

Chapter 3. Foundations

3.1 Customer Flex Load Journey

PGE must continue to scale the Flex Load resource to meet 2030 decarbonization goals. Doing so requires the Company reevaluate the accompanying customer journeys and experiences, simplifying and mitigating barriers to enrollment and participation. PGE will continue to explore means by which to unify, personalize, and simplify the customer experience. The resulting new engagement strategies will help PGE expand Flex Load participation and make inroads into harder-to-reach market segments.

In 2021 through 2022, PGE conducted research regarding the barriers to enrollment and participation in its Flex Load programs. This work leveraged PGE's past research regarding underserved communities, a rapid needs assessment, and also discussions with stakeholders and Commission Staff in forums like PGE's Learning Lab and DRAG.

From that research, PGE identified the following opportunities to better support customers in their Flex Load journey:

- Provide a singular location for customers to learn about the technology, associated programs, and applicable rebates and incentives
- Offer rebates and incentives at point-of-sale to mitigate up-front costs, which can be a barrier to entry for many customers
- Connect customers with vetted, knowledgeable installers who offer fair pricing
- Connect those customers who struggle to obtain financing with third-party financing agencies who offer financing beyond the traditional lending requirements

PGE concluded that two complementary platforms were best suited to educate customers on Flex Load technology and guide them through associated programs, rebates, and incentives. The following sections provide detail on those platforms.

3.1.1 PGE+ Platform

PGE+ is a one-stop-shop platform where customers can:

- Learn about the right technology
- Get tips on installation decisions that affect costs
- Get connected with a vetted installer
- Receive applicable rebates (e.g., from the Energy Trust or manufacturer)
- Enroll in a Flex Load program (e.g., PGE's Smart Thermostat program)

At the end of 2023, the Company rolled out its first PGE+ solution, focusing on Level 2 (L2) EV charging. This solution targets both customers purchasing a qualified level 2 EV charger and those who may have already purchased a charger from a third party and now want help with installation. Should the customer opt to proceed with the PGE+ offering, they are automatically enrolled into PGE's Smart Charging program, with applicable charger rebates paid upfront.

The PGE+ platform also helps customers determine if they qualify for higher rebates based on their household size and income. Note that customers are not required to use PGE+ to enroll in the Smart Charging program and receive its rebates. PGE is exploring the opportunity to extend this support into other residential product categories such as HVAC, rooftop solar, home backup batteries, and

water heating. During exploration, PGE will collaborate with stakeholders such as OPUC Staff, Energy Trust, NEEA, and community action agencies to determine the best customer experience.

PGE will discuss significant new offerings on PGE+ or a new platform with Staff via Demand Response Advisory Group (DRAG) meetings.

3.1.2 Marketplace

The second platform available to customers is Marketplace. PGE launched the Marketplace platform in 2020. It primarily serves as an acquisition channel to pre-enroll customers into the Residential Smart Thermostat offering. Customers can also receive energy efficiency rebates from the Energy Trust for products such as smart thermostats and air purifiers. PGE will continue to evaluate products which could be offered via Marketplace to help customers become resilient, improve cooling/air quality, and adopt micro-mobility.

PGE believes it is important to share developments in the PGE+ and Marketplace platforms as they are key to the continued growth of the Flex Load resource. Note that PGE does not request funding within the MYP for these platforms, whose operational development is funded via capital investment. Similarly, funding for rebates/incentives are via Commission-approved programs linked to from these platforms. Manufacturers or installers may fund promotional discounts, which will automatically be offered to customers on the applicable platform.

PGE will continue to explore products/services and features which could be added to these platforms in support of customers' energy efficiency, flexible load, resilience, and electrification goals.

3.2 DER Modeling

PGE engaged Resilient Edge to develop the AdopDER modeling tool to provide DER adoption forecast, load impacts, and locational load forecasts. AdopDER estimates site-level, 8760-hour load impacts from the adoption and interaction of a broad range of distributed energy resources such as solar, storage, building electrification, transportation electrification, demand response, and flexible loads.

In 2024, PGE and Resilient Edge have coordinated on a US DOE project proposal to develop a public graphical user interface and other capabilities to extend AdopDER modeling. To provide this, PGE would provide a set level of access to the tool allowing stakeholders to develop planning scenarios for their advocated position or interests. This would lower the bar to entry for sophisticated modeling and demonstrate how shared access to such sophisticated tools better informs and effectively influences the utility planning and investment and regulatory decisions.

3.3 Stakeholder Engagement

3.3.1 Demand Response Advisory Group and Flexible Load Advisory Stakeholder Group

PGE has hosted quarterly Demand Response Advisory Group meetings since 2018. The DRAG serves as a venue for PGE to discuss flexible load activities with OPUC staff. DRAG topics include updates on concepts in pipeline, recent launches, upcoming filings, evaluations underway, technology challenges, and lessons learned, as well as market research findings and budget and savings review.

PGE also hosted quarterly Flexible Load Advisory Stakeholder (FLASH) meetings until mid-2022. The FLASH served as a venue for PGE to discuss Flex Load activities with interested stakeholders. Attendees included the Citizens Utility Board (CUB), Energy Trust of Oregon, Northwest Energy

Coalition (NWECC), Community Energy Project, Alliance of Western Energy Consumers (AWEC), Idaho Power, Pacific Power (PAC), Northwest Energy Efficiency Alliance, Northwest Power and Conservation Council, municipal partners, and various stakeholders.

