
Future Program Evolution	Scale proven peak-management capability; expand eligibility to qualifying small nonresidential batteries; refine performance-based compensation and customer enrollment; improve OEM and DERMS integration; continue targeted testing of additional grid services for future offerings.
Evaluation	Formal UM 1856 evaluation beginning in 2027, followed by ongoing evaluations consistent with Flexible Load framework.

Table 39. Smart Battery Objectives and KPIs

Objective	Attribute (what to measure)	Metric (how/what to measure)	Threshold (definition of success)
Demonstrate cost-effectiveness	Cost effectiveness	TRC	TRC of ≥ 1.0 TRC = 0.91
Program Satisfaction	Customer satisfaction	Survey research: Program satisfaction	>80% satisfaction rating

Table 40. Smart Battery Flex Load Acquisition (MW)

Flex Load Acquisition (MW)	2025	2026 Forecast	2028 Forecast
Summer	2.86 MW	3.29 MW	4.62 MW
Winter	2.86 MW	3.29 MW	4.62 MW

Table 41. Smart Battery Funding Sources

Funding	Forecasted for 2027-2028
Deferral	\$1,363,067
O&M	\$291,779
Total	\$1,654,846

Table 42. Smart Battery Forecasted Expenditures

Category	Forecasted for 2027-2028
Incentives [BEGIN CONFIDENTIAL]	[REDACTED]
Program Operations	[REDACTED]
Evaluation	[REDACTED]
Education and Outreach	[REDACTED] [END CONFIDENTIAL]
Total	\$1,654,846

3.5.5 DISTRIBUTED BATTERIES

For purposes of this MYP, “Distributed Batteries” refers to PGE-owned or PGE-operated battery systems deployed at specific sites to demonstrate and provide grid, microgrid, resilience, charging-management, and other operational use cases. These resources are distinct from the Smart Battery Program, which aggregates customer-owned behind-the-meter batteries through a customer participation offering. Distributed Batteries is not a single program or pilot; it is a group of demonstration and operational battery projects developed through UM 1856 and other PGE initiatives.

PGE’s experience with distributed batteries began before UM 1856 with the Salem Smart Power Center and expanded through additional battery demonstrations and projects intended to test a broader range of applications. Under UM 1856, PGE implemented several battery projects designed to generate practical operating experience across microgrids, generation co-location, distribution applications, and other grid-service use cases.

Additional projects, including the Integrated Operations Center and Daimler Electric Island batteries, were developed through separate initiatives and added to PGE’s broader distributed-battery operating experience.



Figure 7. UM 1856 Battery Energy Storage System Projects

Although Coffee Creek Energy Storage and Port Westward were completed under the UM 1856 framework, they are not considered part of the distributed battery fleet described here as they operate at the system level. Coffee Creek is helping PGE gain operational experience with a utility-scale energy storage system, as well as capacity, energy, ancillary services, and outage mitigation benefits to the grid. Port Westward is supporting co-generation frequency use cases.

Table 43. Distributed Batteries Overview

Site Name	Use Case	Battery Power (MW)
Anderson Readiness Center	UM1856 Microgrid	0.5
Beaverton Public Safety Center	UM1856 Microgrid	0.25
Daimler Electric Island	EV Megawatt charge management	0.75
Integrated Operations Center (IOC)	Microgrid	2.0
Salem Smart Power Center	Microgrid	3.9
Total Distributed Batteries MW's		7.4

PGE's Integrated Operations Center (IOC) battery energy storage system (BESS) was installed and acquired as part of the IOC Project. The Daimler Electric Island BESS was installed as a part of Schedule 53 to learn more about megawatt charging load management using an on-site battery.

These projects have demonstrated that battery energy storage systems can reliably provide grid services including frequency response, contingency reserves, demand response support, and resilience benefits for critical facilities. PGE's operational experience demonstrates that achieving reliable performance rests on several factors:

- Commissioning
- Controls integration
- Software and network management
- Long-term operational support

PGE's Distributed Battery projects have also provided valuable insights regarding maintenance requirements, market participation strategies, voltage support opportunities, and vendor lifecycle risk management. PGE is actively incorporating these learnings into future project standards and specifications to improve reliability, operational efficiency, and the value delivered by energy storage resources to customers and the grid.

PGE expects to report a more comprehensive description of its learnings from UM 1856 in 2028; PGE will use these insights to evaluate future distributed-storage use cases and the relationship among utility-owned batteries, customer-owned batteries, microgrids, and broader VPP operations.

At this time, PGE does not plan to expand its utility-owned distributed battery fleet following completion of the Salem Smart Power Center repower project. Instead, PGE will expand its available distributed battery solutions through Schedule 200 batteries, Schedule 199 large load flexibility options for batteries, Smart Battery program (expanding to include commercial

batteries), and a future microgrid offering developed through AR 681 and incorporating lessons learned from microgrid sites already installed and operating.

Refer to [Section 2.3, Market and Policy Evolution](#), of AR 681 – Microgrid Rulemaking, for additional details regarding the legislative and regulatory framework for microgrids. PGE and other stakeholders are actively engaged in the rulemaking process, contributing real-world operating experience to future offering design. The value of the existing distributed battery fleet during the 2027–28 biennium will primarily come from continued operation, integration, and learning rather than acquisition of additional distributed battery resources. [Table 44](#) shows expenditures supporting Distributed Batteries that were included in the VPP cost effectiveness analysis.

Table 44. Distributed Batteries: Funding Sources

Category	Forecasted for 2027–2028
Deferral	-
O&M	\$590,439
CAPEX	\$333,333
Total	\$923,772

3.6 Dispatchable Standby Generation

This program operates under PGE retail Tariff Schedule 200 (P.U.C. Oregon No. E-19, effective 03/19/25) and associated DSG agreements.

Dispatchable Standby Generation (DSG) allows PGE to use eligible customer-sited standby generators and batteries to support grid needs when those resources are not required for the customer’s own reliability needs. Resources that participate in PGE’s DSG program are upgraded, enabled, and operated to meet applicable environmental, telemetry, dispatchability, and operational requirements, turning otherwise-idle customer-sited equipment into an operational VPP resource. Rather than building new supply-side resources to meet contingency reserve and frequency response obligations, PGE compensates customers for making idle DSG capacity available to the grid. Dependable DSG capacity can reduce the amount of alternative capacity PGE would otherwise need to procure or construct, subject to resource availability, performance, and the service requirement.

DSG demonstrates an important aspect of the VPP operating model: distributed customer assets can provide meaningful system capability when they are visible, contractually available, measurable, and operationally reliable. DSG resources are materially different from thermostats or behavioral demand response but operate under the same principles: PGE must understand what capability is available, when it is available, how it will respond, and what it will deliver.

The DSG program operates under Schedule 200. DSG resources can support several system needs, including:

- Contingency reserve obligations
- Frequency response obligations
- Peak management
- Resource adequacy
- Battery optimization
- Localized grid needs

As of May 2026, PGE had approximately 135 MW of enrolled DSG nameplate capacity. PGE's contingency reserve obligation varies over time based on regional reserve-sharing requirements, PGE's resource and load position, and other applicable reliability obligations. For 2026, PGE's contingency reserve obligation is approximately 88 MW. Future requirements may change as the regional resource mix and PGE's share of reserve obligations evolve.

Other commitments, including self-supply or sales, may also impact PGE's total reserve capability calculations. Existing DSG resources provide meaningful support toward meeting these requirements, but PGE does not assume that its current DSG portfolio will satisfy all future reserve needs without continued attention to resource condition, contracts, availability, and changing system requirements.

During the period covered by the 2027-28 VPP MYP, PGE will focus on maintaining DSG as a dependable operational resource while continuing to standardize fleet requirements, strengthen telemetry and dispatch readiness, evaluate additional customer-sited battery opportunities, and improve PGE's ability to coordinate DSG with other distributed resources. Over time, improved resource and grid visibility may also help PGE deploy DSG to support more targeted locational applications.

DSG also supports PGE's affordability strategy because, while it does not eliminate the need for future generation, transmission, or distribution investments, it expands PGE's ability to deploy existing reliable, cost-effective, and qualified customer-sited resources in tandem with incremental infrastructure and supply-side options.

PGE's forecasts for DSG growth currently include large-load flexibility options available to customers through Schedule 96 and proposed Schedule 199, which PGE filed as part of its 2027 General Rate Case in OPUC Docket UE 47327. Large load flexibility customers are not eligible to receive the Schedule 200 incentives, as that flexibility is a byproduct of a service that the customer must fully fund themselves (except for any PGE equipment required to control the device). Since the control technology is the same used to control Dispatchable Standby Generation, PGE is including the large load flexibility and Schedule 199 MWs in this section until a new tariff is approved.

²⁷ Oregon Public Utility Commission, Docket UE 473, In the Matter of Portland General Electric Company, Request for a General Rate Revision. Available online: <https://apps.puc.state.or.us/edockets/DocketNoLayout.asp?DocketID=25142>

Please refer to [Section 3.8, Emerging Use Cases and Technologies](#), for additional details regarding new large-load flexibility options for data centers and large transportation-electrification load growth.

Without a programmatic expansion and standardization effort, PGE's existing portfolio of DSG resources is likely to:

- Contribute a declining share of dependable reserves as equipment ages or contracts expire.
- Require increased manual intervention by operations staff, increasing operational complexity and risk.
- Provide limited ability to support emerging VPP use cases, such as more granular locational dispatch or integrated coordination with other DERs (such as batteries and flexible load).

3.6.1 SCHEDULE 200 PROGRAM DETAILS

Regulatory Reference: Sch 200 (General Rate Case UE 435, UE 473, and prior rate cases).

Table 45. Program Snapshot and VPP Planning Summary

Program Attribute	Dispatchable Standby Generation
Product Phase (Pilot/Program)	Program
Primary VPP Role	Customer-sited generation supporting resource adequacy, contingency reserve, frequency response, peak management, battery optimization, and localized grid needs in constrained or high-priority areas.
Target Customers	Primary program participants are hospitals, water-treatment plants, data centers, military and government sites.
Portfolio Contribution	Schedule 200 includes approximately 135 MW of enrolled capacity in 2026, with a program enrollment forecast of 443.5 MW by the end of 2028, which includes Schedule 200, large load flexibility and Schedule 199 growth forecasts.
Future Program Evolution	Continue to mature program for customer-sited backup generation. Expand and standardize operations supporting battery and large load flexibility use cases. Expand enrolled DSG sites to continue providing resource adequacy as current fleet ages out of program.
Evaluation	DSG is a mature program which provides multiple grid services that are measured by type of event and services provided.

Table 46. DSG Objectives and KPIs

Objective	Attribute (what to measure)	Metric (how/what to measure)	Threshold (definition of success)
Demonstrate continued grid and energy value	Cost effectiveness	$TRC \geq 1.0$	$TRC = 3.37$
	Grow Schedule 199 & 200 enrollment	# of MW's enrolled	443.5 MW
	Perform grid services reliably (CRO availability, FFR performance)	Responsiveness for Contingency Reserve and Frequency Response	CRO response use case: 15 minutes Frequency response use case: less than 3 seconds

Table 47. DSG Enrollment Goals (MW)

Enrollment goals include current large load flexibility customers who have applied on interconnection and do not reflect full large load flexibility future growth interest.

Enrollment Goal (MW)	2025 Actual	2026 Goal	2027-2028 Goal
Summer	131 MW	147.3 MW	443.5 MW
Winter	131 MW	147.3 MW	443.5 MW

Table 48. DSG Funding Sources

Funding below reflects only the Schedule 200 costs to maintain the fleet including the Schedule 200 battery customers. Large load flexibility customers have to interconnect, maintain, and support their own dispatchable generation or energy supply; large load flexibility customers do not receive Aid in Construction payments.

Funding	2025-2026 Timeframe	Forecasted for 2027-2028
CapEX	\$11,235,790	\$5,302,452
O&M	\$8,192,514	\$11,184,347
AIC Amortization	\$2,352,790	\$3,402,957
Deferral	-	-
Total	\$21,780,809	\$19,889,756

Table 49. DSG Forecasted Expenditures

Category	2025-2026 Timeframe	Forecasted for 2027-28
Incentives [BEGIN CONFIDENTIAL]		
Program Operations		
Evaluation		
Education and Outreach		
Infrastructure		[END CONFIDENTIAL]
Total	\$21,780,809	\$19,889,756

3.7 VPP Portfolio Support

Operationally, PGE's VPP relies on shared investments and activities that support the portfolio as a whole, rather than being attributed or dedicated to an individual customer program or resource. PGE categorizes these shared capabilities and activities as "VPP Portfolio Support," and plans to spend \$3.7 million in capital, O&M, and deferral funding on this work during the 2027-28 biennium.

Portfolio Support includes portfolio-level administration and operating support, shared technology or data capabilities, training and education, Regional Technical Forum participation, regional market-transformation activities, and other investments necessary to operate and scale the VPP across multiple resources. As referenced in the VPP technology section, PGE is consolidating multiple Edge DERMS systems into one system and the \$1.4 million of capital costs associated with this transition is included \$3.7 million portfolio support request.

PGE's participation in the Northwest Energy Efficiency Alliance's End-Use Load Flexibility work is an example Portfolio Support activity. This work provides a regional pathway for advancing grid-ready technologies, interoperability, codes and standards, market readiness, and other barriers that individual utilities cannot efficiently resolve independently.

For 2027, PGE proposes \$550,000, a portion of the \$3.7 million proposed portfolio spend, in NEEA End-Use Load Flexibility funding to support the activities described in [Section 3.11.1.1, Northwest Energy Efficiency Alliance](#). PGE is not requesting 2028 NEEA funding through this MYP; any requests for subsequent funding will be submitted through the appropriate OPUC process once PGE evaluates progress against agreed-upon deliverables and has established an updated workplan, scope, and cost estimate.

3.8 Emerging Use Cases and Technologies

PGE applies a Product Lifecycle Management-based approach to its evaluation of emerging use cases and technologies, evaluating viable innovations to confirm scalability based on the learnings from market insights, technology demonstrations and other learning demonstrations.

