



**Portland General Electric**

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September 15, 2023

***Via Electronic Filing***

Public Utility Commission of Oregon  
Attention: Filing Center  
201 High Street SE, Suite 100  
Salem, OR 97301  
P.O. Box 1088  
Salem, OR 97308-1088

Re: UM 1976 – Portland General Electric Company’s Smart Grid Testbed Phase II Proposal

Dear Filing Center:

Consistent with Portland General Electric’s (PGE) approved Smart Grid Testbed (SGTB) Phase II proposal, PGE is submitting the detailed project implementation plan for the continuation of the Flexible Feeder research area for review by the Public Utility Commission of Oregon (OPUC). Budget for the planning phase of the Flexible Feeder project was approved by OPUC within Order 21-444; consistent with that approval and the original SGTB Phase II proposal, this plan provides the details of the implementation phase of the project over the next three years. The plan was developed in close coordination with stakeholders and vetted through the Demand Response Review Committee (DRRC) stakeholder review process, as described in this document.

Should you have any questions or comments regarding this filing, please contact Sam Newman at 503-464-2112. Please direct all formal correspondence and requests to [pge.opuc.filings@pge.com](mailto:pge.opuc.filings@pge.com).

Sincerely,

*/s/ Riley Peck*

Riley Peck  
Senior Manager, Regulatory Strategy  
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# Smart Grid Testbed Phase II Proposal

Flexible Feeder Demonstration  
Supplement

September 2023



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# Smart Grid Test Bed Proposal Update

## 1.1 Update Context and Overview

PGE submitted a proposal for Phase II of Smart Grid Testbed (SGTB) implementation on October 1, 2021.<sup>1</sup> The proposal provided the overall framework for SGTB activities and presented a five-year budget of \$11 million for all testbed activities.

The Phase II proposal provided detailed plans for \$2.9 million of the total budget, associated with the first three demonstrations and the first 2-3 years of implementation. The Phase II proposal indicated that PGE would follow up with detailed plans for the next tranche of funds as implementation progressed. PGE submitted a first addendum in May 2023, which provided project plans for two research areas.

This supplement to the Phase II proposal provides the project plan for the continuation of the Flexible Feeder demonstration. The first two years of funding were submitted and approved along with PGE's Phase II proposal; the approved funding covered project planning activities in 2022 and 2023.<sup>2</sup> Appendix H of this filing contains the updated Flexible Feeder project plan for the remaining three years of project activities.

For consistency, Table 1 below provides an update to the Table 1 of the original Phase II proposal, which breaks out the total project budget, previously requested implementation budget and requested budget inclusive of this addendum.

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<sup>1</sup> See OPUC Docket No. UM 1976, "PGE's Smart Grid Test Bed Phase II Proposal," available at <https://edocs.puc.state.or.us/efdocs/HAD/um1976had145212.pdf>.

<sup>2</sup> See Appendix A of PGE's Phase II Proposal.

Table 1 – Proposed Smart Grid Testbed Phase II Budget (May 2023 Update)

Research Area	Expected Budget	Previous Requests (Approved by Order 21-444 & Order 23-258)	Updated Request (Total)
New Construction Bundle	\$500,000	\$500,000	\$500,000
C&I, Municipal Flexible Load & Resiliency	\$1,727,450 (Updated from \$1,500,000)	\$0	\$0
Distributed PV/Smart Inverters	\$1,000,000	\$1,000,000	\$1,000,000
Multifamily Bundle	\$1,250,000 <sup>3</sup>	\$1,250,000	\$1,250,000
Managed Charging/V2X	\$2,250,000 <sup>4</sup>	\$872,200	\$872,200
Flexible Feeder	\$4,272,550 (Updated from \$4,500,000)	\$985,000	\$4,272,550
Non-Wires Alternative	\$0	\$0	\$0
Total	\$11,000,000	\$4,607,200	\$7,894,750

As shown in Table 1, this request includes a reallocation of \$227,450 from the Flexible Feeder to the C&I/Municipal research area budget. This change reflects the updated Flexible Feeder implementation budget presented in Section H.7 and emerging scoping work of the C&I demonstration, while keeping the overall five-year budget in line with the approved amount.