In 2022, to streamline engagements on behalf of our stakeholders, PGE consolidated the FLASH into the Learning Lab.

3.3.2 Learning Labs and Distribution System Workshops

PGE's Learning Labs and Distribution System Workshops provide stakeholders with a deeper understanding of PGE's key planning initiatives, including the Clean Energy Plan, Distribution System Plan, Transportation Electrification Plan, Flex Load Multi-Year Plan, and Integrated Resource Plan.

PGE strives to engage less technical stakeholders in discussions and provide a space for them to be informed and influence the different plans. We have used storytelling, real-world examples, and visual aids, to make complex technical concepts more accessible to a broad audience. The sessions have been held regularly and utilize various communication tools, such as email updates, Zoom meetings, and collaborative surveys, to ensure continuous engagement and feedback. Feedback collected during these sessions is valuable, helping to refine our plans and align them more closely with community needs and expectations. PGE continues this work with our Distribution System Workshops.

PGE's vision for community engagement continues to evolve to meet the needs of our stakeholders, communities, and customers. PGE recognized during our DSP engagements that there is a need for a variety of methods to meet the needs of different audiences. PGE is pivoting to engagement models which better meet the needs of our stakeholders, communities, and customers.

In addition to the abovementioned quarterly DRAG meetings with OPUC staff, PGE also held the following broader stakeholder engagements³⁷:

- June 15, 2023, Learning Lab: Flex Load 101
- July 27, 2023, Learning Lab: Flexible Load Multi-Year Plan Update³⁸ and also Flexible Load Customer Journeys
- September 7, 2023, Learning Lab: Flexible Load Customer Journeys
- December 13, 2023, Learning Lab: Distributed Energy Resources Integration Opportunity
- February 8, 2024, Learning Lab: PGE+ On-Bill Payments
- May 8, 2024, Distribution System Workshop: Distributed Energy Resources Forecast
- July 25, 2024, Distribution System Workshop: Flex Load/Multi-Year Plan Update, followed by a series of open hours thereafter to address follow-on questions

PGE's vision for the Learning Labs continues to evolve to meet the needs of our stakeholders, communities and customers. Community education and awareness and community partnerships are key to equitable engagement. We seek to develop relevant and relatable "people-centered" content

³⁷ Supporting materials for these meetings (e.g., slide decks and videos) can be found at <https://portlandgeneral.com/about/who-we-are/resource-planning/resource-planning-engagement>.

³⁸ PGE (2023). *Learning Lab: Flexible Load Multi-Year Plan Update*. Slide deck and video available at https://assets.ctfassets.net/416ywc1laqmd/2qldrqECZtBeDmPBNpOwAC/87c8f45cb430fbc29ffd0599af145db3/Learning_Lab_7.27.23.pdf#page=6 and <https://www.youtube.com/watch?v=eRyfUDmqZPQ&t=471s>, respectively.

with input from community-based and culturally specific organizations, to be shared with our communities and customers.

3.3.3 Industry Engagement

PGE will continue to engage influencers of customer education and enrollment in PGE Flex Load offerings where we see opportunities to grow the Flex Load resource. To date, these efforts have focused on associations such as the Home Builders Association, the Urban Land Institute, the Commercial Real Estate Development Association, and other market actors such as equipment manufacturers, installers, or EV dealerships. These engagements help PGE better understand underlying market and customer needs and ultimately support education and remove barriers to building decarbonization, electrification, resilience, and grid interactivity.

3.4 Coordination on Affordability

This section describes efforts which PGE, the Energy Trust of Oregon, and other regional entities are undertaking to coordinate planning and co-deployment of solutions to address affordability. This work reduces energy burden for affected customers, in part by supporting affected customers' ability to participate in PGE's Flex Load offerings and participate in the bi-directional grid.

3.4.1 Multi-Year Planning: Affordability Pillars

Navigating the trilemma of affordability, reliability, and decarbonization is complex. Recent legislation has the potential to transform long held approaches to serving customer needs. House Bill (HB) 3141 (2021) revised public purpose charge (PPC) allocations, established equity metrics and evolved low-income electric bill payment assistance. HB 2475 (2021) allows the OPUC to consider customer characteristics that affect affordability when approving programs and energy rates charged by regulated utilities. Both bills invite reconsideration of the treatment of cost-effective energy efficiency and demand response resources as described in Oregon Revised Statute (ORS) 757.054.

PGE's ratepayer investment in energy efficiency is effectuated by Energy Trust of Oregon since 2002. The annual budget includes both cost-effective programs and non-cost-effective programs by way of measure exception. The latter is subject to criteria as provided in the docket progression: UM 551 (1994) Order No. 94-590, then UM 1622 - Gas and Electric Exceptions (2012) then, UM 1696 - Electric Exceptions (2014) Order No. 15-029. Generally, measure exceptions serve as a pathway to a cost-effective offering, however, they also serve to provide incentives for traditionally hard to reach customers. In addition to exceptions, PGE ratepayers fund the program delivery infrastructure to deliver these incentives to traditionally hard to reach customers via community partner organizations. This investment in both non-cost-effective measures and community partner capacity building represents a larger portion of the Energy Trust of Oregon budget since the passage of HB 3141 and HB 2475, and though necessary to increase participation, are a deviation from standard practice, a contributor to recent budget increases and therefore rate impacting for non-participants.