This section describes PGE’s “Innovation-to-scale” pipeline process, as well as emerging use case demonstrations and new technologies PGE is or will be evaluating during the 2027-28 biennium.

3.8.1 INNOVATION-TO-SCALE PIPELINE

PGE relies on its Strategic Innovation and Product Lifecycle Management processes to support its emerging use case and technology decision-making. Early-stage work evaluates customer and system needs, technical feasibility, economics, integration requirements, and potential grid value before PGE commits to significant ratepayer investment. Demonstrations then test the specific uncertainties that must be resolved before the use case or technology can be more broadly deployed.

PGE’s Transportation Electrification planning illustrates how this approach works in practice. Rather than assuming that a single commercial managed-charging model should immediately become a program, PGE tests approaches including off-peak incentives, fleet demand response, optimization, and workplace charging to determine which technologies and participation models provide sufficient customer value, grid benefit, performance, scalability, and cost-effectiveness to advance.

Across its VPP portfolio, PGE expects demonstrations and pilots to result in one of four outcomes:

- Advance toward a scalable program or operating capability.
- Integrate the capability or learning into an existing program, platform, tariff, or customer pathway.
- Continue targeted testing to resolve a defined remaining uncertainty.
- Conclude the activity when it does not demonstrate sufficient customer value, system value, performance, scalability, or cost-effectiveness.

This approach avoids a “perpetual pilot” model. Continued investment should be tied to a specific unanswered question and a credible pathway for applying the resulting learning.

3.8.2 DEVELOP LOCAL FLEXIBILITY SOLUTIONS

A Non-Wires Solution (NWS) is an investment, strategy, or action intended to defer, reduce, or remove the need for a traditional utility solution, such as upgrading a substation or distribution line, by addressing an identified distribution-system need in a specific geographic area. NWS can include combinations of distributed energy resources (including customer-sited resources such as flexible load) and enabling technologies.

For the VPP, Non-Wires Solutions present an opportunity to increase the value of resources used to meet broader system needs by determining whether those same resources can also be used to address local distribution constraints. For example, Flexible Load resources located downstream of constrained equipment may be able to reduce demand during the hours driving an identified capacity need. Where that response is dependable, persistent, and cost-effective, it may provide an alternative or complement to a traditional infrastructure investment.

This is a practical application of the “Unlock before build” principle described in [Section 1.2.2, Affordability](#). PGE does not assume that an NWS is preferable to a traditional grid investment under all circumstances. Traditional infrastructure benefits from established planning and engineering practices, long asset lives, and well-understood reliability performance. NWS is a developing capability that requires PGE to establish equivalent rigor around resource availability, customer participation, technical performance, economics, and long-term reliability to support deployment of these alternative solutions.

3.8.2.1 Non-Wires Solution Strategy

PGE’s near-term NWS strategy is to first determine whether existing VPP resources and operating platforms can provide some or all of the additional capability required to resolve a localized flexibility constraint before procuring new utility-owned resources or specialized equipment.

Many utility industry NWS strategies rely on dedicated storage, new distributed assets, or advanced controls installed specifically to address an identified constraint. While these approaches may be appropriate for some future PGE needs, initially, PGE will test whether the Flexible Load resources already active in its VPP portfolio can also provide the required distribution value in the location where it is needed. This approach can help PGE better understand the incremental value of existing customer resources before adding the cost of a dedicated solution.

Initially, PGE is considering distribution needs that occur during periods that also align with broader system peaks. This provides a practical starting point because existing VPP dispatches may be able to address both needs without immediately requiring fully automated feeder-specific dispatch.

As PGE’s resource data, DERMS capabilities, and distribution system integration mature, future iterations will help PGE group and dispatch resources in a particular location based on a local grid condition, rather than only as part of a system-wide event. This approach requires PGE to understand where participating resources are located, how much dependable flexibility is available within a constrained area, and whether those resources can respond for the duration and frequency required to meet the distribution need.

Customer participation is also crucial to effective NWS deployment. A local grid need creates a different acquisition challenge than a territory-wide problem because the required operational flexibility must be provided by customers located within a defined portion of the distribution system. During the 2027-28 biennium, PGE will strengthen integration between Distribution planning, resource planning, Flex Load Portfolio Planning, community engagement, Grid operations, and VPP operations to improve its ability to consider locational value as an integral part of its VPP portfolio.

3.8.2.2 NWS Demonstrations and Framework Development

PGE understands the importance of considering a range of potential solutions to address identified grid needs and has dedicated significant effort in recent years to building a foundation that includes the resources, technical capabilities, tools, and processes required to effectively

plan and test NWS. In parallel, PGE has also been exploring potential NWS concepts; beginning in 2027, PGE intends to develop, execute, and evaluate two related NWS strategies:

- An initial NWS demonstration using existing VPP capabilities
- A repeatable framework for identifying and evaluating future NWS opportunities.

PGE's Distribution Planning, VPP Flex Load, and Resource Planning teams are collaborating in the development of an updated NWS framework, which establishes multiple criteria to help PGE identify and evaluate viable NWS candidates:

- Extent of the load constraint on feeder and its timing.
- Cost of traditional upgrade.
- Energy equity index.
- Known and forecasted load growth on feeder.
- Permitting risk associated with deploying a traditional upgrade.

Based on the criteria, Distribution Planning prioritizes feeders for consideration by PGE's Flex Load team, which in turn analyzes the VPP Flex Load potential at those specific feeders to determine which feeders are appropriate for advancing with NWS concept.

These demonstrations will test whether existing Flexible Load resources can provide dependable value for identified distribution system needs. In addition to assessing resource performance, this work will help PGE identify and understand which customer acquisition, resource availability, dispatch coordination, measurement, and operational process adjustments are required to provide additional operational flexibility within a specified geographic area.

This demonstration will also inform PGE's broader planning capabilities, specifically, in the development of a more repeatable process for identifying distribution needs that warrant further NWS evaluation, as well as instances in which a distributed solution should be considered in tandem with traditional infrastructure investment.

However, not every grid need can be addressed through an NWS. The suitability of a distributed solution depends on factors that include the nature and timing of the constraint, asset age and condition, reliability requirements, required duration and frequency of response, expected load growth, resource availability, customer participation, persistence of the solution, implementation timing, cost, and operational feasibility. In some locations, customer flexibility may help PGE reduce or defer a capacity-driven upgrade, but aging or deteriorating equipment may still need to be replaced to maintain safe and reliable service.

3.8.3 LARGE LOAD AND INDUSTRIAL FLEXIBILITY

Large Load and Industrial Flexibility is an increasingly important application of PGE's broader VPP capabilities. As data centers, industrial facilities, large commercial charging depots, and other large energy-use facilities connect to PGE's system, the scale and concentration of those loads can create significant new generation and grid requirements. At the same time, some large customers have onsite generation, storage, or controllable load that can provide meaningful flexibility.

PGE does not assume that all large loads can or should be curtailed. Rather, PGE is increasingly evaluating flexibility as part of understanding how significant new loads will both use and benefit the system: what portion of the load must be continuously served, what portion may be shifted or reduced, how reliably that flexibility can be provided, and whether it can create cost-effective value for customers and the grid.

This work is occurring within a new large-load regulatory and service framework. In 2025, Oregon enacted the POWER Act (House Bill 3546²⁸), directing the Commission to establish a new classification of service for large energy use facilities capable of using 20 MW or more and to address the costs and risks associated with serving those loads. In UM2377, under Order No. 26-154²⁹, entered May 7, 2026, the Commission established Schedule 96 for qualifying large energy use facilities of 20 MW or more and adopted related revisions to Schedules 89 and 90 and PGE's Rules C and I. Compliance rates took effect July 8, 2026.

PGE's large-load service process has also become more structured through UE 430. Large-load customers enter a defined service queue and fund the studies needed for PGE to evaluate the generation, transmission, distribution, and other system requirements associated with serving the proposed load. This provides an earlier and more disciplined opportunity to understand the characteristics of significant new loads before PGE commits to major system investments or service arrangements.

The Schedule 96 framework primarily addresses the costs and risks associated with serving large loads and helps protect other customers from cost shifting. Load flexibility presents a related but distinct opportunity. A large customer capable of reliably reducing, shifting, storing, or otherwise managing a portion of its demand may have different system characteristics than an otherwise comparable inflexible load. PGE's objective is to identify and appropriately utilize those differences where they can be demonstrated.

Flexibility was considered in the UM 2377 proceeding, including a proposal for a separate flexible-load subclass with defined performance, telemetry, and flexibility requirements. However, the OPUC chose not to adopt that proposal in Order No. 26-154. PGE's approach does not depend on creation of a separate subclass. Instead, PGE can continue developing large-load flexibility through existing programs, customer agreements, operating requirements, and, where appropriate, future regulatory mechanisms such as Schedule 199.

PGE already has practical experience incorporating large-customer flexibility into grid operations. Energy Partner on Demand and Dispatchable Standby Generation establish operating precedents for identifying available capacity, defining customer obligations, issuing dispatch instructions, and measuring performance. PGE has also begun incorporating flexibility

²⁸Oregon Legislative Assembly, House Bill 3546 (2025), Chapter 323, Oregon Laws 2025. Available online through the Oregon Legislative Information System

(<https://olis.oregonlegislature.gov/liz/2025R1/Measures/Overview/HB3546>)

²⁹ Oregon Public Utility Commission, Order No. 26-154, Docket UM 2377 (May 7, 2026). Available online through Oregon Public Utility Commission eDockets

(<https://apps.puc.state.or.us/edockets/DocketNoLayout.asp?DocketID=24470&OrderBy=ActionType>)

commitments into large-load customer arrangements, including requirements for defined capacity to install equipment similar to Dispatchable Standby Generation where appropriate.

Depending on the customer and its operations, Large Load and Industrial Flexibility may include:

- Controllable industrial or process load
- Flexible commercial charging load
- Customer-sited energy storage
- Backup generation
- Combinations of load, storage, generation, and controls.

PGE intends to continue evaluating flexibility as an intentional part of its large-load study and service development processes. The large-load queue and customer-funded study requirements established through UE 430 provide an opportunity to identify potential flexibility earlier, alongside the infrastructure and resource requirements associated with serving the customer. Where meaningful flexibility exists, PGE can then evaluate how that capability should be reflected in customer agreements, VPP participation, operating requirements, and system planning.³⁰

During the next two years, PGE will continue integrating large-load flexibility into its broader VPP strategy by evaluating how existing Flexible Load and DSG capabilities apply to large customers; how verified flexibility can be incorporated into customer arrangements; and how large-load flexibility should interact with system planning, flexible interconnection concepts, and future tariff development.

PGE is not requesting approval of a specific new flexible-load tariff structure through this MYP. Any new tariff, special contract structure, or other regulatory mechanism requiring Commission approval would be brought forward through the appropriate proceeding.

3.8.4 SMART GRID TEST BED

PGE's Smart Grid Test Bed (SGTB) project, Docket UM 1976³¹, provides a structured environment for testing emerging distributed energy resource technologies, customer participation approaches, controls, integrations, and operating processes under real-world conditions. The SGTB serves as an important bridge between innovation, distribution planning, and PGE's VPP portfolio.

The Smart Grid Test Bed provides technical, customer, operating, and cost information that PGE uses in its broader Product Lifecycle Management process. SGTB demonstrations are intended to

³⁰ Oregon Legislative Assembly, House Bill 3546 (2025). Available online: <https://olis.oregonlegislature.gov/liz/2025R1/Measures/Overview/HB3546>. See also Oregon Public Utility Commission, Docket UM 2377, including Order No. 26-154. Available online: <https://apps.puc.state.or.us/edockets/DocketNoLayout.asp?DocketID=24470&OrderBy=ActionType>; and Docket UE 430, large-load service proceeding. Available online: <https://apps.puc.state.or.us/edockets/DocketNoLayout.asp?DocketID=23949>

³¹ Oregon Public Utility Commission, Docket UM 1976, PGE Deferral of Expenses Associated with Demand Response Testbed Pilot. Available online: <https://apps.puc.state.or.us/edockets/docket.asp?DocketID=21662>

resolve defined uncertainties and produce actionable evidence regarding technology performance, customer use cases, integration requirements, operating requirements, cost, and potential grid value.

As demonstrations reach decision points, PGE applies that evidence through the Product Lifecycle Management process described in [Section 3.8.1, Innovation-to-Scale Pipeline](#), to determine whether a capability should advance, be integrated into another program or operating capability, continue targeted testing, or conclude.

In this way, SGTB supports PGE's broader objective of using pilots and demonstrations as a pathway to decisions and scalable VPP capabilities rather than as an ongoing end state.

3.9 Smart Grid Test Bed Demonstrations (SGTB)

Regulatory Reference: Sch 13 SMART GRID TESTBED TECHNOLOGY VALIDATION AND TESTING (Deferral UM 1976)

SGTB Phase I helped inform PGE's foundational approach to demand response, flexible load, customer engagement, and distributed-resource coordination. Phase II builds on that foundation by focusing more directly on resource development, DER deployment, and the operational capabilities required to use distributed resources to meet customer and grid needs.

Phase II includes six major areas of investigation:

- Flexible Feeder
- Commercial, Industrial, & Municipal Flexible Load and Resiliency
- Distributed PV/Smart Solar
- Connected Water Heaters
- Managed EV Charging and V2X
- Single Family New Construction

3.9.1 LEARNINGS FROM THE LAST MYP

SGTB Phase II has produced practical technical and operating insights relevant to PGE's VPP strategy. Demonstrations test defined uncertainties and produce evidence regarding technology performance, customer use cases, controls, integration requirements, operating performance, and cost. PGE evaluates those results through the Product Lifecycle Management process described in [Section 3.8.1](#) when determining whether a capability should advance.