This proposed update is not intended to modify elements of the approved Phase II plan related to program scope, staffing or other topics not specifically addressed below. PGE expects Schedule 13 to continue to serve as the primary tariff covering SGTB activities. Proposed updates to the tariff to add provisions specific to the new demonstration projects will be provided to OPUC in advance of implementation.

PGE requests the following actions:

- Agreement that \$3.54M for the Flexible Feeder project is reasonable.<sup>5</sup> If approved, these funds will allow continuation of project expenditures into the three-year project implementation phase.
- Agreement to modify the originally approved research area budgets by reallocating \$227,450 in funding from the Flexible Feeder to the C&I/Municipal research area.

<sup>3</sup> Budget reflects funds reallocated per Order 23-258.

<sup>4</sup> Budget reflects funds reallocated per Order 23-258.

<sup>5</sup> In the context of Table 1, the \$3.54M proposed is not entirely incremental to the \$985,000 originally approved for planning and launch activities. This is due to the continuation of some 2022-2023 activities into 2024, which is discussed in the updated Project Plan.

## 1.2 Flexible Feeder Status Update and Project Structure

### 1.2.1 Planning Phase Workstreams

This filing is being proposed at a slightly different point in the process than previous projects have been proposed. To date, SGTB demonstration project plans have been developed and submitted for OPUC approval prior to the beginning of significant project work; uniquely, the Flexible Feeder project proposal for the first two years of funding was previously included in the SGTB Phase II Proposal as discussed above. Accordingly, this project plan is both an update to the previously approved project plan and the vehicle for providing additional detail on budgets, activities, and milestones for implementation and evaluation work.

These updates build on the work already completed and in progress and seek to ensure a smooth extension of the project into years 3-5. Section H.2 of Appendix H summarizes the status of the planning phase activities and describes how they inform project implementation.

### 1.2.2 Federal Grant Alignment

In the Phase II proposal, PGE described the linkage between the Flexible Feeder project and a federal Department of Energy (DOE) Connected Communities grant application which has since been awarded for the SALMON project. The \$6.65 million grant funds Energy Trust of Oregon (ETO), Community Energy Project (CEP), National Renewable Energy Laboratory (NREL), and PGE activities to develop a community energy resource consisting of efficiency measures, connected devices, distributed solar, energy storage, and smart charging. While the scope of activities covered by the DOE grant is closely linked, the SALMON project is independent from the Flexible Feeder budget and proposal, and we have sought to ensure that this proposal remains focused on the portion of work funded by PGE customers.

Compliance with DOE award requirements and processes have affected aspects of the timeline, scope and implementation planning. Detailed planning work began later in 2022 than anticipated in the Phase II proposal, and some tasks, such as contractor training, are now scheduled to take place in 2024. Assurance of alignment of the two projects has already driven some changes to the project scope which are reflected as differences between Appendix H of this document and the original Flexible Feeder project proposal in Appendix A of the Phase II proposal. Scope and budget alignment of the two projects is discussed further in Section H.7 of Appendix H.

### 1.2.3 Timing of Deployment

As with previous SGTB proposals for funding approval, we have not included a final measure list of incentive offers as part of the proposal. While PGE used measure-level estimates to develop the budget request, the specific measure list has not yet been presented to the PGE Demand Response Review Committee (DRRC) for approval. To date, the DRRC has reviewed and approved the project plan, marketing approach, and estimated incentive levels. We will

share the final incentive recommendations with DRRC during the Q3 2023 meeting and once approved, measure lists will be presented along with the advice filing to update Schedule 13 later this year.

## 1.3 Process for Project Development, Review and Approval

### 1.3.1 Project Concept Development

As with other SGTB projects, PGE has sponsored the Flexible Feeder project's presentation to the DRRC through the project concept development, planning and launch phases. DRRC input has been sought at quarterly meetings, including detailed Flexible Feeder project update presentations at the 2023 Q1 and Q2 meetings, held on March 16 and June 15 respectively, and DRRC members have reviewed and submitted feedback on the draft project plan, which was circulated to DRRC members in August 2023.