To manage the rate impact of energy efficiency investment and successfully garner the participation of customers who might otherwise experience barriers to participation, a more holistic approach is needed. This holistic approach must leverage and braid the federal, state, and local funds which have become available to reduce the costs to customers. PGE's approach includes work with the Energy Trust to cobrand and reach hard to serve customers to ensure our lowest income customers benefit.

PGE sees affordability as a mandate for all customers, however, of the approximately 800,000 residential customers that PGE currently serves, it is estimated that 20% are energy burdened - with bills that represent at least 6% of income. Numerous utility and state agency programs exist for the benefit of lower income customers and navigating these programs is challenging across multiple organizations and eligibility requirements.

To meet the needs of *all* residential customers, PGE proposes a holistic approach to affordability, built upon the following three pillars:

1. **Bill Assistance** - Participation in Public Purpose Charge (Sch 108), low-income assistance (Sch 115), and other state agency programs that fund low-income housing, weatherization, and bill payment assistance.

Between 2014 and 2023 PGE's public purpose charge disbursement and low-income assistance funding supported more than \$235M in weatherization upgrades and electric bill assistance, including Energy Conservation Helping Oregonians and Oregon Energy Assistance Program funding, for income qualified households and delivered via Community Action Agencies.

2. **Bill Discount** - PGE's Income Qualified Bill Discount (IQBD) (Sch 18) tiers of discounts afforded to income eligible PGE customers.

On docket UM 2211 PGE conducted engagement on the IQBD proposal through the Fall and Winter of 2021, ultimately filing the Company's proposal on January 13, 2022. The proposed IQBD was the result of several evolutions informed by stakeholder feedback and met most Staff baseline evaluation criteria. The program is applicable to all PGE residential customers with a gross household income at or below 60 percent of Oregon state median income (SMI), adjusted for household size. Monthly bill discounts are calculated as a percentage of bill, and are offered at five tiers, based on the enrolled Customer's household income as a percentage of SMI. Total enrollment and expenditures in 2023 were approximately 70,000 and approximately \$14.5M, respectively.

3. **Bill Reduction** - Participation in energy efficiency (Sch 109/110) and/or Flexible Load programs to reduce consumption and the decrease in investment via braiding of federal, state and local public sector incentives.

To ensure prudent investments PGE is required, per statute, to plan for and pursue all available energy efficiency resources that are cost effective, reliable, and feasible. The intent of this investment in energy efficiency is to promote lower energy bills, protect the public health and safety, and improve environmental benefits, and similarly, the intent of the utility investment in demand response resources is to reduce the need for procuring new power generating resources, which, in turn, reduces energy bills, protects the public health and safety, and improves environmental benefits.

Distributed energy resources activation is a part of an all-resource solution to least cost service and an increasing contributor to meeting PGE's decarbonization goals as articulated in its recent Integrated Resource Plan. Also, per Section 7 of enrolled HB 2475, in addition to comprehensive classifications, tariff schedules, rates and bill credits, the Public Utility Commission may address the mitigation of energy burdens through bill reduction measures

or programs that may include, but need not be limited to, demand response or weatherization.

An inventory of bill assistance, bill discount and bill reduction programming, and associated income eligibility as a percent of SMI, is provided in [Table 7](#) below.

Table 7. Income Eligible Program Inventory

Program Name	Customer Outcome	Administrator	Funding Source	Eligibility Criteria	2023 Annual \$
Low-Income Home Energy Assistance - Energy Conservation Helping Oregonians and Low-Income Housing	Bill Assistance, Bill Reduction	Oregon Housing and Community Services	PGE schedule 108: PPC	< 60% SMI	~\$36M in aggregate ³⁹
Oregon Energy Assistance Program	Bill Assistance	Oregon Housing and Community Services	PGE schedule 115: Low-Income Assistance	< 60% SMI	
Low-Income Home Energy Assistance - Weatherization Assistance Program	Bill Reduction	Oregon Housing and Community Services	PGE schedule 108: PPC	< 80% SMI	
Income Qualified Bill Discount	Bill Discount	PGE	PGE customer rates via non-participants	< 60% SMI	~\$14.5M
PGE Flexible Load Management/ Demand Response Programs	Bill Reduction	PGE	PGE customer rates	n/a	Subset of ~\$15.6M
Energy Efficiency Programs	Bill Reduction	Energy Trust	PGE schedule 109		Subset of ~\$87M
Renewable Energy	Bill Reduction	Energy Trust	PGE schedule 108: PPC		Subset of ~\$16M
Solar/ Savings Within Reach and on bill financing	Bill Reduction	Energy Trust	PGE customer rates and PPC	< 120% SMI	<i>Incl'd in Energy Efficiency & Renewable program spend</i>
Solar for All	Bill Reduction	ODOE, Energy Trust, Bonneville Env. Foundation	Public - Federal Braiding opportunity	tbd	\$87M total beginning 2025/2026

³⁹ Report to Legislative Assembly on Public Purpose Charge Receipts and Expenditures Report Prepared by Evergreen Economics Period: July 1, 2021 - June 30, 2023; As well as retrieved from remittance on PGE Schedules 108 and 115.