Table 50. SGTB Learnings with Real-World Applications

VPP Component	Insights
Managed EV Charging	Coordinated EV charging can reduce feeder EV peak load by up to 40% when paired with sufficient EV adoption while maintaining high customer satisfaction.
Smart Solar Inverter Testing	Demonstrated the potential for low-cost voltage management that can improve power quality, support grid stability, and extend the useful life of distribution assets, while also identifying implementation considerations that must be addressed before broader deployment.
Flexible Feeder	Including the DOE-funded SALMON project, has advanced digital twin and DERMS integration testing at National Laboratory of the Rockies and demonstrated advanced load management modeling,
	Initiated integration of a new thermostat into PGE's Commercial Thermostat program.
DERs	In the North Portland SGTB Collaboration neighborhood, PGE has deployed DERs in collaboration with Energy Trust of Oregon and Community Energy Project to test community-based DER adoption and operating models.

These results have also informed PGE's Distribution System Plan and Non-Wires Solutions work by clarifying the telemetry, controls, customer participation requirements, and operating processes needed to use customer and distributed resources in planning and grid operations.

One important component of this work is the Department of Energy-funded Connected Communities Smart Grid Advanced Load Management and Optimized Neighborhood (SALMON) project. In partnership with the National Laboratory of the Rockies, PGE has developed a digital twin model that performs at greater than 95% accuracy when compared with real-world grid conditions. The model allows PGE to evaluate distributed-resource types and dispatch strategies before field deployment and can inform the screening and design of local flexibility applications described elsewhere in this Plan.

SGTB Phase II is a seven-year project with a total budget of approximately \$11 million. As individual demonstrations reach decision points, PGE applies the resulting evidence through the Product Lifecycle Management process described in [Section 3.8.1](#).

3.9.1.1 Vehicle-to-Grid (V2G)

Bidirectional electric-vehicle technologies are an emerging form of distributed storage that could ultimately allow vehicle batteries to provide grid services. PGE has been evaluating Vehicle-to-

Grid (V2G) and Vehicle-to-Everything (V2X) capabilities through demonstrations designed to test technical performance, customer use cases, interoperability, and interconnection requirements.

PGE's school bus V2G work has demonstrated both the potential of this technology to improve grid performance and the barriers remaining to this approach. In 2024, testing with one bus and one charger included 27 summer discharge events.³² The battery discharged energy to the grid during 70% of the events, demonstrating that the vehicle and charger were technically capable of providing V2G response. However, discharge alone did not constitute a successful event.

Many events experienced issues with starting on time or managing charging during the peak period, resulting in an overall successful event rate of 22%. The demonstration did not establish the level of operational reliability needed to scale the technology, but it identified important lessons regarding vehicle-charger integration, communications, scheduling, and automation that PGE is continuing to test.

PGE's V2G and V2X SGTB assessments are ongoing; in 2025, PGE expanded testing to assess additional bus and charger configurations across two sites. SGTB results to date indicate that while the underlying storage capability is promising, reliable operation will depend on effective interoperability between the vehicle, charger, software, communications, and utility systems.

PGE is also using SGTB to evaluate residential V2X applications, including the ability of a bidirectional vehicle – an electric vehicle equipped with technology that allows it to draw power to charge its battery, or discharge stored energy for home or grid use – to offset home load and potentially export to the grid during peak times. This work includes evaluation of grid impacts, customer experience, equipment requirements, and the interconnection processes needed for safe bidirectional operation.

During the 2027-28 biennium, PGE will continue using demonstrations to assess and resolve interoperability and operational barriers before promoting V2G to a scaled VPP resource. PGE's near-term objective is to establish the technical, customer, and operating conditions under which bidirectional vehicles can reliably contribute to the VPP portfolio, rather than assuming that EV batteries are equivalent to stationary storage.

These activities are funded and governed through PGE's Transportation Electrification Plan or Smart Grid Test Bed regulatory pathways and are included in this MYP because they inform future VPP capability. No duplicate funding approval is requested through this filing.

3.10 Additional EV Charging Demonstrations

PGE's Transportation Electrification Plan includes managed-charging demonstrations that are funded and governed separately from the VPP MYP but may provide useful learning about technologies, customer participation models, and operating approaches that could support future flexible-load capability:

³² Portland General Electric, 2025 Transportation Electrification Annual Report, Oregon Public Utility Commission Docket UM 2033, pp. 289-290. Available online: <https://edocs.puc.state.or.us/efdocs/HAQ/um2033haq336533034.pdf>

- **Commercial Managed Charging Demonstration:** PGE's commercial managed-charging work began with a study of potential strategies for fleet, multifamily, public, and workplace charging. The study found meaningful long-term load-management potential, particularly as medium- and heavy-duty vehicle adoption grows, but also found that commercial managed-charging technologies and program models remain less mature than comparable residential approaches.

Based on those findings, PGE is using targeted demonstrations to determine which combinations of technology, rate design, customer participation, and operating controls can provide scalable customer and grid value before considering broader program deployment.

- **Multifamily Managed Charging Demonstration:** PGE tested telematics-based managed charging with 10 EV drivers living in multifamily properties from May through October 2025. The demonstration tested whether vehicle charging could be shifted without requiring control through a shared charging station and whether common multifamily conditions, including underground parking, would create significant connectivity or customer-experience barriers.

The demonstration successfully shifted nearly 1 MWh of charging across the participating vehicles while preserving customers' ability to override managed schedules when needed. It also demonstrated that telematics-based control could operate reliably in the tested multifamily environment.

These results indicate that multifamily customers with dedicated charging arrangements may be able to participate through approaches similar to PGE's existing Residential Smart Charging Pilot. PGE will use the demonstration findings to inform future eligibility, enrollment, verification, and tariff considerations through the Transportation Electrification planning and regulatory processes.

3.10.1 ADDITIONAL DEMONSTRATIONS AND INSIGHTS

Other demonstrations completed or advanced during the prior MYP period have helped PGE evaluate emerging flexible-load technologies and determine whether they are ready to scale, require additional targeted testing, or should not advance under current market conditions.

- **Single Family Water Heater Learnings:** PGE, NEEA, the Smart Grid Test Bed, and PGE+ Marketplace activities have evaluated connected heat-pump water heaters and universal control modules as potential flexible-load resources. Demonstrations showed that the technology can provide measurable load-shifting and that trade ally-supported installation can significantly improve customer enrollment and completion. The work also identified substantial barriers to scale. Current equipment acquisition, integration, software, and customer-delivery costs do not provide a clear cost-effective pathway for a scaled PGE offering.

PGE will preserve these learnings and continue working through NEEA, Energy Trust, and future technology demonstrations as the market develops. Any future water-heating offering would need to demonstrate improved economics, reliable connectivity and

dispatch performance, and a scalable customer-acquisition pathway before advancing through PGE's Product Lifecycle Management process.

- **Grid-Enabled Window ACs/Micro Heat Pumps:** PGE tested grid-enabled window air conditioners in five renter-occupied homes to evaluate customer experience and demand-response capability. The devices responded to dispatch instructions and provided measurable load reduction while operating, and participating customers reported positive comfort and usability experiences. The demonstration also identified limitations affecting resource reliability and scalability, including intermittent customer use, limited product compatibility, dependence on manufacturer coordination, and limited experience during extreme weather conditions.

PGE will continue monitoring technology and vendor readiness and may conduct additional targeted testing where it can resolve specific remaining uncertainties. Current results do not support advancement to a scaled VPP offering.

- **Smart Panel:** PGE completed a technical demonstration of the SPAN Smart Panel to evaluate whether whole-home load controls could dynamically manage customer demand and potentially support electrification without immediately requiring larger customer-side electrical upgrades. Testing demonstrated that the panel could manage multiple household loads, including throttling EV charging, temporarily pausing water heating, prioritizing circuits, and maintaining total household demand within defined electrical limits. The demonstration established the technical capability of whole-home load management but did not establish a scalable VPP use case.

PGE will use these results to inform continued evaluation of managed electrification and whole-home flexibility. Any future program development would proceed through PGE's Product Lifecycle Management process based on demonstrated customer value, system value, operating performance, scalability, and cost-effectiveness.

3.10.2 ADDITIONAL EMERGING EXPLORATIONS IN 2027-2028

3.10.2.1 Schedule 38 – Fleet Managed Charging Demonstration

Schedule 38 provides an alternative to standard commercial time-of-use rate structures by eliminating a demand charge and recovering costs through kilowatt-hour charges. This structure can be particularly useful for commercial customers with variable or infrequent loads, including EV fleets and public charging sites, because it provides greater predictability around charging costs.

In 2024, PGE expanded eligibility for Schedule 38 to separately metered EV charging loads up to 4,000 kW. Through UE 435, PGE also revised Schedules 38, 83, 85 and 89 to introduce a mid-peak period and increased the Schedule 38 on-peak to off-peak price differential from 1.5 cents per kWh to 3.0 cents per kWh. PGE will continue monitoring how these changes affect customer usage patterns and bills and will use that experience to inform future rate design.

PGE's Fleet Time-of-Use demonstration provides early evidence that, when paired with rate education and consultation, a well-designed rate signal can create meaningful flexibility without

requiring an additional event-based incentive. Across 10 participating fleet sites, fleet managers shifted 61% of their kWh to off-peak hours and achieved an average 8% reduction in energy bills.

These results demonstrate that managed load does not always require direct utility control. Rate design, customer education, and clear economic signals can also move consumption into periods that provide greater value to both the customer and the system.

3.10.2.2 Schedule 32 – Time of Use

Schedule 32 Time of Use is PGE's voluntary time-varying rate option for qualifying small nonresidential customers. It allows customers to respond to differentiated energy prices based on the time of day and season, creating an opportunity for customers with flexible operations to reduce their bills while shifting discretionary consumption away from higher-cost or more constrained periods.

PGE's experience with residential Time of Day and Schedule 38 demonstrates the importance of providing customers with clear information about both potential savings and the behaviors necessary to achieve them. During the 2027-28 biennium, PGE will be exploring which lessons learned from Schedule 38 and Time of Day programs apply to Schedule 32 small commercial customers. This assessment will include the viability, costs and potential utilization of a Rate Comparison Tool, as well as explore the customer's ability to sign up and view savings achieved on a Business Customer Dashboard.

Implementation timing for this enhanced functionality will depend on related Customer Information System modernization work. Once it has determined the appropriate scope and confirmed costs for this effort, PGE will review options through its Demand Response Advisory Group (DRAG) and propose changes through UM2141.

3.10.2.3 Growth of Cold Storage, Irrigation and Agriculture

PGE will continue exploring opportunities to expand demand response participation among agricultural, irrigation, and cold-storage customers as part of its 2027-28 VPP strategy. Schedule 26 provides a potential pathway for these customers because many of these loads are seasonal, operationally significant, and concentrated during summer conditions when system needs can also be high.

PGE plans to assess the flexible load potential of agriculture, irrigation and cold storage during the 2027-2028 timeframe. PGE will use the results of the assessments to determine whether any of the options have a viable path forward. The opportunities will be evaluated through PGE's Product Lifecycle Management (PLM) process, including stage-gate consideration of customer value, grid benefit, technical and operational feasibility, evaluability, cost-effectiveness, and readiness to advance.

PGE will bring the results to the OPUC, including the customer opportunity, identified system or locational grid value, expected performance, required program-design changes, and cost-effectiveness. If the PLM process indicates that additional field validation is warranted before broader implementation, PGE will propose an appropriate pilot for OPUC review.

- **Agriculture and Irrigation:** Initial PGE analysis identified more than 2,000 agricultural and irrigation account holders with a pronounced seasonal load profile. Aggregate load

associated with these accounts exceeds 31.2 MW in July and falls to less than 2 MW during winter months.

During the 2027-28 biennium, PGE will evaluate this opportunity through a targeted Energy Partner on Demand market-development effort. PGE will map agricultural and irrigation load against system, feeder, and substation needs to determine whether the resource aligns with summer peak or localized grid constraints; engage customers and industry partners to understand operating limitations; and evaluate whether existing Schedule 26 enrollment, nomination, event, baseline, and incentive structures need to be adapted for irrigation customers. PGE will also use experience from other utility agricultural demand response programs to inform program design.

- **Cold Storage:** Cold storage facilities are another potential Flexible Load opportunity because refrigeration systems represent significant controllable load. In some applications, thermal mass and pre-cooling may allow electricity use to shift outside constrained or higher-value periods while maintaining product-temperature and operational requirements. Existing equipment such as variable-speed compressors, refrigeration controls, and building automation systems may also provide a pathway to participation without requiring significant new control equipment at every facility.

PGE identified cold storage for further evaluation through preliminary screening of commercial and industrial end uses based on load magnitude, potential controllability, existing automation, operational flexibility, and experience from demand response programs in other utility territories. This screening identifies opportunities for further study; it does not by itself establish that cold-storage flexibility will provide sufficient customer or system value to support a new offering.

During the 2027-28 biennium, PGE will evaluate candidates for cold-storage loads in greater detail. This work will include analyzing hourly and seasonal load shapes; identifying customer operating and product-temperature constraints; assessing the prevalence and capability of existing refrigeration controls; evaluating potential fit within Schedule 26; and mapping candidate facilities against system, feeder, and substation needs. PGE will use this analysis to determine whether cold-storage flexibility could provide system peak, capacity, energy, or locational grid value and whether the timing and duration of that flexibility align with PGE's operating needs.

3.11 Strategic Partnerships and Market Development

PGE cannot efficiently advance every technology, technical standard, customer pathway, and enabling capability independently. Strategic partnerships allow PGE to leverage regional research, market transformation, technical expertise, customer-delivery networks, equipment manufacturers, aggregators, and other market participants to reduce duplication of effort and accelerate the development of additional VPP capabilities.

PGE will also continue evaluating opportunities to coordinate with the Portland Clean Energy Fund (PCEF), Community Action Agencies, and other community-based organizations where existing investments in building efficiency, electrification, or grid-enabled technologies may

complement voluntary VPP participation. These partnerships are exploratory and do not represent a separate VPP program or funding request in this MYP.

For purposes of this section, “market development” refers primarily to development of the equipment, technology, customer pathways, and delivery ecosystem that enable the VPP to scale. This is distinct from PGE’s participation in regional energy markets, including WEIM and EDAM, which is discussed separately in this Plan.