The DRRC will continue to be heavily involved in the Flexible Feeder project through the implementation phase. PGE expects to keep the DRRC apprised of implementation progress and seek feedback on technical topics such as classification and evaluation of grid services and use cases.

### 1.3.2 Project Review

PGE continues to use the demonstration project review template, which was developed as a collaboration between PGE and OPUC Staff during SGTB Phase I, for the development and refinement of project plans. The format includes the following elements:

- An overview of key information including the number of customers, the technology of market intervention being tested, funding source(s) and amount(s), the period of performance, as well as any contractor(s) and/or partner(s) supporting the effort.
- A narrative description of the planned activities, including among other things the project goals, research questions, as well as roles and responsibilities of partner organizations.
- The target population for project, specifying the targeted customer segments, enrollment goals, and the reasoning behind these selections.
- A discussion of optional activities and the alternatives considered.
- Information on how the project fulfills the goals of the Testbed and informs product development, including the long-term transition to Pilot and/or Program.
- Total Costs and funding sources, with anticipated O&M expenses and revenues broken down by FERC account, capital costs, and the number of FTE employees and contractors.
- A timeline of activity, milestones, risks, and a risk mitigation plan.

- A description of benefits to customers and ratepayers, including how the plans contribute to environmental, emissions, and community impact objections in support of Executive Order 20-04.
- The evaluation strategy and performance metrics on which the effort will be measured.

### 1.3.3 Project Approval

Appendix H includes the detailed Flexible Feeder project implementation plan for Commission consideration and approval. Additional work to be completed in SGTB Phase II — specifically in the Commercial & Industrial and Vehicle-to-Everything (V2X) research areas — is not outlined here, as it will be scoped and reviewed with the DRRC as SGTB continues. This will ensure alignment with approved portfolio goals, then be submitted to the OPUC using the proposal template.



# Appendices

This proposal serves as an addendum to PGE’s original SGTB Phase II proposal and first addendum, in which Appendices A through G have already been used.

## Appendix H: Demonstration Project Activity: Flexible Feeder

Subject: Flexible Feeder - Implementation (Years 3-5)	Date: September 15, 2023
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### H.1 Summary of Project Dashboard

Number of Customers Involved	Technology Being Tested	Funding Source	Funding Amount	Time Period	Contractor and/or partner
550-700 homes	HVAC and Water Heater Controls, Solar, Storage, EV Charging and Efficiency	SGTB Phase II Funding and DOE Connected Communities	SGTB: \$3.54M  DOE: \$6.65M	November 2023 - December 2026	Energy Trust of Oregon, Community Energy Project, and NREL

### H.2 Description of Demonstration Project (Statement of the Research Question)

The goal of this project is to demonstrate and document the value of distributed energy resources (DERs), such as smart thermostats, storage, electric vehicle (EV) charging, and smart water heaters, as assets to support grid operation. This work builds on the grid monitoring and control capabilities enabled by the Advanced Distribution Management System (ADMS) and Distributed Energy Resource Management System (DERMS) implemented through PGE’s Integrated Grid Program. In addition to exploring the operational value of DERs, the project will also examine the co-benefits of flexible load and efficiency, including how they can be jointly deployed to increase their impact, cost effectiveness, and customer satisfaction. Flexible Feeder’s linkage with PGE’s DOE Connected Communities grant provides a significant opportunity and complexity, allowing a

significant increase in project scope and learning and supporting the continuation of key workstreams.

### Transition from Planning Phase to Implementation

This research plan outlines the second phase of the Flexible Feeder demonstration, which launched in January 2022 and reflects detailed work conducted during the planning phase by PGE and its partners.<sup>6</sup> Since that time, the project team has worked to build a comprehensive project plan, assess the market and identify the best suited measures to promote, built a marketing and outreach strategy to drive participation, put together an adoption forecast and recommended incentive approach, and reviewed those plans with the DRRC at integral stages throughout the development phase.