Program Name	Customer Outcome	Administrator	Funding Source	Eligibility Criteria	2023 Annual \$
Portland Clean Energy Community Benefits Fund (PCEF)	Bill Reduction	Grant recipients for single family, affordable multi-family and small business projects	Public - Local Braiding opportunity	tbd	tbd; MOU with Energy Trust re: deferred maintenance pending
Home Electrification (IRA Sec. 50122)	Bill Reduction	ODOE via Energy Trust	Public - Federal Braiding opportunity	< 80% SMI	\$52M total beginning 2025
Home Efficiency (IRA Sec. 50121)	Bill Reduction	ODOE via Energy Trust	Public - Federal Braiding opportunity	< 80% SMI	\$52M total beginning 2025

3.4.2 Action Planning with the Energy Trust

As a result of legislative direction in HB 3141 (2021), codified as ORS 757.746(e), Energy Trust of Oregon was required to, “with public utilities, jointly develop public utility specific budgets, action plans and agreements that detail the entity’s public utility-specific action plan (USAP), resources, including coordinated activities that require joint investment and deployment.” Also, per the legislation, “Each action plan must reflect stakeholder feedback gathered through a public process managed by the entity and the relevant public utility as overseen by the commission.” This statutory direction required modification to Energy Trust's current budget development process, with more utility-specific coordination. In June of 2022, following a series of work sessions with OPUC, Energy Trust, utility funders and ratepayer advocates, a Budget Process Coordination and Action Plan Memorandum (the “HB 3141 Budget Coordination Memo”) was formed. This memorandum represented a joint planning framework that articulated stepwise activities to support annual budget and utility-specific action planning.

Building on this plan development process the Energy Trust and PGE propose evolving from a two-year cycle to a multi-year (2026-2030) time horizon and from an activity-based plan to an outcomes-based co-deployment framework. Doing so affords the two organizations the opportunity to better maximize value for our shared customers, accelerate procurement as determined in the PGE Integrated Resource Plan in compliance with HB 2021, as well as align based on organizational and program readiness.

3.4.3 Co-Deployment with the Energy Trust

Co-deployment with the Energy Trust encompasses a shared strategy, with common marketing, outreach, and messaging, to efficiently deliver complementary energy services to shared customers. Through co-deployment of complementary services, customers benefit from behind-the-scenes coordination with streamlined participation and total delivery cost reduction for all ratepayers. To start, co-deployment will include targeting priority high energy burdened customers with services that lead to meaningful bill reduction and advance the shared objective of reducing energy burden. The timing of this effort is aligned with implementation of HB 2475 through the OPUC Docket No UM 2211, with the goal of reducing energy burden and the anticipated availability of public sector funding. Co-deployed services will initially consist of existing, feasible offerings provided by each organization today. Over time, additional services and deployment forms or pathways will be added to the framework as each organization is ready to bring in more services to market. The framework will evolve to focus on different configurations of candidate screening and more targeted delivery.

Co-deployment may take a variety of forms and pathways:

- Community outreach: Shared program marketing collateral and tabling events together
- Co-funding: A methodological approach in which PGE provides complementary funding for flex value (e.g., residential thermostats)
- Bill reduction: Referral of IQBD customers to increase EE program participation (also provides flex potential for future co-funding opportunities)
- Solar+ storage: Aligning PGE smart battery roadmap with the U.S. Environmental Protection Agency Greenhouse Gas Reduction Fund Solar for All grant funding timing
- Pilot to program: Ensuring that tested collaboration yields a hand-off to product and measure development

Potential services and timing for co-deployment based on understood organizational and program readiness as laid out in [Table 8](#), below:

Table 8. Potential Services and Timing for Co-Deployment with Energy Trust

	2025	2026-2027	2027-2028
Energy Trust	For single family residences: insulation, no cost heat pumps, heat pump water heaters, ductless heat pumps, targeted to replace electric resistance heating; For multifamily residences: strategic energy management	Solar plus storage (solar for all and PCEF combination); Develop and/or deploy co-funded measures for efficiency and flex value, learning from SGTB and flex feeder experiences; Co-evaluation of framework, recommendations for improvements For multifamily residences: line voltage thermostats	Evaluation of framework and impacts; Expand to other customers and/or geographical areas
PGE	Energy Burden Needs Assessment recommendations regarding UM 2211 New Discount Program	Alignment on solar+storage and midstream heating ventilation and air conditioning via PGE+, continue residential and non-residential thermostat co-funding, support new building demand response design and technical assistance	Co-fund or otherwise co-deploy “on-line” voltage thermostats and midstream HPWH

3.4.4 Governance with the Energy Trust

This section describes a new approach to coordination with the Trust. This governance structure clarifies and formalizes the roles of each partner and lays out a process to articulate priorities through utility-specific action planning.

A joint commitment by each organization is key to success, and an agreed upon process for decision-making, role definition and annual updates to the multi-year framework provide the guidance for stakeholders to understand the intent and accountability associated with co-deployment.

Though short, intermediate, and long-term outcomes are provided in the logical model, the processes that support those outcomes or impacts represent the key elements. Each of these elements needs to be clearly defined at both the organizational and project levels to support consistent management processes and achieve the intended outcomes.