3.11.1 REGIONAL PARTNERSHIPS

3.11.1.1 Northwest Energy Efficiency Alliance

Table 51. Partnership Snapshot and VPP Planning Summary

Program Attribute	2026 – 2027 Plan Summary
Activity Type	Regional market transformation and VPP enablement
Primary VPP Role	Improve market readiness for grid-ready, connected, flexible end-use equipment
Direct MW Contribution	No direct MW acquisition; supports future scalability of flexible load resources
PGE Role	Active funder and shaping partner focused on practical, accountable, non-duplicative work
Key Focus Areas	Codes and standards, connected-device readiness, water heaters, variable speed heat pumps, batteries, EVs, commercial controls, multifamily systems, and market transformation metrics
Customer Affordability	Reduces the risk that individual utilities separately fund duplicative market research, custom integrations, technology development, and program-specific workarounds to overcome common equipment and standards barriers
2027 Priority	Produce decision-ready outputs that help PGE and regional utilities make better decisions about VPP-enabling technologies, equipment standards, and flexible end-use market pathways

PGE has long supported regional market transformation through core funding to the Northwest Energy Efficiency Alliance (NEEA) via its funding agreement with Energy Trust of Oregon. PGE participates in NEEA’s End-Use Load Flexibility work to address regional technology and market barriers that are difficult for an individual utility to resolve efficiently. The work does not directly acquire MW for PGE; instead, it supports market readiness for connected, interoperable, grid-enabled technologies that can improve the scalability and cost of PGE’s existing and future VPP offerings.

[Table 52](#) summarizes the specific 2026–2027 deliverables PGE expects from this partnership and how those deliverables support PGE’s VPP.

Table 52. Key 2026-27 NEEA Deliverables and PGE Value

Workstream	Key 2026 – 2027 Deliverables	How it Supports PGE’s VPP
Codes and Standards	Action plan, initial model code language, flexible demand appliance standards framework, and standards committee updates	Helps move the market toward grid-ready equipment and buildings, reducing future need for PGE-specific workarounds
Connected Water Heaters	Market transformation strategy, CTA-2045 implementation guide, OEM commitments, and demonstration learnings	Advances interoperable water-heating technologies and provides PGE with information and operating experience that can inform the design and potential future implementation of a new flexible water-heating offering
Residential HVAC, batteries, and EVs	Variable-Speed Heat Pump (VSHP) specification work, battery market assessment and demonstration planning, EV market assessment and managed charging demonstration plan	Supports continuous improvement of PGE’s existing residential HVAC, battery, and EV programs by applying lessons learned on interoperability, customer experience, performance, and scalable OEM integration. PGE can also share operating experience from these programs with NEEA and regional partners to help inform common technology and standards requirements.
Multifamily and commercial load flex	Central water heater findings, commercial controls assessment, Luminaire-Level Lighting Controls (LLLC) + HVAC standards and demonstrations	Helps connect energy efficiency and flexible load in harder-to-reach building segments and informs future customer offerings including integrating grid connectivity into the energy efficiency “measure” development
Market Transformation Metrics	Grid Values Tool, Market Transformation progress indicators, and data strategy	Provides PGE with a basis for evaluating whether its investment in NEEA market transformation activities is producing measurable progress and customer and system value, while supporting future cost-effectiveness and regulatory review

PGE has informed NEEA that it will not fund work that re-creates activities already underway within PGE. The value of this partnership lies in addressing regional market barriers that PGE cannot efficiently solve on its own. PGE has therefore placed particular emphasis on codes and standards, where regional market transformation can create durable value. Incorporating flexible-load capability into equipment specifications, codes, voluntary standards, qualified product lists, and manufacturer practices can reduce the need for customized utility integrations and workarounds as programs scale. This is particularly important for technologies such as water heaters, variable-speed heat pumps, commercial controls, batteries, EVs, small and medium commercial HVAC and lighting systems.

Additional information on PGE's 2027 NEEA funding request and the condition for any future funding is provided in [Section 3.7, VPP Portfolio Support](#).

3.11.1.2 Regional Technical Forum

The Regional Technical Forum (RTF) provides PGE and other Northwest utilities with common, publicly reviewed technical methodologies for evaluating energy efficiency and demand-response resources. Since expanding its work to include demand response, the RTF has developed standardized demand-impact products that can inform utility planning, program design, and regional assessments of flexible-load potential.

This work is relevant to PGE because many customer technologies can provide more than one type of value. Equipment such as connected thermostats, EV charging, and irrigation pump controls may reduce overall energy consumption, shift when electricity is used, or provide dispatchable load flexibility. Current RTF demand-response products address several of these technologies and provide a regional reference for estimating demand impacts.³³

The distinction between energy-efficiency savings and flexible-load capability is particularly important when PGE and Energy Trust coordinate customer offerings. Some technologies enter the market through an Energy Trust efficiency pathway which reduces the customer's upfront equipment cost and can also create an opportunity for a PGE Flexible Load program. If the recognized energy-savings value of an underlying efficiency measure changes, the economics of that customer-acquisition pathway may also change. That does not necessarily mean, however, that the equipment no longer provides demand-response capability.

Connected thermostats illustrate this distinction. The energy-efficiency savings attributed to a thermostat measure and the load reduction available from controlling HVAC during a demand-response event are different resource attributes and should be evaluated based on the value each provides. A change to the efficiency treatment of the equipment may affect the cost of acquiring or deploying the resource, while its ability to provide measurable peak reduction or other flexible-load value remain unchanged.

PGE will continue to monitor and use applicable RTF demand-response methodologies and work products where they can inform VPP planning, evaluation, cost-effectiveness, and program

³³ Regional Technical Forum, Demand Response Technologies. Available online: <https://rtf.nwccouncil.org/demand-responses/?sort=-title>

design. PGE also has an interest in regional methodologies that increasingly recognize the multiple ways customer technologies can provide energy, capacity, and flexibility value.

3.11.1.3 Energy Trust of Oregon Coordination

PGE and Energy Trust of Oregon coordinate activities through the Utility-Specific Action Plan (USAP), established under HB 3141. The USAP provides a formal mechanism for the two organizations to identify and advance utility-specific activities that require joint coordination. Following Energy Trust's transition to its 2026-2030 Multiyear Plan, the USAP operates on a rolling six-quarter planning horizon, with SMART initiatives submitted annually through the ETO-1 docket and revisited quarterly as work progresses. The most current annual USAP is filed publicly with the Commission in Energy Trust's ETO 1 docket.³⁴

The current PGE-Energy Trust USAP is organized around three shared areas of focus: affordability; accelerating savings and generation in support of State clean-energy goals; and co-development and co-deployment of demand-side management and distributed energy resources. For PGE's VPP, this coordination creates an opportunity to better connect Energy Trust's efficiency, renewable energy, storage, customer-delivery, and market infrastructure with PGE's flexible-load programs and solar and storage programs.

The primary strategies underway during 2026-2027 are summarized below.

Table 53. PGE and Energy Trust USAP Elements 2027-28

2026 – 2027 Strategy	PGE and Energy Trust Focus	Relevance to PGE's VPP
Coordinated Offer and Technology Delivery	Maintain a common framework for identifying opportunities for coordinated program design, delivery, marketing, evaluation, and technology deployment across Energy Trust and PGE offerings.	Creates a repeatable pathway for connecting efficiency and DER adoption with PGE flexible-load opportunities instead of developing a separate coordination approach for each technology.
Affordability and Multifamily Coordination	Coordinate outreach and delivery of no-cost efficiency opportunities for customers enrolled in PGE's Income-Qualified Bill Discount program and develop a coordinated approach for multifamily customers.	Can connect affordability and efficiency investments with future flexible-load opportunities while improving the customer experience for customers who may otherwise face barriers to participation.

³⁴ Energy Trust of Oregon and Portland General Electric, Utility-Specific Action Plan: Q1 2026-Q2 2027, Oregon Public Utility Commission Docket ETO 1. Available online: <https://edocs.puc.state.or.us/efdocs/HAH/eto1hah342756037.pdf>. See also Docket ETO 1: <https://apps.puc.state.or.us/edockets/DocketNoLayout.asp?Child=servlist&DocketID=24724>

2026 – 2027 Strategy	PGE and Energy Trust Focus	Relevance to PGE's VPP
Home Energy Reports	Co-develop Home Energy Reports, including program-design inputs, customer communications, measurement, and evaluation, with launch currently planned for 2027.	Provides a coordinated behavioral energy-management pathway and additional experience using customer information to support energy reduction and load-shifting strategies.
Industrial Controls and Flexible Load	Evaluate control systems and customer types that may qualify for both Energy Trust Production Efficiency offerings and PGE's Energy Partner on Demand program, including opportunities to better coordinate referrals, delivery, and incentives.	Helps identify where investments in industrial controls can provide both efficiency and dispatchable flexible-load value.
Solar and Battery Storage	Review PGE and Energy Trust solar and storage offerings, identify areas of overlap or misalignment, and determine where coordinated delivery and marketing may be feasible.	Helps connect customer adoption of distributed solar and storage with resources and operating capabilities relevant to the broader VPP.
Commercial Smart Thermostats	Coordinate customer and trade-ally outreach between Energy Trust's commercial smart thermostat offering and PGE's Energy Partner Smart Thermostat program.	Provides a clearer pathway for an efficiency investment to also become an eligible dispatchable VPP resource.

The USAP provides a structured process for determining where coordinated delivery creates customer and system value, identifying the appropriate role for each organization, and establishing activities and milestones for implementation. PGE expects this coordination to remain an important pathway for connecting customer investments in efficiency and distributed technologies with VPP participation where the same equipment or customer action can provide both energy and grid value.

3.11.1.4 Aggregators & OEMs

Aggregators and original equipment manufacturers (OEMs) are important to VPP scale because many customer resources already operate through manufacturer or third-party technology platforms. These partners can provide device connectivity, enrollment pathways, telemetry, forecasting, dispatch execution, and performance information, allowing PGE to expand

participation across technologies without developing a unique end-to-end solution for every resource type.

As its VPP portfolio grows, PGE's objective is to increasingly standardize how these external platforms connect with the VPP. Common requirements for customer consent, resource eligibility, data access, interoperability, dispatch capability, measurement, performance, and resource exit can make it easier to add qualified manufacturers, aggregators, and technologies without recreating PGE's operating model for each partner.

OEM and aggregator relationships can also reduce customer enrollment friction by connecting participation more directly with devices and applications customers already use and by aggregating individual resources into groups useful to grid operations.

Individual partners and technologies will change over time. PGE therefore intends to build scalable interfaces and operating requirements rather than depend on any single provider. PGE remains the VPP portfolio orchestrator and accountable for the resource capabilities represented to planners and operators; third-party participation changes how a resource is enabled, not PGE's responsibility for its performance.

Chapter 4 VPP Budget & Cost Effectiveness

PGE's Virtual Power Plant brings together resources that have historically been developed, funded, evaluated, and recovered through different programs and regulatory mechanisms. As PGE increasingly operates these resources as a coordinated portfolio, this section provides a consolidated view of the costs associated with operating and growing the VPP and the value the investments are expected to provide

This consolidated view does not mean that every VPP resource is funded, evaluated, or recovered through the same mechanism. Rather, this chapter distinguishes between total portfolio costs presented for transparency, costs for which approval is requested through this MYP, and costs addressed through other regulatory proceedings.

4.1 Holistic View of VPP

Consistent with the OPUC's direction in UE 435³⁵, PGE has developed a more holistic view of the costs and benefits associated with the VPP activities evaluated in this Plan. This approach brings together costs that have historically been managed through different programs and regulatory mechanisms so that the Commission and stakeholders can better understand the true investment associated with operating and growing the portfolio, as well as the customer and system value it provides.

For purposes of this section, the holistic cost view includes Flexible Load programs, applicable storage resources, Dispatchable Standby Generation, and shared VPP Portfolio Support activities included in PGE's portfolio model.

However, not every distributed resource discussed in this MYP is included in the VPP budget or benefit-cost analysis. Resources whose economics are evaluated through separate procurement, power-cost, tariff, or other regulatory frameworks remain part of PGE's broader VPP strategy, but their cost information is not duplicated in this analysis. For example, applicable rooftop solar and Community-Based Renewable Energy costs and benefits are addressed through the regulatory and procurement mechanisms applicable to those resources.

Accordingly, the holistic cost presented in this appendix should be understood as the consolidated cost of the VPP activities included in PGE's 2027-28 portfolio model, rather than as the cost of every MW represented in the broader VPP capacity forecast.

[Appendix B, Regulatory, Tariff, & Filing Crosswalk](#), provides additional information regarding the regulatory, tariff, and funding pathways associated with the resources included in this MYP.

4.2 Portfolio Budget

PGE's VPP costs reflect the different characteristics of the resources included in the portfolio. Flexible Load costs are associated primarily with customer incentives, implementation, program administration, evaluation, customer engagement, and technology services. Storage and

³⁵ Oregon Public Utility Commission, Order No. 24-454, Docket UE 435. Available online: <https://apps.puc.state.or.us/orders/2024ords/24-454.pdf>

Dispatchable Standby Generation may also require capital investment or Aid in Construction to enable qualifying resources to provide applicable grid services. Shared investments and activities that support multiple resources are reflected in VPP Portfolio Support.

Table 54. 2027-28 VPP Portfolio Costs

TOTAL COSTS	2027 (Proposed) (\$000s)	2028 (Proposed) (\$000s)	TOTAL (Proposed) (\$000s)
Flexible Load Portfolio			
Energy Partner on Demand	\$6,096	\$6,987	\$13,083
Energy Partner Thermostat ³⁶	\$1,776	\$1,617	\$3,393
Smart Thermostat	\$4,981	\$5,373	\$10,354
Peak Time Rebates	\$3,354	\$3,441	\$6,795
Time of Day	\$432	\$483	\$915
Smart Charging	\$1,260	\$1,338	\$2,598
Flexible Load Total	\$17,899	\$19,239	\$37,138
Storage Portfolio			
Distributed Batteries	\$626	\$298	\$924
Smart Battery	\$802	\$853	\$1,655
Sched 200 - Battery	\$2,347	\$432	\$2,778
Storage Total	\$3,774	\$1,583	\$5,357
Dispatchable Standby Generation	\$7,664	\$9,448	\$17,111
VPP Portfolio Support	\$1,913	\$1,805	\$3,718
Total	\$31,250	\$32,075	\$63,325

³⁶ Energy Partner Thermostat budget costs are presented on a gross basis before the Energy Trust of Oregon incentive contribution. PGE's cost-effectiveness analysis credits the Energy Trust contribution and therefore uses net program costs for benefit-cost calculations.