PGE's project plan for the Flexible Feeder planning and launch work laid out a scope including, DER adoption forecasting, campaign development, contractor engagement and training, and campaign launch<sup>7</sup>; the learnings and status from this work is described below.

### Project Planning and DER Adoption Forecasting

PGE worked with CEP, ETO and NREL to define the project schedule, deliverables, and complete contracting.

Energy Trust conducted both residential and commercial market assessment reports for the project area. The reports include a review of key characteristics for single family, multifamily, and commercial sites. The analysis was based on multiple data sources including home energy score data, Experian, Energy Trust's past participation data, and Census data. The report also includes opportunities and key inputs to consider when creating energy efficiency and distributed energy forecasts.

The market characterization reports were then used as a shared reference resource for the project team to develop DER adoption forecasts and prioritize measures to develop specific offers and campaign strategies to position the project for successful outcomes. Lastly, we began outreach with the large commercial customers in the project area to help them understand the combined opportunities for efficiency and load flexibility and to gauge interest in implementing a project as they can take years to complete.

### Campaign Development

The project team worked to develop a coordinated marketing plan to support the Flexible Feeder and SALMON project goals. The plan outlines an approach to increase customer

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<sup>6</sup> The OPUC approved \$985k of Flexible Feeder research funding in October of 2021 as part of the SGTB Phase II Program Proposal (OPUC Order No. 21-444). That request was designed to cover two years of planning leading up to an additional funding request for project implementation. To better align with federal funding we are leveraging in this project, some activity timelines were slightly adjusted (for example, the contractor training element was delayed one quarter to better align with approval of the delivery plan and incentive levels).

<sup>7</sup> See Section A.9 Timeline of Activity in Appendix A to PGE's SGTB Phase II Proposal

awareness of, and engagement with, the many energy-efficiency and smart load shifting options available through this project. It also identifies target audiences and summarizes key market insights that informed the development of the branding, integrated marketing communications and outreach strategy that will support us reaching the project goals.

The team also prioritized existing energy efficiency measures with the highest load flexibility values and created a participation forecast by customer segment based on the learnings from the market characterization reports. This forecast was used as the basis to develop the specific blend of offers and incentives we will offer through this project. In addition, ETO identified where additional incentives would likely help drive greater participation for these existing measures. Those incremental incentives are included in the Customer Incentive budget line item in Table 4 below.

In the process of identifying and prioritizing existing measures with potential flexibility, ETO also identified potential new measures that could provide EE and flexible load value. ETO is currently developing the engineering analysis to validate both the EE and flexible load values to then approve the new measures for inclusion into their portfolio.

#### Contractor Engagement and Training

The project team is engaging with contractors and developing an RFQ to identify specific installers who will be trained on installation of energy efficiency projects as well as commissioning and enrollment of the equipment in the related utility program. The project team shifted the training portion of the scope later in the project to ensure alignment and approval of the campaign strategies and offers being developed. The majority of funding approved in the initial Flexible Feeder proposal is being rolled into the second phase request reflecting the updated timing of implementation scheduled for 2024.

#### Campaign Launch

Due to leveraging the DOE SALMON project funds, the project team will launch the campaign in Q4 2023. There are additional reviews of all customer-facing materials required to meet the DOE funding requirement that we were unaware of when scheduling the flexible feeder project that added to our overall timeline.

The project team collaborated to develop a comprehensive go to market strategy informed by each of the preceding elements created in support of this project. We intend to provide free Home Energy Scores to single family residential homeowners to educate and engage customers on what efficiency upgrades their home could benefit from. To simplify the upgrade process, we plan to offer increased incentives on existing energy efficiency measures, with one-time enrollment incentives for flexible load capable measures installed by pre-approved, specially trained installers who will both install the efficiency offers, and commission the DERs, when applicable.

Our enrollment strategy focuses first on enrollment in PGE's native demand response programs (such as residential smart thermostat enrollment in our Direct Load Control Pilot, Schedule 5), followed by enrollment in our broader flexible load operation (greater upfront

incentives with potential monthly participation bill credits to be proposed through Schedule 13). Customers must be enrolled in the native program to be eligible for the SGTB-specific offering and will remain enrolled in the native program for the duration of their SGTB participation. In some cases, PGE may schedule additional events or layer on additional incentives as specified in Schedule 13. When the Flexible Feeder demonstration concludes, customer enrollment will roll back to only the native program.