Table 9. Energy Trust of Oregon Coordination

Decision (why)	Key Element (what)	Delivery Partners (who)	Energy Trust Inputs	PGE Inputs	Activities (how)	Outputs (where)
Objectives/ Priorities	Co deployment plan design	Contribute and/or Co-Create	Co-Lead	Co-Lead	Development of multi-year outcomes and governance	Frame-work
Planning/ Policies	Determining Market and/or Resource Potential	Contribute	Co-Lead (EE/RE)	Co-Lead (Flex Load/DR)	Define resource requirements	USAP
Planning/ Policies	Budget Development/ Forecasting	Contribute	Co-Lead	Contribute	Identify research objectives and co-deployment opportunities and locations	USAP
Administration / Delivery	Budget Monitoring and Tracking	Contribute	Lead	Awareness/ Contribute	Discuss pipeline management and variance	USAP
Administration / Delivery	Budget Reporting and Narrative	Contribute	Lead	Contribute	Discuss pipeline management and variance	USAP
Administration / Delivery	Program management	Lead and/or Contribute	Lead	Contribute	Identify delivery channels and operational efficiencies	USAP
Planning/ Policies	Delivery partner engagement	N/A	Lead	Contribute	Identify relevant partners based on opportunities and locations	USAP
Planning/ Policies	Marketing plan development	Contribute and/or Co-Create	Co-Lead	Co-Lead	Identify delivery channels and operational efficiencies	USAP
Planning/ Policies	Marketing implementation	Contribute	Co-Lead	Co-Lead	Identify relevant partners based on opportunities and locations	USAP
Planning/ Policies	Customer Outreach	Co-Lead	Co-Lead	Co-Lead	Identify referral and tabling opportunities	USAP

Decision (why)	Key Element (what)	Delivery Partners (who)	Energy Trust Inputs	PGE Inputs	Activities (how)	Outputs (where)
Administration / Delivery	Customer Enrollment	N/A		N/A	Identify relevant partners based on opportunities and locations	USAP
Administration / Delivery	Managing Contractors & Trade Allies	Contribute and/or Co-Lead (depending on partner)	Lead	Contribute	Define resource requirements and operational efficiencies	USAP
Administration / Delivery	Project installation	Lead/Co-Lead	Lead/Co-Lead		Identify delivery channels and operational efficiencies	USAP
Administration / Delivery	Reporting, Tracking Outcomes	Contribute	Co-Lead	Co-Lead	Share metrics on outcomes	USAP
Administration / Delivery	Manage 3 rd Party Evaluation		Lead	Contribute	Identify operational efficiencies	USAP

3.4.5 History of Regional Partnership

PGE sees the value of a holistic approach which includes co-deployment of bill reduction programs with the Energy Trust of Oregon, in concert with bill assistance and bill discount programs, and observes the sizeable amount of public sector funding expected to deploy in Oregon in 2025 and beyond. Higher public sector incentives are expected for the same income eligible customers on PGE’s IQBD, many of which benefit from Energy Trust measure exception, so an opportunity exists to braid and amplify. As Energy Trust is the Oregon Department of Energy (ODOE)-designated implementer of Inflation Reduction Act funds, and co-implementer of EPA Solar for All funds, it is in a unique position to braid and deploy to the customers for whom the incentives are intended.

Higher incentives for energy efficiency and renewable energy offered in specific geographic areas is not a new approach. There is a legacy of partnership in co-deploying at the neighborhood level with Energy Trust of Oregon, Northwest Energy Efficiency Alliance, national labs, Community Energy Project, and other members of the Demand Response Review Committee in the Smart Grid Testbed since 2019. Additionally, Energy Trust has pursued targeted load management (TLM) projects independent of PGE since 2018. An inventory of these projects is provided in [Table 10](#). Lessons learned from these demonstration projects may be brought to bear on new locational co-deployment approaches.

Table 10. Demonstration Project Summary⁴⁰

Project	Dates	Location	Evaluator	Measures
NW Natural – Energy Trust Geographically Targeted Energy Efficiency (GeoTEE)	2019 - 2022	Cottage Grove, Creswell	Apex Analytics, LLC	Furnaces, HVAC, insulation, windows, fireplaces
PGE Smart Grid Testbed Project	2019 - 2021	Portland, Hillsboro, Milwaukie	Cadmus Group	Peak Time Rebates (PTR), Thermostats, EV charging
Pacific Power – Energy Trust TLM Pilot	2018 - 2021	Medford area	Pivot Advising, LLC	Solar, weatherization, thermostats, central air conditioning, energy saver kits, lighting, food service equipment, HVAC systems controls and O&M (e.g., heat pumps)
Pacific Power – Energy Trust TLM Pilot	2016 - 2018	North Santiam Canyon	Navigant Consulting	HVAC, water heating, lighting, cooking, refrigeration

Table 11, below, provides an analysis and synthesis of process and impact evaluations conducted by third party evaluators of demonstration projects in Oregon. Review of these reports was conducted to highlight lessons learned and identify themes across the various projects. The intent in cataloging findings from these multi-phase demonstration projects is to both promote awareness of the increase in participation the result of targeted geographic deployment, and the resulting organizational capabilities built that may be leveraged because of this local partnership work.