The holistic VPP portfolio total should not be interpreted as the amount PGE is requesting for approval through this MYP. It includes activities supported through multiple regulatory and recovery mechanisms.

This total also should not be interpreted as a like-for-like increase from prior Flexible Load Multi-Year Plans. This MYP presents a broader portfolio view by bringing Flexible Load together with applicable storage, Dispatchable Standby Generation, and shared VPP investments that historically have been addressed through different planning and regulatory frameworks.

4.3 Funding and Recovery Pathways

The resources included in the VPP portfolio are supported through multiple funding and recovery mechanisms including operating expenses, OPUC-authorized deferred accounting, Transportation Electrification funding through the Monthly Meter Charge, capital investment, and Aid in Construction treatment.

While presenting these sources together improves transparency, it does not consolidate into a single VPP recovery mechanism or alter the regulatory treatment applicable to an investment.

Table 55. PGE VPP Portfolio Funding Sources

Funding Sources	2027 (Proposed) (\$000s)	2028 (Proposed) (\$000s)	TOTAL (Proposed) (\$000s)
O&M	\$7,254	\$7,852	\$15,107
MMC	\$1,200	\$1,276	\$2,476
Deferral	\$16,973	\$18,331	\$35,303
Aid in Construction Amortization	\$1,287	\$2,116	\$3,403
CAPEX	\$ 4,537	\$2,499	\$7,036
TOTAL	\$31,250	\$32,075	\$63,325

PGE will continue to use the regulatory pathway appropriate to each resource and investment. Note that inclusion in the holistic VPP view does not create a new recovery mechanism and does not result in duplicate recovery.

Dispatchable Standby Generation illustrates this distinction. PGE may make capital investments or provide Aid in Construction to enable qualifying customer-sited generation and battery resources to satisfy Schedule 200 requirements and provide dependable grid services. These costs are included in the VPP portfolio view because they are available to PGE VPP operations, while applicable authorization and recovery are addressed through the General Rate Case.

Residential Smart Charging provides another example. Managed charging contributes Flexible Load capability and is therefore included in PGE's VPP planning and cost-effectiveness analysis,

while program funding is approved through PGE's Transportation Electrification Plan and Monthly Meter Charge. PGE does not seek duplicate approval of those costs through this MYP.

Utility-owned distributed batteries and other VPP-related capital investments are similarly included where appropriate to provide a holistic portfolio view.

4.4 Cost-Effectiveness Methodology

PGE uses established demand-side cost-effectiveness tests to evaluate the costs and benefits of applicable VPP programs and resources from different customer, utility, and system perspectives. PGE follows the California Standard Practice Manual (CSPM) framework, together with applicable OPUC direction, in evaluating these resources.³⁷

PGE uses the following cost-effectiveness tests:

Table 56. CSPM Tests and Participating Customer Groups

Test	Measures
Participant Cost Test (PCT)	Benefits and costs to participating customers.
Program Administrator Cost (PAC)	Benefits and costs to the utility for managing the program, including administration, supply, and capital impacts.
Rate Impact Measure (RIM)	Impacts to all customer bills (including non-participating customers) because of the program.
Total Resource Cost (TRC) ³⁸	Net cost of the program to both the participant and the utility, essentially a combination of PCT and PAC.
Modified TRC	Treats all amounts paid to the customer as incentive.

4.5 TRC Treatment Used in This Filing

The standard TRC framework distinguishes between customer compensation associated with the loss of use of a participating resource, for example, a battery or HVAC system when called by a program, referred to as Value of Service Lost, and the portion of customer compensation considered an incentive for program participation. The Modified TRC does not make this distinction and instead treats all amounts paid to participating customers as incentive payments.

Consistent with prior OPUC direction, PGE continues to provide the Modified TRC in this filing. For clarity, references to "TRC" throughout this MYP refer to the Modified TRC unless otherwise

³⁷ California Standard Practice Manual: Economic Analysis of Demand-Side Programs and Projects.

³⁸ PGE continues to provide the Modified TRC consistent with Staff's request reflected in Appendix A, footnote 14, of Oregon Public Utility Commission Order No. 24-049. Available online: <https://apps.puc.state.or.us/orders/2024ords/24-049.pdf>.

stated. PGE also uses the other applicable cost-effectiveness tests described above where relevant.³⁹

4.6 Benefit and Cost Components

Depending on the resource and applicable test, PGE evaluates benefits and costs from the perspective represented by each test.

Table 57. Benefit & Cost Components of Each Test

Benefit / Cost Category	Total Resource Cost Test ⁴⁰ (TRC)	Program Administrator Cost Test (PAC)	Rate Impact Measure Test (RIM)	Participant Cost Test (PCT)
Program Management	COST	COST	COST	
Avoided Costs of Supplying Electricity	BENEFIT	BENEFIT	BENEFIT	
Bill Increases				COST
Bill Reductions				BENEFIT
Capital Costs to Utility	COST	COST	COST	
Capital Costs to Participant	COST			COST
Environmental Benefits	BENEFIT			
Incentives Paid		COST	COST	BENEFIT
Increased Supply Costs	COST	COST	COST	
Market Benefits	BENEFIT	BENEFIT	BENEFIT	
Market Participation Revenue	BENEFIT	BENEFIT	BENEFIT	
Non-energy/Monetary Benefits	BENEFIT			BENEFIT
Revenue Gain from Increased Sales			BENEFIT	

³⁹ See Fulmer and Biewald, Misconceptions, Mistakes and Misnomers in DSM Cost Effectiveness Analysis, Tellus Institute, available through the Northwest Power and Conservation Council.

⁴⁰ The TRC column reflects the Modified TRC treatment used for purposes of this filing. As described above, PGE's Modified TRC does not include Value of Service Lost as a separate benefit and treats customer payments consistent with the methodology directed by Staff.

Benefit / Cost Category	Total Resource Cost Test ⁴⁰ (TRC)	Program Administrator Cost Test (PAC)	Rate Impact Measure Test (RIM)	Participant Cost Test (PCT)
Revenue Loss from Reduced Sales			COST	
Tax Credits	BENEFIT			BENEFIT
Transaction Costs to Participant	COST			COST
Value of Service Lost				COST

For each applicable program, PGE estimates the number of customers expected to participate and the amount of kW each customer or resource can contribute to determine the expected capacity or energy-shifting contribution.

PGE values those contributions using its best available estimates of applicable system benefits, which may include:

- Generation capacity value
- Market value of energy
- Transmission and distribution deferral value
- Flexibility value
- Line-loss reductions
- Risk-reduction value
- Applicable Northwest Power Act credit

PGE reduces modeled benefits where appropriate to reflect Effective Load Carrying Capability, resource dispatch limitations, customer behavior, resource availability, or other factors that affect the amount of capacity or flexibility PGE can reasonably rely on.

Program costs may include program management, implementation, customer incentives, evaluation, customer engagement, technology services, utility capital, participating-customer costs, and other costs applicable to the resource being evaluated. Historical costs are based on actual expenditures where available, while forward-looking costs reflect program forecasts, contract terms, expected participation, and other planning assumptions.

4.7 Avoided Capacity Cost

The generation-capacity value used in PGE's current analysis is based on a wind-solar-battery hybrid resource in the Columbia River Gorge identified through PGE's 2026 Clean Energy Plan

and Integrated Resource Plan. The current cost-effectiveness model uses a 2030 capacity value of approximately \$176/kW-year.⁴¹

PGE recognizes that the methodology developed through UM 1893 incorporates a longer-term set of capacity resources from the IRP portfolio. PGE believes that a nearer-term capacity resource may more closely reflect the avoided-capacity value associated with demand-response programs and incremental MYP investment decisions that generally have shorter program lives than the longer-term portfolio represented through the UM 1893 methodology.⁴²

4.8 Cost Effectiveness Time Horizon

PGE evaluates cost-effectiveness from two perspectives, or views:

- Full Lifecycle View: Calculates the net present value of costs and benefits beginning with the start of the applicable program or asset.
- Forward-Looking View: Calculates the net present value of expected costs and benefits from the current planning period through the remaining program or asset life.

The Full Lifecycle View captures development, customer acquisition, and capital costs incurred to establish a resource together with benefits realized over its operating life. The Forward-Looking View is particularly useful for evaluating whether continued or incremental investment in an existing program is expected to provide customer and system value going forward.

Relying solely on Full Lifecycle results can make incremental investment decisions more difficult because significant historical costs and benefits may outweigh the effect of current program-design changes. The Forward-Looking View therefore provides an additional lens for evaluating the investments proposed during the 2027-2028 MYP period.

Both views use the same ending year for each resource, based on factors including asset life, the remaining economic life of customer incentives, and the anticipated duration of the applicable program phase. The time horizons for each VPP portfolio asset are included in [Appendix A. Funding & Cost Effectiveness Details](#).

Regardless of the view selected, PGE calculates the net present value of costs and benefits over a consistent analytical period for the applicable resource.

4.9 Cost Effectiveness Results

For portfolio-level decision-making in this MYP, PGE emphasizes the Forward-Looking View because it is most directly relevant to decisions regarding continued and incremental investment during the 2027-28 planning period. PGE also retains Full Lifecycle results and program-level results to provide transparency; results are available in [Table 63](#). Currently the Full Lifecycle results are higher than the Forward-Looking View.

⁴¹ Portland General Electric, 2026 Clean Energy Plan and Integrated Resource Plan. Available online: <https://apps.puc.state.or.us/edockets/docket.asp?DocketID=25196>.

⁴² Oregon Public Utility Commission, Docket UM 1893. Available online: <https://apps.puc.state.or.us/edockets/docket.asp?DocketID=20999>.

Table 58. Forward-Looking VPP Cost-Effectiveness Summary

VPP Component	TRC	RIM
Flexible Load Total	1.09	0.61
Storage Total	0.72	0.62
Dispatchable Standby Generation	3.37	2.61
VPP Portfolio Support ⁴³	–	–
TOTAL	2.25	1.64

These results demonstrate why PGE evaluates both individual resources and the portfolio as a whole. Cost-effectiveness varies materially across VPP technologies and programs. Some resources or sub-portfolios have benefit-cost ratios below 1.0 under one or more tests, while other resources provide substantially greater modeled benefits relative to costs.

Under the current Forward-Looking analysis, the overall VPP portfolio has a TRC of approximately 2.25 and a RIM of approximately 1.64, indicating that modeled portfolio benefits exceed modeled portfolio costs under both measures.

PGE does not interpret a portfolio-level benefit-cost ratio above 1.0 as evidence that every individual program should continue unchanged. Program-level cost-effectiveness remains an important input to Product Lifecycle Management and investment decisions. Where an individual resource does not demonstrate a viable pathway to customer and system value, PGE may modify the resource, continue targeted testing, integrate useful capabilities or learnings elsewhere, or conclude the activity.

Conversely, an emerging resource may warrant targeted investment even before achieving scaled cost-effectiveness when a specific technical, customer, or operating uncertainty remains to be resolved and PGE has a defined decision pathway for applying the resulting learning.

4.10 Funding Requests

PGE requests OPUC approval of the 2027-28 deferral funding identified in this MYP for Flexible Load programs, pilots, and other VPP activities. The requested funding supports continued operation and growth of customer flexibility resources, program evaluation and customer engagement, and the technology and portfolio capabilities necessary to improve resource performance, dispatchability, operational visibility, and scalability.

⁴³VPP Portfolio Support costs support multiple resources and do not have standalone resource benefits assigned to them. Applicable Portfolio Support costs are included in the overall portfolio calculation.

4.11 2027–2028 Portfolio Funding Summary

Based on the final 2027–28 VPP portfolio model, PGE will summarize its funding requests as follows:

- **Funding Approval Requested Through this MYP:** \$35.3 million, representing the subset of costs for which PGE seeks Commission approval through this filing and applicable deferred-accounting and recovery mechanisms.
- **VPP Costs Funded, Approved, Requested, or Recovered Through Other Regulatory Mechanisms:** \$28 million, representing costs included for holistic portfolio transparency but addressed through the General Rate Case, Transportation Electrification Plan, or other applicable proceedings.

This approach is consistent with prior Flexible Load Multi-Year Plans, in which PGE requested OPUC approval of funding for the Flexible Load portfolio while separately identifying activities funded or recovered through other regulatory mechanisms.⁴⁴ This VPP MYP expands the portfolio view while retaining that distinction. Inclusion of an activity or cost in the holistic VPP budget does not, by itself, constitute a request for cost recovery through this filing.

4.12 Flexible Load Funding

For 2027–2028, PGE requests OPUC approval of funding for the existing Flexible Load pilots and programs, Smart Battery pilot, and deferred VPP portfolio support costs identified in this Plan. Costs eligible for deferred accounting will continue to be addressed through the applicable Commission-authorized deferral, with Schedule 135 serving as the balancing account for all VPP deferred costs.⁴⁵

Requested funding supports customer incentives, program administration and operations, evaluation, customer engagement, technology services, and other activities necessary to maintain, improve, and grow these resources.

PGE also requests the OPUC actions necessary to implement the program lifecycle changes proposed in this MYP, including:

- Transitioning Smart Battery from pilot to program.
- Transitioning Time of Day from pilot to program.
- Expanding Smart Battery participation to eligible small nonresidential customers.
- Concluding the Multi-Family Water Heater Pilot and completing associated closeout activities.