The plan presented here outlines the next phase of the Flexible Feeder demonstration and covers the full range of implementation activities, including project management, customer incentives, customer engagement, partnerships, special projects, contractors, and evaluation. This request will bring total funding for the Flexible Feeder project up to \$4.3M which is within the budget provided by the SGTB Phase II Program Plan.

### Scope Alignment with Federal Grant

In addition to SGTB funding, the project is leveraging the \$6.65M award from the DOE Connected Communities program. The DOE award is being primarily used to fund the activities of ETO, CEP, NREL and, Northwest Energy Efficiency Alliance (NEEA), which include:

- An expanded customer engagement campaign co-managed by PGE and ETO,
- Focused support and engagement of underserved communities with EE and DR through partnership with CEP,
- Analysis of the value of distributed solar with smart inverters, storage, and managed charging, which will be tested in separate Phase II demonstrations,
- Enhanced technical assistance on distribution system modeling and DERMS integration/operation, and
- Engagement of regional stakeholders to support understanding and adoption of project learnings.

A key objective of aligning the two projects is to ensure a seamless experience for all participating customers.

We also leveraged federal grant funding to develop a comprehensive evaluation plan for both the SALMON and Flexible Feeder projects. The plan was written following the guidelines provided to us by Lawrence Berkely National Lab who is contracted with DOE to act as the Connected Communities Program Coordinator. In that role, they are tasked with evaluating the entire DOE program consisting of 10 projects across the country. DOE accepted our evaluation plan as part of our Budget Period 1 go/no-go decision. The plan includes six sections: Customer Benefits and Experience, Grid Services and Energy Impact, Benefit-Cost Analysis, Business Model, GHG Benefit and Resilience Benefit. The evaluation report will be shared with the DRRC and OPUC when available at the conclusion of the project.

The DOE project also funds extensive feeder modeling work and Digital Twin Development: PGE provided NREL with an electrical model (CYME) of the distribution system feeders. NREL converted the models to OpenDSS and validated accuracy of the conversion by comparing

OpenDSS power flow results with that of CYME. They then used data collected from the advanced metering infrastructure to create customer load profiles.

NREL and PGE's Distribution Planning group developed a digital twin of the community infrastructure that replicated real world conditions across a baseline of selected days of grid operation with an error rate of less than 5%. The digital twin will help baseline operational parameters (e.g., bus voltage, network loading, technical losses, etc.) serving as a platform to model planning and operation scenarios.

### H.3 Participation and Type of Participant Targeted

The project will enroll customers taking service within a 2.5 square mile study area located in North Portland, bound by Interstate 5 in the east, the bluffs above Swan Island in the west, Rosa Parks Ave. in the North, and Goings Ave. in the south. The area, served by portions of the Delaware-Denver and Peninsula Park-Ockley Green feeders, contains a mix of single family, multifamily, and small commercial customers. The project team seeks to build a 1.4 MW flexible load resource within the study area, by driving DER adoption across 580 (roughly 20%) of the community's 2,800 buildings.

The project team is focusing resources on driving customer adoption of flexible loads, as well as energy efficiency measures that enable or enhance load flexibility. The approach is closely coordinated with the SALMON project and is focused on engagement, enrollment, and continuing participation of customers by testing new channels to market and install measures. The implementation approach prioritizes:

- Incentives for prioritized measures in the project area to increase participation and enable efficiency projects to be "no- or low- cost" to all customers. Free HES score as entry point.
- Streamlining the installation process by using select contractors (ETO trade allies) who participate in commissioning training for all grid-connected devices.
- Offering free retrofits and replacements to low-income and BIPOC households including weatherization, maintenance and safety repairs, deep energy retrofits, and water heater replacements.
- Customers will also receive enrollment and ongoing incentives to automate their smart devices, such as thermostats, water heaters, electric vehicle chargers and batteries, to work in concert with PGE as it operates the grid.
- Small to medium businesses will be served through direct outreach where a single point person shares details on eligible improvements and incentives specific to their site.