⁴⁰ PGE (March 2022). *SGTB Phase I - Final Evaluation Report*. Retrieved from [SGTB Phase I - PGE SGTB Final Evaluation Report - FINAL VERSION - 31MAR2022 - CLEAN.pdf - All Documents \(sharepoint.com\)](#)

Apex Analytics LLC (June 2023). *Northwest Natural – Energy Trust Geographically Targeted Energy Efficiency (GeoTEE)*. Retrieved from https://www.energytrust.org/wp-content/uploads/2023/07/GeoTEE-Phase-3-Evaluation-Report_REVISED_2023.06.05_Final.pdf

Pivot Advising (September 2021). *Pacific Power - Energy Trust Targeted Load Management Medford Pilot Process Evaluation*. Retrieved from https://www.energytrust.org/wp-content/uploads/2023/03/Final_PAC-TLM-Evaluation-Report_2021.pdf

Navigant Consulting (March 2020). *Pacific Power - Energy Trust Targeted Load Management Pilot North Santiam Canyon Summary Report*. Retrieved from https://www.energytrust.org/wp-content/uploads/2023/04/PAC_N.Santiam_TLM_SummaryReport_Final.pdf

Table 11. Demonstration Project Evaluation Themes

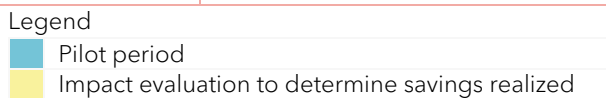
Category	Evaluation Theme
Research Objectives	<p>An effort focused solely on maximizing peak reductions might take a different approach than an effort that also prioritizes reaching underserved customers</p> <p>In contrast to TLM and GeoTEE projects the SGTB objectives went beyond strictly load reduction and included an assessment of customer participation in, motivations for, and comfort levels with demand response as well as the best methods to engage.</p>
Customer Value/ Participation	<p>Spurred by increased incentives based on local avoided costs, in pilot areas identified by the utility, the TLM and GeoTEE pilots all realized an increase in residential participation over baseline</p> <p>For SGTB, it was observed that default opt-in enrollment in PTR also increased participation in firmer kinds of demand response (e.g., self- enrolled thermostats)</p> <p>Also, auto-enabling customers in PTR lifted enrollment rates for environmental justice community (EJC) groups and reduced disparities in program delivery for those who may have faced barriers to self-enrolling.</p>
Equity	<p>Unequal customer treatment was identified in concerns both arising from making offerings available to customers in the pilot area but not to those outside the boundary, and the extent to which offerings reach communities that have historically been underserved</p> <p>It was noted that less intuitive boundaries, those not defined by zip code but instead by the electric distribution infrastructure, invite issues from those outside the boundary</p> <p>In the SGTB PGE Community Outreach Consultants (COC) worked with ETO and Community Energy Project to deliver weatherization and cooling workshops to low-income renters and homeowners.</p>
Planning and Alignment	<p>Given energy efficiency program delivery requires a distinct set of considerations it was recommended that ETO and its utility partners factor in the amount of demonstration project scopes the work needed to build relationships and understand community needs</p> <p>Providing quantitative savings targets specific to each program to help program implementers gauge their success</p> <p>An up-front local market analysis to inform marketing, outreach, and design</p> <p>SGTB targeted marketing of the Smart Thermostat program based on customer HVAC data increased the effectiveness of PGE's marketing</p>
Marketing and Outreach	<p>Efforts like email outreach played a larger role in building awareness of ETO than in directly motivating upgrade projects</p> <p>SGTB pursued five customer value proposition (CVP) marketing campaigns over the course of the pilot which explored engagement from a variety of perspectives - awareness, incentives, donating PTR earnings to a select non-profit, avoided carbon emissions, and renewables messaging</p> <p>Important to bring marketing into the conversation during the initial program design so that the approach is fully integrated</p>
Org. Capabilities	<p>ETO was able to develop systems and processes to coordinate special offerings and track the resulting uptake within targeted geographic areas</p> <p>It was suggested that the pilot's project manager be provided more authority to communicate directly with implementers rather than routing communications through staff from each program.</p> <p>Interviewees shared that key stakeholders should be consulted about their preference for the type and frequency of reporting that would be most useful to them</p>

The DOE also awarded PGE a grant to accelerate and deploy grid edge computing, which will be effective October 1, 2024.⁴¹ The first edge computing meter installs thereunder are targeted for 2025, with 90K units expected by end of 2028. This work includes establishing a new DER gateway capability, DER disaggregation software, and options for customer facing applications/data. As noted on PGE’s website, these investments “will help PGE maintain resilient grid operations during severe weather events and achieve progress toward our decarbonization targets. Grid edge technologies improve resilience, enable the integration of distributed energy resources, and maximize customer investments in home energy solutions.”⁴²

It bears acknowledging that there are active demonstration projects from which additional lessons will be learned (see [Table 12](#)). Those projects include the PGE Smart Grid Testbed Collaboration (SALMON) and associated Flex Feeder, Smart Solar and Smart Battery pilots, pursued in partnership with Energy Trust, NEEA, NREL, and Community Energy Project, as well as the NEEA End Use Load Flexibility project for which PGE is one of several regional utility funders.