⁴⁴ Portland General Electric, 2025–2026 Flexible Load Multi-Year Plan, Oregon Public Utility Commission Docket UM 2141. Available online: <https://edocs.puc.state.or.us/efdocs/HAQ/um2141haq332220025.pdf>

⁴⁵ Oregon Public Utility Commission, Docket UM 2234, PGE Flexible Load deferred-accounting authorization. Available online: <https://apps.puc.state.or.us/edockets/DocketNoLayout.asp?DocketID=23208>. See also Portland General Electric, Schedule 135, available through PGE's tariffs: <https://portlandgeneral.com/about/info/rates-and-regulatory/tariff>.

4.13 Smart Battery Regulatory and Recovery Transition

As part of the Smart Battery transition, PGE proposes to align Smart Battery cost recovery with the Flexible Load portfolio through the applicable UM 2234 deferred accounting and Schedule 135 framework, subject to the necessary OPUC authorization.⁴⁶

Smart Battery Pilot costs have historically been recovered through UM 2078.⁴⁷ Aligning the ongoing program with the Flexible Load recovery framework would provide more consistent regulatory treatment as Smart Battery transitions from a pilot to an ongoing VPP program.

4.14 Costs Addressed Through Other Regulatory Mechanisms

To review holistic costs and benefits, the holistic VPP budget of \$63.3 million also includes activities that are approved, requested, or recovered through separate regulatory mechanisms. These costs are included here to give the OPUC and stakeholders an understanding of the overall cost and value of PGE's VPP portfolio, but PGE is not requesting approval of those costs a second time through this MYP.

Applicable Dispatchable Standby Generation capital, Aid in Construction, and related investment are addressed through the General Rate Case via Schedule 200 treatment.⁴⁸

Residential Smart Charging costs are addressed through PGE's Transportation Electrification Plan in UM 2033 and applicable Monthly Meter Charge funding.⁴⁹ Those costs are included in this appendix because Residential Smart Charging contributes to the Flexible Load portfolio and overall VPP cost-effectiveness analysis, but no duplicate funding approval is requested through this MYP.

Utility-owned distributed batteries and other VPP-related capital investments are likewise included where appropriate for holistic portfolio transparency while applicable authorization and recovery remain subject to the General Rate Case or other regulatory mechanisms governing those investments.

4.15 Emerging Activities

PGE also describes emerging VPP opportunities for which no funding approval is requested through this filing. Potential agricultural, irrigation, cold-storage, Schedule 32, and other future

⁴⁶ Oregon Public Utility Commission, Docket UM 2234, PGE Flexible Load deferred-accounting authorization. Available online:

<https://apps.puc.state.or.us/edockets/DocketNoLayout.asp?DocketID=23208>. See also Portland General Electric, Schedule 135, available through PGE's tariffs: <https://portlandgeneral.com/about/info/rates-and-regulatory/tariff>.

⁴⁷ Oregon Public Utility Commission, Docket UM 2078, Smart Battery Pilot deferred-accounting treatment. Available online:

<https://apps.puc.state.or.us/edockets/DocketNoLayout.asp?DocketID=22381&OrderBy=ActionType>.

⁴⁸ UE 435 as the current approved rate-case treatment and UE 473 as PGE's 2027 General Rate Case filing.

⁴⁹ Oregon Public Utility Commission, Docket UM 2033, PGE Transportation Electrification Plan. Available online: <https://apps.puc.state.or.us/edockets/DocketNoLayout.asp?DocketID=22127>. See also Portland General Electric, Schedule 150, available through PGE's tariffs: <https://portlandgeneral.com/about/info/rates-and-regulatory/tariff>.

Flexible Load opportunities will be brought to the Commission through the appropriate regulatory process once customer opportunity, program design, costs, implementation requirements, and cost-effectiveness are sufficiently developed.

These activities are included in this Plan to describe the direction of PGE's VPP development and the Product Lifecycle Management process through which future offerings may advance. Inclusion does not constitute a request for funding approval or establish a commitment to implement a new program or tariff.

4.15.1 NEEA END USE LOAD FLEXIBILITY

PGE requests approval of \$550,000 of 2027 funding for the Northwest Energy Efficiency Alliance End Use Load Flexibility activities described in this Plan.

PGE has communicated its 2027 support as a focused bridge-year investment intended to advance regional work on grid-ready equipment, interoperability, codes and standards, connected end uses, and other market barriers that individual utilities cannot efficiently address independently.

PGE is not requesting 2028 NEEA funding at this time but has included potential costs to calculate a conservative holistic cost-benefit. Any request for additional funding would be brought through regulatory processes after PGE evaluates progress against current deliverables and an updated scope, workplan, and cost for subsequent activities are established.

Additional information regarding the NEEA activity, expected deliverables, and relationship to PGE's VPP is provided in [Section 3.11, Strategic Partnerships and Market Development](#).

Table 59. Upcoming VPP Activity Costs and Regulatory/Recovery Mechanisms

VPP Activity / Cost	Treatment in this MYP	Regulatory / Recovery Path
Existing Flexible Load programs and pilots	Approval requested	UM 2234 / Schedule 135, applicable MYP deferral
Applicable VPP Portfolio Support for customer programs	Approval requested	Schedule 135 / applicable MYP deferral
Smart Battery transition	Program/funding approval requested	UM 2234/Schedule 135, applicable MYP deferral
Time of Day transition	Program approval requested	MYP / applicable tariff and Schedule 135
MFWH discontinuation	Approval/acknowledgment requested	UM 1827 / applicable MYP deferral
DSG generation and storage	Included in holistic budget/BCA; no duplicate recovery requested	GRC / Schedule 200 / AIC treatment as applicable

VPP Activity / Cost	Treatment in this MYP	Regulatory / Recovery Path
Residential Smart Charging	Included in holistic budget; no duplicate approval requested	UM 2033 / Transportation Electrification Plan / MMC
Utility-owned distributed batteries and VPP capital infrastructure	Included in holistic budget/BCA	GRC / applicable capital recovery
Agriculture, irrigation, future Schedule 32 designs	Strategic direction only; no current funding request	Future tariff / regulatory filing
NEEA End Use Load Flexibility - 2027	Funding approval requested for \$550,000	UM 2234 / Schedule 135, applicable MYP deferral
NEEA End Use Load Flexibility - 2028	No current funding approval requested	Subsequent Commission process after scope, deliverables, and costs are established

Chapter 5 Portfolio Performance for 2027-2028

The true value of PGE's VPP portfolio depends on both the amount of capacity enrolled and PGE's ability to forecast available capacity, coordinate dispatch, verify delivery, and incorporate performance into future planning and operations.

PGE remains accountable for the VPP resources it represents to grid operators, system planners, regional markets, regulators, and customers, even when individual functions are performed by aggregators, manufacturers, program implementers, or other partners. Regardless of which entities perform specific functions within the portfolio, PGE retains responsibility for performance outcomes and remains subject to regulatory oversight and customer protection obligations.

PGE's performance, planning assumptions, investment decisions, and customer outcomes are subject to regulatory review that provide independent oversight of how the portfolio is managed and how value is delivered. PGE has clear performance expectations, independent evaluation, transparent metrics, and a feedback loop that translates operating experience into changes in planning values, program design, partner requirements, and investment decisions.

This combination of PGE accountability and regulatory oversight helps protect customer interests and ensures that portfolio performance can be validated through transparent and auditable processes.

Customer and stakeholder input is incorporated through program-specific customer research and surveys, participant-experience evaluations, targeted customer and community engagement for demonstrations such as Non-Wires Solutions, and established public stakeholder processes in related planning proceedings.

5.1 Performance Accountability

As the VPP matures into a resource on which PGE can increasingly rely for peak management, reliability, and other grid services, it is important to distinguish between the amount of capacity associated with the portfolio and the amount of capacity PGE can reasonably plan for under various system conditions.

PGE considers multiple measures of resource capability depending on grid capability, including

- Enrolled or nameplate capacity
- Available capacity
- Forecasted performance
- Delivered performance

For Flexible Load resources, PGE uses evaluation results and operating experience to update planning assumptions that reflect factors such as season, weather, customer behavior, technology type, and historical event performance. Energy Partner on Demand uses customer nominations and measured performance to establish expected capability. Storage and Dispatchable Standby Generation have different operating requirements based on the services they are intended to provide.

PGE works with aggregators, device manufacturers, program implementers, and other partners to acquire and operate various components of the VPP. These partners may enroll customers, maintain device connectivity, forecast resource availability, execute dispatch instructions, or provide performance information. However, PGE remains the portfolio orchestrator and retains accountability for the capability represented to PGE's planners and operators and, where applicable, to regional market and reliability processes.

Performance accountability also requires a feedback loop after resources are dispatched. PGE compares expected and actual performance to understand differences and identify their causes. Variance may result from weather, customer opt-outs, equipment availability, device connectivity, forecasting assumptions, partner performance, operating constraints, or other factors. PGE uses its performance accountability findings to inform future forecasts, planning values, customer communications, operating procedures, partner requirements, and program design.

During the 2027-28 biennium, PGE will continue moving toward a more consistent portfolio-level performance framework while recognizing (and valuing) differences among individual resource types.

The goal of this process is to improve PGE's ability to understand resource availability prior to dispatch, forecast expected performance, measure actual delivery, identify material performance gaps, and incorporate those results into future operating and planning decisions.

5.2 Metrics and Reporting

Table 60. VPP Forecasted Capacity (Summer MW) by Portfolio

Resource	2025 Actual	2026 Forecasted	2027 Proposed	2028 Proposed
Flexible Load Portfolio				
Energy Partner on Demand Program	43.4	45.8	48.5	52.7
Energy Partner Thermostat Pilot	2.4	2.5	3.2	3.6
Smart Thermostat Program	45.2	48.6	52.0	53.7
Multi-Family Water Heater Pilot	1.5	1.4	-	-
Peak Time Rebates Program	18.5	19.0	20.0	20.7
Time of Day Pilot	3.8	4.7	5.6	6.5
Smart Charging Pilot	2.5	2.6	2.9	3.3
Total Flexible Load Portfolio	117.3	124.5	132.2	140.4

Resource	2025 Actual	2026 Forecasted	2027 Proposed	2028 Proposed
Solar and Storage Portfolio				
Rooftop Solar Program	311	337	345	355
Community-Based Renewable Energy ⁵⁰			4.5	6.7
Distributed Batteries	2.4	7.3	7.3	7.3
Smart Battery Pilot	2.9	3.3	3.9	4.6
Schedule 200 Program - Battery	1.0	1.0	33.5	33.5
Total Solar and Storage Portfolio	317.4	348.4	394.3	407.6
Dispatchable Standby Generation	130.0	146.3	181.1	410.0
Total	564.6	617.2	707.6	957.9

PGE will continue to report customers served for residential and commercial offerings where customer counts provide a meaningful indicator of program reach and scale. For large commercial and industrial resources, however, customer count is generally less informative than enrolled MW because individual sites can present materially different load profiles, longer enrollment cycles, and significantly greater flexible load capability. Consistent with prior MYP reporting, PGE therefore emphasizes MW rather than customer count for Energy Partner on Demand (Schedule 26) and does not include Schedule 26 participants in the commercial customer totals shown in [Table 61](#).

Table 61. Flex Load Portfolio: Customers Served

Customers Served	2025 Actual	2026 Forecasted	2027 Forecasted	2028 Forecasted
Residential Offerings	256,159	277,282	309,875	326,662
Commercial Offerings	13,009	14,259	4,730	5,505

⁵⁰ Forecasted Community-Based Renewable Energy capacity reflects projects currently anticipated to reach commercial operation in each year and remains subject to successful contract execution and project development.

The decline in reported commercial customers beginning in 2027 reflects the planned sunset of PGE's Multi-Family Water Heater pilot, rather than a reduction in PGE's broader commercial Flexible Load activity. Beginning in 2027, the commercial customer counts shown in [Table 61](#) reflect Energy Partner Smart Thermostat participation. PGE will continue to evaluate commercial portfolio growth using the metric most appropriate to the resource, including customer participation where it reflects scale and MW where individual customer capability is the more meaningful measure.

5.3 Evaluation Framework

Evaluation is a component of PGE's VPP performance-accountability framework. PGE uses independent evaluation, program analysis, and operational performance data to assess whether resources are delivering the customer and system value expected of them and whether the capability represented to planners and operators is supported by measured performance.

Evaluation results provide a feedback loop into portfolio governance. Findings may inform planning values, forecasting assumptions, program design, customer and partner requirements, incentives, operating practices, Product Lifecycle Management decisions, and future investment. The specific evaluation method varies by resource based on the technology, service provided, program design, and applicable regulatory requirements.

[Appendix D, Evaluation Overview](#), describes the individual evaluation workstreams, methods, and planned evaluation periods across the VPP portfolio.

5.4 What Success Looks Like at the End of 2028

By the end of 2028, PGE expects its VPP to be larger and more integrated into planning and operations. Success will reflect growth in enrolled MW together with changes in the quality, customer value, and operational usefulness of those resources.

PGE expects several tangible indicators of progress by the end of the biennium:

- **Portfolio Growth:** VPP resources continue growing toward the capacity forecasts identified in this Plan, while PGE increasingly distinguishes between enrolled, available, forecasted, and delivered capability.
- **Deliberate Program Lifecycle Decisions:** Smart Battery and Time of Day transition from pilots to programs, the existing Multi-Family Water Heater pilot concludes, and emerging opportunities advance, continue testing, or stop based on PGE's Product Lifecycle Management process and demonstrated customer and system value.
- **Improved Operating Capability:** PGE has greater visibility into resource availability and location, improved forecasting and performance feedback, more standardized dispatch processes, and stronger coordination among VPP, Grid Operations, and Power Operations.
- **Demonstrated Grid Value:** PGE has operating and evaluation results from its initial Non-Wires Solution work and additional experience determining where customer flexibility can provide system, market, or local-grid value.

- **Sustained Customer Participation:** PGE continues to make enrollment and participation understandable and worthwhile for customers, provides participation options that fit different customer needs, and manages communications and dispatch in ways that support retention, satisfaction, and continued willingness to provide flexibility.
- **Scalable Portfolio Operations:** Growth in VPP resources does not require a proportional increase in manual processes, technology complexity, or operating cost.

Taken together, these outcomes represent PGE's transition toward both **more** MW and **better** MW: resources that provide meaningful customer value, dependably perform the service expected of them, create benefits relative to cost, and can increasingly be coordinated as a portfolio.

Chapter 6 Looking Toward 2030

This 2027–28 MYP represents an important step in PGE’s transition from operating individual distributed-resource programs toward operating an increasingly integrated VPP. The work described throughout this Plan by growing participation, improving resource performance and dispatchability, increasing locational capabilities, integrating technology platforms, and advancing resources from innovation to scale, establishes the foundation for the VPP PGE intends to operate beyond this planning period.

By 2030, PGE’s objective is not simply to have **more** distributed resources enrolled. It is to have **more dependable** flexibility available to customers and the electric system: resources that can be understood, forecasted, coordinated, dispatched where appropriate, measured, and applied to the needs for which they provide the greatest value.

6.1 The 2030 Goal

PGE’s long-term goal is for customer and distributed resources to be capable of contributing capacity equivalent to approximately 25% of peak system needs by 2030. This aspiration, also reflected in PGE’s Distribution System Plan, provides a useful measure of the scale PGE seeks to achieve.

The 25% figure is best understood as a proxy for scale rather than the definition of VPP success. Not every distributed resource provides the same operating capability, and not every MW can provide the same energy, capacity, reliability, or grid service. The composition of PGE’s VPP will continue to evolve based on customer adoption, technology, economics, resource performance, system needs, market conditions, and regulatory outcomes.

The 25% goal is broader than the 2027–28 portfolio forecast presented in this MYP. The MYP forecasts approximately 958 MW by the end of 2028, while the 2030 goal reflects additional resource growth beyond the biennium, including large-load flexibility and emerging technology reflected in PGE’s CEP/IRP. Individual 2030 program planning values presented in this MYP should therefore not be interpreted as a comprehensive 2030 VPP portfolio forecast.

For that reason, PGE will increasingly evaluate progress based on the amount of dependable flexibility it can reasonably put to work. Availability, forecastability, dispatchability, duration, location, performance, persistence, cost, and the service a resource can provide will become increasingly important measures of portfolio maturity.

Existing Flexible Load programs will remain important contributors to that growth, while additional capability may come from distributed storage, managed transportation load, commercial and industrial flexibility, customer-sited generation and storage, large-load flexibility, and other technologies that demonstrate customer and system value.

6.2 Integrated VPP Operations at Scale

A VPP operating at 2030 scale cannot depend on proportional growth in manual processes, program-specific integrations, and separate operating procedures. Continued scale requires

increasingly common operating capabilities that allow PGE to understand the resources available across its VPP portfolio and coordinate them based on the service required.

The 2027–28 technology and operating roadmap described in this MYP is intended to create a foundation for these common operating capabilities. Improved integration between Customer and Grid capabilities will improve PGE’s ability to connect resource availability, customer eligibility, grid conditions, dispatch, and measured performance without eliminating the specialized systems and partners needed to manage individual technologies.

At maturity, this allows PGE to increasingly operate distributed resources according to their characteristics and system value, rather than solely according to the individual program through which they were acquired. Different system needs may require different combinations of resources, and PGE’s objective is to have sufficient visibility and operating capability to make those distinctions consistently.

The result is a VPP that can function as part of normal planning and operating processes alongside other resource and infrastructure options. The level of integration will continue to reflect the resource and the service it provides; PGE does not assume that every resource must have identical controls, telemetry, or operating requirements.

6.3 Customer-Centered Participation

PGE’s VPP can only achieve meaningful scale if participation continues to provide value to customers. Customers adopt thermostats, electric vehicles, batteries, solar systems, building controls, and other technologies primarily to serve their own needs.

By 2030, PGE envisions a simpler and more integrated participation experience. Rather than requiring customers to navigate separate program pathways, PGE intends to increasingly connect customers with opportunities appropriate to their equipment, energy-use patterns, and preferences.

Maintaining customer trust remains essential as the VPP becomes more integrated into PGE operations. Customers must continue to understand how participation works, what control they retain, how they are compensated, and how their resources may be used. Increased automation and operational value must continue to be balanced with customer choice, comfort, business requirements, resilience needs, and applicable opt-out provisions.

6.4 Evolving Grid Services

As its VPP matures, PGE expects to increasingly evaluate resources based on the services they can provide. Historically, customer flexibility has been used primarily for peak management and reliability events. Those services remain important, but PGE’s operating experience demonstrates that distributed resources can also support energy shifting, contingency and frequency response, market operations, localized distribution needs, and other emerging applications.

At the system level, more dependable forecasting, dispatch, and measurement can increase the usefulness of flexible resources for capacity, reliability, and evolving regional market operations. At the distribution level, improved locational visibility can create additional opportunities to use qualifying customer resources where they can complement traditional infrastructure. New and

growing loads may also create flexibility opportunities when controllable capability is identified early enough in the planning process.

Not every resource can provide every service, and not every technically feasible application should be scaled. New opportunities will be advanced when they demonstrate a credible combination of customer value, grid benefit, operating performance, scalability, and cost-effectiveness.

6.5 Closing Vision

PGE's VPP began as a collection of individual programs intended to determine whether customers would shift electricity use, whether distributed technologies could respond to grid needs, and whether those resources could provide measurable value. PGE's operating experience has increasingly answered those foundational questions. Customers and distributed resources participate at meaningful scale, are dispatched and measured, are coordinated across different resources, and support both broad system needs and more localized grid conditions.

The question, as we approach 2030, is no longer simply whether customer and distributed resources can contribute to the electric system. It is how PGE can make that contribution increasingly dependable, affordable, and integrated into how the electric system is planned and operated.

PGE's long-term vision is a VPP in which customer participation and grid operations reinforce one another. Customers receive value for the flexibility they choose to provide. PGE gains another resource option for meeting customer and system needs. Distributed technologies installed for customer purposes can provide additional value to the broader electric system. PGE can evaluate new loads with flexibility in mind. Planners and operators gain additional choices for meeting energy, capacity, reliability, and distribution needs.

The VPP does not eliminate the need for new generation, transmission, or distribution investment. PGE will continue making those investments where and when they are needed. The role of the VPP is to confirm that customer and distributed resources are also available as credible options when planning for the future.

The 2027-28 MYP is designed to advance that future through additional participation, more dependable flexibility, greater portfolio diversity, improved locational capability, stronger performance accountability, and an operating architecture capable of coordinating distributed resources at scale.

By 2030, PGE's goal is not simply to have a larger VPP. The goal is to operate a VPP that has become a normal part of how PGE serves customers – a customer-powered resource that can be relied upon alongside other system resources to support reliability, affordability, and efficient use of the electric system.

Appendix A Funding & Cost Effectiveness Details

A.1 Cost Effectiveness Time Horizon by Portfolio Asset

Table 62. PGE VPP Portfolio Asset Cost Effectiveness Time Horizon

VPP Component	Full Lifecycle Start Year	Forward-Looking End Year
Flexible Load Portfolio		
Energy Partner on Demand	2017	2030
Energy Partner Thermostat	2023	2032
Smart Thermostat	2017	2036
Peak Time Rebate	2019	2030
Time of Day	2021	2030
Smart Charging	2020	2030
Energy Storage Portfolio		
Distributed Batteries	2021	2040
Smart Battery	2020	2034
Sched 200 - Battery	2027	2040
Dispatchable Standby Generation	2024 ⁵¹	2050
VPP Portfolio Support	2017	2042

⁵¹ DSG has operated at PGE for substantially longer than the period reflected here. The 2024 start year reflects its treatment within the current VPP cost-effectiveness model, not the beginning of the DSG program itself.

Table 63. All TRC & RIM Benefit Cost Ratios

VPP Component	Full Lifecycle TRC	Forward-Looking TRC	Full Lifecycle RIM	Forward-Looking (2026+) RIM
Flexible Load Portfolio				
Energy Partner on Demand	1.22	1.23	0.67	0.53
Energy Partner Thermostat	0.60	0.57	0.39	0.36
Smart Thermostat	1.69	1.26	0.97	0.84
Peak Time Rebate	0.94	1.32	0.50	0.44
Time of Day	0.85	0.89	0.85	0.89
Smart Charging	0.52	0.34	0.33	0.21
Flexible Load Total	1.10	1.09	0.66	0.61
Energy Storage Portfolio				
Distributed Batteries	0.15	0.14	0.15	0.14
Smart Battery	0.75	0.91	0.51	0.59
Sched 200 - Battery	25.46	26.30	4.07	4.30
Storage Total	0.64	0.72	0.55	0.62
Dispatchable Standby Generation	3.43	3.37	2.66	2.61
VPP Portfolio Support	—	—	—	—
TOTAL	1.83	2.25	1.34	1.64

Appendix B Regulatory, Tariff, & Filing Crosswalk

B.1 Regulatory Alignment of VPP Activities

Table 64. PGE VPP Activities, Filings, Dockets, and Rate Schedules

Flex Load Activity	Major Filings and Docket(s)	Deferral(s)	Rate Schedule(s) ⁵²
Demonstrations (Smart Grid Test Bed)	2018 Smart Grid Testbed Proposal 2021 Smart Grid Testbed Phase II Proposal	Originally ADV 859 ⁵³ , currently UM 1976 ⁵⁴	Schedule 13
Pilots and Programs	UM 2141 ⁵⁵ 2020 Flex Load Plan⁵⁶ 2021 Flex Load Multi-Year Plan⁵⁷ 2022 Flex Load Multi-Year Plan Update⁵⁸ 2025-2026 Flex Load Multi-Year Plan⁵⁹ 2025 VPP Data filing⁶⁰ UM1856 - Annual reports	Costs for all pilots and programs are recoverable under applicable dockets ⁶¹	Schedules 4, 5, 7, 25, 26, with Schedule 135 serving as a balancing account

⁵² PGE's website link for list of tariffs: <https://portlandgeneral.com/about/info/rates-and-regulatory/tariff>.

⁵³ SGTB original filing: <https://edocs.puc.state.or.us/efdocs/UAC/adv859uac113045.pdf>.

⁵⁴ Current SGTB filing: <https://edocs.puc.state.or.us/efdocs/HAD/um1976had145212.pdf>.

⁵⁵ UM2141 docket: <https://apps.puc.state.or.us/edockets/DocketNoLayout.asp?DocketID=22696>.

⁵⁶ 2020 Flex Load Plan: <https://edocs.puc.state.or.us/efdocs/HAA/haa125814.pdf>.

⁵⁷ 2021 Flex Load Multi-Year Plan: <https://edocs.puc.state.or.us/efdocs/HAD/um2141had16243.pdf>.

⁵⁸ 2022 Flex Load Multi-Year Plan update:
<https://edocs.puc.state.or.us/efdocs/HAD/um2141had163540.pdf>

⁵⁹ 2025-2206 Flex Load Multi-Year Plan:
<https://edocs.puc.state.or.us/efdocs/HAQ/um2141haq332220025.pdf>.

⁶⁰ 2025 VPP Data filing: <https://edocs.puc.state.or.us/efdocs/HAD/um2141had339936027.pdf>.

⁶¹ Applicable Flexible Load program and pilot costs are recovered through Commission-authorized deferred-accounting mechanisms: Flexible Load programs are addressed through UM 2234, with Schedule 135 serving as the applicable balancing account. Multi-Family Water Heater costs are addressed through UM 1827. Smart Battery Pilot costs have historically been addressed through UM 2078; as part of the proposed transition to program status, PGE proposes to align ongoing Smart Battery cost recovery with UM 2234 and Schedule 135 beginning in 2027, subject to necessary Commission authorization.

Flex Load Activity	Major Filings and Docket(s)	Deferral(s)	Rate Schedule(s) ⁵²
Transportation Electrification Demonstrations, Pilots and Programs	UM 2033 ⁶² 2019 Transportation Electrification Plan (TEP)⁶³ 2023 Clean Energy Fuel Plan⁶⁴ 2023 TEP⁶⁵ and first⁶⁶ and second⁶⁷ errata 2026-2028 TEP⁶⁸	Funding is provided through base rates, the Clean Fuels Program, and Monthly-Meter Charge	Schedule 150

Relating to UM 2141, PGE has been exploring opportunities to simplify the tariff and administrative framework supporting its Flexible Load portfolio. PGE continues to coordinate with OPUC Staff and stakeholders regarding the appropriate balance between tariff content, customer-facing program information, regulatory oversight, and administrative flexibility. No specific consolidated tariff structure is submitted for approval through this MYP; any future tariff changes will be advanced through the appropriate regulatory process.

B.2 Funding Definition and Filing Crosswalk

The following table provides a holistic cost recovery overview for PGE's VPP.

Table 65. PGE VPP Funding Sources and Recovery Crosswalk

Funding Type	Definition	Filing	Schedule (if applicable)
Operations and Maintenance (O&M)	Applicable operating costs recovered through rates	Rate Case UE 435 - latest approval UE 473 request as applicable	N/A
Monthly Meter Charge (MMC)	Transportation Electrification funding/recovery	UM 2033 ⁶⁹ - TEP approves UM 2165	Schedule 150

⁶² UM2033 docket: <https://apps.puc.state.or.us/edockets/DocketNoLayout.asp?DocketID=22127>.

⁶³ 2019 Transportation Electrification plan: <https://edocs.puc.state.or.us/efdocs/HAA/haa102039.pdf>.

⁶⁴ 2023 Clean Energy Plan: <https://edocs.puc.state.or.us/efdocs/HAH/um2033hah162744.pdf>.

⁶⁵ 2023 Transportation Electrification plan: <https://edocs.puc.state.or.us/efdocs/HAH/um2033hah15818.pdf>.

⁶⁶ 2023 first errata filing: <https://edocs.puc.state.or.us/efdocs/HAH/um2033hah174542.pdf>.

⁶⁷ 2023 second errata filing: <https://edocs.puc.state.or.us/efdocs/HAH/um2033hah152037.pdf>.

⁶⁸ 2026-2028 Transportation Electrification plan:

<https://edocs.puc.state.or.us/efdocs/HAQ/um2033haq338346027.pdf>.