Table 12. Scope of Regional Partnership

Scope	Goals	Partners	Budget	'19	'20	'21	'22	'23	'24	'25	'26	'27	'28	'29
End Use Load Flexibility	Accelerate the adoption of grid-enabled end-use technologies through market transformation	NEEA and another nine utilities across the region	\$0.7M (6-yr)											
SGTB Phase II DOE Connected Communities Project SALMON aka SGTB Collaboration	Build a 1.4 MW Flex Load resource within the project area and integrate the Flex Load devices into PGEs’ ADMS and DERMS.	Energy Trust, Community Energy Project, NREL	\$6.7M (5-yr)											
SGTB Phase II Flex Feeder Measure Development Incentive Delivery	Understand how best to integrate efficiency with other DERs in the planning, forecasting, & design of DSM programs, help PGE manage loads during periods of high demand.	NREL, Energy Trust. NEEA serves as stakeholder	\$4.3M (5-yr)											
SGTB Phase II Smart Solar	Study how solar smart inverters can provide additional grid benefits via applying customized smart inverter settings	NREL, Energy Trust	\$1.0M (2-yr)											
PGE Smart Battery	Explore the ability of distributed assets to provide grid services	Energy Trust	\$1.1M (5-yr)											
SGTB Phase I	To accelerate the development of DR and to acquire it “at scale.”	PNNL, NWPC, NEEA, CUB, ODOE, Energy Trust, cities, and CBOs	\$5.8M (2.5 yr)											



⁴¹ U.S. Department of Energy, Grid Deployment Office. *Fact Sheet: Grid Resilience and Innovation Partnerships Program*. Retrieved from https://www.energy.gov/sites/default/files/2023-11/DOE_GRIP_2123_Portland%20General%20Electric%20Company_v4_RELEASE_508.pdf.

⁴² PGE. *Funding the Future of Reliable, Affordable and Clean Energy; PGE awarded grant to accelerate and deploy grid edge computing*. Retrieved from <https://portlandgeneral.com/about/who-we-are/clean-energy-future/funding-the-future-of-reliable-affordable-and-clean-energy>.

Defining time-based outcomes provides the end state necessary to understand the inputs, activities and outputs required to meet those targets. PGE collaborated with Energy Trust to identify Co-Deployment Logic Model outcomes and then presented them to PGE’s Community Benefits and Impact Advisory Group (CBIAG) to inform the inputs, activities, and outputs. This approach ensured both that organizations were at a state of readiness to pursue stated outcomes and that those outcomes aligned with the CBIAG’s understanding of our shared customers’ needs. It is anticipated that PGE and Energy Trust will replicate this approach annually, in support of the utility specific action plan process, for intermediate and long-term outcomes.

Through a series of work sessions PGE and Energy Trust staff agreed that affordability represented the most urgent customer need and therefore it was appropriate to identify this as the short-term outcome. Co-deployment serves not only to address the affordability outcome but also serves as the first step toward locational deployment to address grid constraints and locational distribution value. That is, research objectives related to customer engagement in the short-term are therefore intended to inform the grid assessment criteria in the long-term. Put differently, a locational program-only approach in the short-term serves to address planning needs in the long-term.

Through a July 2024 workshop PGE and Energy Trust co-presented this logic model framework and proposed short- term outcomes to the CBIAG. Given PGE had completed and socialized an Energy Burden Needs Assessment with the group the request was to understand what program delivery approaches will be necessary to realize higher participation in customer segments that have historically been hard to reach.

It is anticipated that EPA Solar for All funding and IRA will begin to flow in 2025 and 2026, respectively.⁴³ Given 40% of those dollars are earmarked for environmental justice communities, including income-eligible customers there is an opportunity to amplify ratepayer funded energy efficiency and renewable energy incentives as well as increase participation in PGE’s IQBD in communities for whom these programs are intended. An inventory of measures that meet both identified customer need and carry multiple funding opportunities are provided in [Table 13](#), below.

Table 13. Prioritized Co-Deployment Measures

Measure	Objective	Energy Trust-Exception	Energy Trust-Pilot	RTF-Flex ⁴⁴	Public Sector Braiding ⁴⁵
All Insulation/Weatherization	Affordability, DERs Activation	Expires March 2028		2025-2029	IRA HEAR, 25C

⁴³ Wozniacka, G. (2024, October 7). *Oregonians won’t see \$113M in promised clean energy rebates until late 2025 or 2026*. OregonLive. Retrieved from <https://www.oregonlive.com/environment/2024/10/oregonians-wont-see-113m-in-promised-clean-energy-rebates-until-late-2025-or-2026.html>.

⁴⁴ The Regional Technical Forum is a technical advisory committee to the Northwest Power and Conservation Council established in 1999 to develop standards to verify and evaluate energy efficiency savings. In the 2025-2029 Funding Levels the RTF has included in its business plan priority energy efficiency and demand response technologies.

⁴⁵ The IRA includes the Home Electrification Appliance Rebate (HEAR) program which provides funding for incentives to flow state energy offices. In addition, there exists IRS sections 25C and 25D for energy-efficient home improvements and residential clean energy credits.