⁶⁹ UM2033 docket: <https://apps.puc.state.or.us/edockets/DocketNoLayout.asp?DocketID=22127>.

Funding Type	Definition	Filing	Schedule (if applicable)
Flexible Load Deferred Costs	Commission-authorized deferred accounting	Costs for all flexible load pilots and programs are recovered via UM 2234 ⁷⁰ Smart Battery pilot recovered via UM2078 ⁷¹ but will be requesting to move to UM2234.	Schedule 135 serving as a balancing account
Capital Expenditures (CAPEX)	Applicable capital recovery	Rate Case UE 435 - latest approval UE 473 request as applicable	N/A
Aid In Construction (AIC)	Applicable DSG/Schedule 200 treatment	Rate Case UE 435 - latest approval UE 473 request as applicable	N/A

⁷⁰ UM2234 docket: <https://apps.puc.state.or.us/edockets/DocketNoLayout.asp?DocketID=23208>.

⁷¹ UM2078 docket: <https://apps.puc.state.or.us/edockets/DocketNoLayout.asp?DocketID=22381&OrderBy=ActionType>

Appendix C WEIM, EDAM, Resource Adequacy & Market Materials

This appendix provides the operating and market-design detail supporting the strategic discussion in [Section 2.3, Market and Policy Evolution](#). It describes how PGE currently represents Flexible Load in WEIM and the issues PGE is evaluating as EDAM and regional resource-adequacy frameworks develop.

C.1 Western Energy Imbalance Market (WEIM)

Demand response can generally be represented in the Western Energy Imbalance Market through two models:

- **Load Forecast Adjustment (LFA):** Expected demand response modifies the load represented to the market
- **Supply-Side Demand Response:** Each qualifying resource participates more directly in market dispatch and is subject to applicable metering, telemetry, bidding, and performance requirements.

PGE currently represents its demand response programs through the Load Forecast Adjustment framework. This approach aligns with the current design of PGE's Flexible Load programs because PGE determines when customer resources are dispatched rather than relying on market prices to initiate individual demand response events. The framework also allows PGE to reflect expected demand response in the load used for WEIM Resource Sufficiency Evaluations.

When PGE plans a demand-response event, it provides the expected load reduction to CAISO in advance of the operating period. Depending on CAISO's operating process, the event may be reflected through an adjustment to the short-term load forecast or through DR conformance entered into CAISO operating tools.⁷² Both approaches are intended to represent the expected reduction in PGE load within WEIM operations.

The current framework has limitations. Once customer demand changes in response to an event, CAISO's persistence-based forecasting can interpret that change as an underlying change in load rather than as the result of a temporary demand-response dispatch. Similar effects can occur when load returns following the event. This can make it more difficult to accurately represent the resource during and immediately following demand-response events and reduces transparency between underlying customer load and the flexibility PGE has intentionally dispatched.

PGE has been working with CAISO and other WEIM entities to improve the treatment of demand response and flexible load. Areas of focus include:

- Improving the Load Forecast Adjustment framework so demand response can be represented more transparently as a load-modifying resource.

⁷² Under current CAISO procedures, planned PGE demand-response events may be represented either through a CAISO Short-Term Load Forecast Adjustment or through RTBS DR Conformance entered by PGE Balance Authority Operations in BAAOP. The applicable pathway is communicated by CAISO's Short-Term Forecasting team.

- Better distinguishing underlying load from intentional demand-response actions within load forecasting.
- Supporting more granular representation of demand response, including fifteen-minute operating intervals where appropriate.
- Developing a mechanism that allows CAISO's short-term forecasting processes to recognize known demand-response activity without treating the resulting load change as an unexplained change in underlying demand.

PGE participates in CAISO's Demand and Distributed Energy Market Integration (DDEMI) initiative and related stakeholder coordination focused on demand response and distributed-resource participation. PGE has participated in DDEMI working groups, provided feedback through CAISO's stakeholder-comment process, and coordinated with other WEIM and EDAM entities on issues specific to those market participants.⁷³

The first phase of DDEMI did not address all issues identified by PGE and other WEIM/EDAM entities. PGE and other affected utilities continue targeted coordination with CAISO regarding issues specific to WEIM and EDAM participation. That work may inform subsequent DDEMI phases and future market-rule changes.

C.2 Extended Day-Ahead Market (EDAM)

PGE begins participating in the EDAM market on October 1, 2026. EDAM expands regional energy-market coordination into the day-ahead timeframe, when participating utilities establish financially binding schedules for the following operating day.

Flexible Load can reduce, shift, or shape expected customer demand, while storage resources can change when electricity is consumed or delivered. Both can provide value within day-ahead operations, but the appropriate participation pathway will depend on each resource's operating characteristics and its ability to meet applicable forecasting, scheduling, measurement, telemetry, and performance requirements.

PGE expects market integration to proceed by resource type. Resources with stronger visibility, forecasting, control, and measurement capabilities may support deeper day-ahead integration sooner, while other customer resources may continue to provide value through load-modifying approaches as their capabilities and applicable market rules mature.

Accurate forecasting becomes increasingly important under EDAM because differences between day-ahead schedules and actual customer demand or resource performance can create balancing costs and additional market exposure. The VPP operating improvements described elsewhere in this Plan – including better expected-availability forecasting, measurement,

⁷³ California Independent System Operator, Demand and Distributed Energy Market Integration Stakeholder Initiative. Available online: <https://stakeholdercenter.caiso.com/RecurringStakeholderProcesses/Demand-Distributed-Energy-Market-Integration>.

dispatch integration, and performance feedback – therefore support both PGE’s internal operations and its future expanded participation in regional markets.

Market frameworks for demand-side resources remain under development. PGE will continue working with CAISO and other stakeholders through DDEMI and related processes to improve participation pathways for Flexible Load and distributed resources while maintaining reliability, customer protections, and appropriate performance accountability.

C.3 Demand Response and EDAM Resource Adequacy

PGE is also participating in regional work to develop a voluntary Resource Adequacy framework aligned with EDAM. The developing framework is intended to better coordinate forward resource planning with regional market operations while supporting transparency, deliverability, and reliability.

Demand response and flexible load are contemplated as potential contributors within that framework. Important design questions remain, including how load-modifying resources should be represented, what availability and duration requirements should apply, how performance should be demonstrated, and how qualifying capacity should be valued.

PGE supports a technology-neutral, performance-based approach in which resources are evaluated according to the capability they can reliably provide. This aligns with the broader VPP direction described throughout this MYP: enrolled capacity alone does not establish dependable resource capability, and different resources should be evaluated according to their availability, duration, forecastability, measurement, performance, and the service provided.

PGE will continue participating in the regional stakeholder process as the EDAM-aligned Resource Adequacy framework develops. Additional information regarding current proposals, workshops, and stakeholder materials is available through the Regional Organization for Western Energy.⁷⁴

⁷⁴ Regional Organization for Western Energy, Regional Resource Adequacy stakeholder materials. Available online: <https://rowesternenergy.org/regional-resource-adequacy/>

Appendix D Evaluation Overview

This appendix summarizes the planned and completed evaluation workstreams PGE is using to assess individual VPP programs, resources, and the Flexible Load portfolio. These evaluations provide the detailed evidence that supports the performance-accountability framework described in [Chapter 5](#).

This appendix describes the applicable evaluation scope and timing for Flexible Load programs, Residential Smart Charging, Smart Battery, Distributed Batteries, and other VPP resources where separate evaluation or reporting requirements apply.

D.1 Flexible Load Portfolio

The appendix below summarizes the evaluations planned for various elements of PGE's VPP portfolio through 2029:

- **Portfolio-Level:** Current 2026-27 and planned 2028-29 evaluations will focus on energy impacts (the maximum aggregate and average impacts, together with a summary of each product's contribution to the aggregate impacts under different dispatch scenarios, event types, and seasons) and events for each season. Additional reports will include residential and commercial enrollee compositions for each product and season, as well as process-related insights for the entire portfolio.

PGE's 2026-27 evaluation will also attempt to quantify the locational value of load flexibility across PGE's distribution system; these results will translate flexible load capabilities provided by the Flexible Load portfolio into location-specific avoided cost values, which can be used to inform distribution planning, program design, cost effectiveness, and targeted procurement.

For the 2028-29 evaluation, PGE is considering additional research on Flexible Load portfolio grid benefits, resource adequacy measures, and dispatch strategies and scenarios, as well as individual and portfolio-level program impacts and processes.

- **Peak Time Rebates:** The current 2026-27 evaluation is focused primarily on measuring the energy impacts of the product, which include maximum aggregate impacts, average per-participant impacts, and impacts by customer microsegments and other important characteristics for each season, event-day, and event-hour. The evaluation will also assess the product implementer's baseline methodology for calculating participant impacts and includes an option to conduct a participant survey that focuses on process-related topics.

PGE is planning a similarly-scoped evaluation during the 2028-29 biennium to further refine any key evaluation-related learnings and recommendations from the current evaluation. If a participant survey is not conducted as part of the current 2026-27 evaluation, PGE's plan is to include it as part of the 2028-29 evaluation.

- **Smart Thermostats:** The current 2026-27 evaluation is focused primarily on measuring the energy impacts of the product, which include maximum aggregate impacts, average per participant impacts, and impacts by important customer characteristics, such as HVAC and housing type, for each season, event-day, and event-hour, as well as for adjacent pre- and

post-event hours. The current evaluation also includes an option to conduct a participant survey that focuses on process-related topics.

PGE is planning a similarly-scoped evaluation during the 2028-29 biennium to further refine any key evaluation-related learnings and recommendations from the current evaluation. If a participant survey is not conducted as part of the current 2026-27 evaluation, the plan is to include it as part of the next evaluation in 2028-29.

- **Time-Of-Day Rate:** The current 2026-27 evaluation is focused on both product impacts and processes. The evaluation was designed to measure the energy impacts of the rate during the 2025 program year, including aggregate impacts, average per participant impacts, and impacts by important customer characteristics, such as EV ownership, housing type, and tenure on the rate.

This evaluation also covers important process-related tasks:

1. A benchmarking study comparing PGE's rate with similar rates at other utilities to gain insights into industry best practices.
2. An enrollment/attrition analysis focused on why and when customers enroll, stay on, and leave the rate to help improve uptake and retention.

PGE is planning a similarly-scoped evaluation during the 2028-29 biennium to further refine any key evaluation-related learnings and recommendations from the current evaluation. If a participant survey is not conducted as part of the current 2026-27 evaluation, PGE's plan is to include it as part of the next evaluation in 2028-29.

- **Energy Partner on Demand (Schedule 26):** The current evaluation is focused on both product impacts and processes: maximum aggregate impacts, average per participant impacts, and impacts by important customer characteristics, such as business sector and size, for each season, event-day, and event-hour, as well as for adjacent pre- and post-event hours.

The impact evaluation will also include:

1. An assessment of the product implementer's settlement estimates to verify consistency and identify any discrepancies.
2. Development of a statistical model to identify the conditions and dispatch factors that influence participant load reduction performance, particularly any negative load impacts.

The 2026-27 process evaluation will also include research into increasing realization rates and enhancing seasonal readiness through interviews, discovery research, and other research tasks.

PGE is planning a similarly-scoped evaluation during the 2028-29 biennium to further refine any key evaluation- or process-related learnings and recommendations from the current evaluation. If a participant survey is not conducted as part of the current 2026-27 evaluation, the plan is to include it as part of the next evaluation in 2028-29.

- **Energy Partner Commercial Thermostats (Schedule 25):** The current evaluation is focused on both product impacts and processes: maximum aggregate impacts, average per participant

impacts, and impacts by important customer characteristics, such as business sector and size, thermostat type, building type, etc. for each season, event-day, and event-hour, as well as for adjacent pre- and post-event hours.

The impacts evaluation will also include:

1. An analysis of the factors that influence load reduction effectiveness to help improve the product's impacts.
2. A telemetry data quality and methodology assessment to better understand whether and how these data can be leveraged for more granular and accurate HVAC load measurements.
3. Validation of the product implementer's HVAC load model.
4. The process evaluation will include:
 - Development of a program logic model
 - Interviews and research to evaluate trade ally engagement, participant experience, and product process effectiveness.

PGE is planning a similarly-scoped evaluation during the 2028-29 biennium to further refine any key evaluation- or process-related learnings and recommendations from the current evaluation. PGE may include additional process research to build on learnings from and implementation of the logic model developed in 2026-27.

PGE's portfolio evaluation plans build on past assessments to include more research and metrics at the portfolio level while also retaining a focus on the performance of individual products. The 2028-29 work will also focus on portfolio-level performance and value, in alignment with the goals and objectives set forth in this MYP.

- **Residential Smart Charging Pilot:** PGE's current Residential EV Smart Charge pilot design evaluation approaches are sufficient for the pilot as implemented; reported impacts are stable year-over-year. If the pilot continues as currently designed, PGE will conduct evaluations similar to those completed in 2024 and 2025, using randomized-control methods to estimate seasonal demand-response impacts and surveying customers approximately every other year.

D.2 UM 1856 Energy Storage

Energy storage evaluation occurs through resource-specific workstreams. Smart Battery will undergo formal evaluation beginning in 2027, while comprehensive learnings from the UM 1856⁷⁵ distributed-battery projects are expected to be reported through the applicable regulatory process in 2028 and will inform PGE's broader VPP and future storage decisions.

⁷⁵ Oregon Public Utility Commission, Docket UM 1856, In the Matter of Portland General Electric Company, Draft Storage Potential Evaluation and related Energy Storage Pilot filings and compliance reports. Available online: <https://apps.puc.state.or.us/edockets/docket.asp?DocketID=20913>

CERTIFICATE OF SERVICE

I hereby certify that I have this day caused **Portland General Electric Company's**
CONFIDENTIAL 2027-2028 Virtual Power Plant Multi-Year Plan to be served by
electronic transfer to those parties whose e-mail addresses appear on the attached service list for
OPUC Docket UM 2141.

Dated at Portland, Oregon, this 15th day of October, 2026.

/s/ Danielle McCain

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UM 2141 Service

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