Measure	Objective	Energy Trust-Exception	Energy Trust-Pilot	RTF-Flex ⁴⁴	Public Sector Braiding ⁴⁵
Low-Income Insulation/Weatherization	Affordability	Expires March 2028		2025-2029	IRA HEAR, 25C
Ducted Heat Pumps	Affordability, DERs Activation	Expires Dec 2026 (Fixed Promotion)	No-Cost Program Delivery Pilot (PDP)	2025-2029 upgrades/conversions	IRA HEAR, 25C
Ductless Heat Pumps	Affordability, DERs Activation	Expires March 2025	No-Cost Program Delivery Pilot (PDP)	2025-2029 + Small Commercial	IRA HEAR, 25C
Extended Capacity Heat Pump	DERs Activation	Expires Jan 2026			IRA HEAR, 25C
Manufactured Home Replacement	Affordability	Expires March 2025			
New Buildings	DERs Activation	Expires March 2024			
Heat Pump Water Heater	Affordability, DERs Activation		No-Cost Program Delivery Pilot (PDP)	2025-2029 + Commercial	IRA HEAR, 25C
Connected Thermostat	DERs Activation	Equity Metrics < \$500		2025-2029 + Commercial	
Line Voltage Thermostat	DERs Activation			2025-2029	
Level 2 Electric Vehicle Service Equipment	DERs Activation			2025-2029	25D
Irrigation Pump Controls	DERs Activation			2025-2029	
Battery	DERs Activation				ODOE, 25D
Inverter	DERs Activation				ODOE, 25D

Public sector dollars may be braided with PGE customer dollars, bill discounts and programs, combined with Energy Trust measure exceptions (e.g., insulation, ductless heat pumps) and Energy Trust Savings and Solar Within Reach programs to increase participation in identified census block groups, and, if applicable, PCEF-funded deferred maintenance⁴⁶. Numerous energy burden maps exist including: DEQ Disadvantaged Communities (DACs), HB 2165 electric vehicle charging for priority populations, and the Biden Administration’s Climate and Economic Justice Screening Tool (CEJST) apart of the Justice40 initiative and the basis for deployment of IRA funds. A co-deployment on an identified census block group provides an opportunity to maximize value for the customers for

⁴⁶ Up to 30-50% of PCEF project funding can be used for health, safety, accessibility, or enabling repairs and serve to complement other funding sources for equipment and components.

whom these dollars are intended in a manner that draws inspiration from previous demonstration project successes and furthers PGE and Energy Trust’s affordability objectives.

Therefore, in support of short-term affordability outcomes—and given limited inputs (or resources)—locations and implementation plans are provided in the UM 2211 Energy Burden Needs Assessment recommendations, informed by that rich dataset and the feedback elicited from the CBIAG.

3.5 Evaluation Practice

To keep pace with PGE's growing variety of flexible loads and expanded utilization of DERs through establishment of the Virtual Power Plant, PGE is developing evaluation standards and practices to ensure:

- Evaluation materials clearly document key program strategies, tactics, and pilot learnings used to assess pilots' overall progress toward their goals.
- Evaluation, Measurement, and Verification (EM&V) approaches can feasibly (i.e., technically and cost effectively) measure impacts
- Assessments qualitatively characterize DERs and quantify both the direct and indirect impacts created by PGE's resource stacking/dispatch strategies and use of advanced grid control capabilities

Although programs may target various energy, grid, and non-energy benefits, PGE employs the following general evaluation framework based on the maturation process of the Flex Load activity:

- **Demonstration phase:** in this phase PGE seeks to deploy DERs to a limited number of customer sites to test *resource functionality*--PGE's ability to control the resource via integration with dispatch systems and/or OEM grid enablement features, capability of OEMs and DERMS to log and deliver needed resource data, user acceptance of DER performance, and PGE control over their devices/equipment. Other customer centric initiatives are also evaluated here through engagement, study and survey work. These generally include the customer journey and the customer value proposition.
- **Pilot phase:** as DERs are more broadly distributed, PGE seeks to test the suitability of implementation plans and learn how perceptions and experiences of the pilot affect market acceptance of the implementation as designed. Initial learnings from the demonstration implementation will be used to stage/schedule evaluation research plans (e.g., market and participant surveys, program interviews, and impact analyses) as well as to develop logic models and metrics. *Formative evaluation* activities involve recommendations regarding the measurement of pilot metrics, logic models, and research plans and methods until the pilot arrives at a stable implementation design. To document resource performance under a greater range of real-world conditions, the evaluation may also recommend additional conditions under which the pilot could dispatch the resource.
- **Program acceptance and maintenance:** A *conclusive evaluation* is a summative assessment of pilot performance relative to the accepted goals, metrics, and criteria detailed in the updated logic model. This document includes findings from past and current evaluations to validate the overall dependability of the resource relative to metric outcomes under specified operational conditions, with past and ongoing program satisfaction and resource impact performance informing any pilot modifications. Once program status is conferred, the evaluation will conduct the following activities, as appropriate, to ensure overall resource stability: A) process analysis involving program and implementer interviews at a minimum, and B) impact analysis of resource performance at a cadence determined by PGE.

Further, PGE is monitoring the California Public Utility Commission's Distribution Investment Deferral Framework (DIDF) where the Commission and IOUs are addressing the technical EM&V challenges impact studies encounter—from load disaggregation of DERs collocated at customer sites to measurement of locational benefits. DER providers in California's energy markets

experience technical challenges in both measuring and valuing DER outcomes. We anticipate PGE will also face similar EM&V challenges as its DER portfolio grows in depth and breadth. The DIDF process convenes⁴⁷ to oversee the development of evaluation criteria and metrics for each program. PGE will monitor and assess the potential benefits of this work and how it might be used in our approach to evaluation and program development.

⁴⁷ Further discussion of CPUC's DIDF and evaluation criteria adoption practices are outlined in: [Order Instituting Rulemaking to Create a Consistent Regulatory Framework for the Guidance, Planning and Evaluation of Integrated Distributed Energy Resources](#). Decision 18-02-004 February 8, 2018.