Based on the market characterization of the study area, the project team has identified several opportunities for measures that increase energy efficiency, enhance flexible load potential by improving customer experience during events, and/or enable flexible load by deploying connected technologies that can respond to a signal from PGE and be dispatched as part of the virtual power plant; these opportunities are outlined in Table 1 below. Table 2 outlines which customer types the existing offers are designed to support.

Table 1: Measure Type and Source(s) of Benefit

Measure Type	Energy Efficiency	Flexible Load Enhancing	Flexible Load Enabling
Thermostats/HVAC Controls	X		X
Smart Water Heaters	X		X
Insulation (attic, floor, wall)	X	X	
Solar Smart Inverters			X
EV Charging			X
Battery Energy Storage			X

Table 2: Incentives Available by Customer Class and Measure Type

Measure Type	Customer Class*		
	Single Family Homes	Multi-Family Units	Small/Med Business
Thermostats/HVAC Controls	X	X	X
Smart Water Heaters		X	
Insulation (attic, floor, wall)	X		
Solar Smart Inverters	X		
EV Charging	X	X	X
Battery Energy Storage	X		X

\* In addition the customer classes listed in the table, the project team is in discussions with the large commercial customers in the project area to gauge interest and have set aside budgeted funds for potential special projects which may encompass one or more measure types outlined here.

Incentive offerings corresponding to the asset types listed in Table 1 and Table 2 are pending DRRC review and approval. Following the Q3 2023 DRRC meeting, PGE intends to seek formal DRRC approval of an incentive memo which will inform the subsequent Schedule 13 advice filing. As mentioned in Section H.2 (Campaign Launch), all single-family residential homeowners will be eligible for a free Home Energy Score to help them identify potential

project opportunities. Table 3 below lists estimated residential energy efficiency measures and incentives as a snapshot of the incentive design approach.

Table 3: Estimated Market Rate Residential Energy Efficiency Offers

Measure Description	Typical Cost	ETO Max Incentive	PGE Added Incentive	Estimated Customer Co-Pay
Insulation: Single and Multi-Family				
Attic Insulation (per Sq. Ft.)	2.26	\$1.53	\$0.73	\$0
Floor Insulation (per Sq. Ft.)	\$3.42-	2.01	\$1.30	\$1.35
Wall Insulation (Sq. Ft.)	4.39	2.78	1.30	\$1.23
Smart Thermostats: All HVAC types				
Smart Thermostat Contractor Installed	\$400	\$250	\$200	\$0
Smart Thermostat Retail or Online	\$250	\$189	\$50	\$11
Water Heating: Single and Multi-Family				
Heat Pump Water Heater	\$3,500	\$390	\$2,000	\$1,110
HVAC System Replacement				
Single Family Ductless Heat Pump	\$10,873	\$2,900	\$0	\$7,973
Multi Family Heat Pump Conversion	\$8,758	\$5,624	\$3,000	\$134
Single Family Heat Pump Conversion	\$10,261	\$5,624	\$3,000	\$1,637

\* All incentive values are displayed at highest available value depending on existing conditions and are pending OPUC approval.

Like other single-family homeowners, income qualified customers are eligible for a free Home Energy Score to help determine appropriate improvements. If the home does not have major roofing or structural issues, they may also be eligible for installation of the following at no cost to them:

- Increased insulation (attic, floor, wall)
- Whole home air-sealing
- Heat pump
- Smart thermostat
- Water heater replacement
- Solar with battery storage

#### H.4 Optional Activities or Alternatives Considered

Field testing and documenting the value of DERs in grid operations is critical to building a cost-effective flexible load portfolio, meeting OPUC mandated flexible load targets, and optimizing investments of customer sited vs. utility sited infrastructure. Because these values, particularly on the distribution operations side, are heavily influenced by DER density and location, the primary alternative available to PGE is waiting until customer adoption naturally reaches a level of saturation that allows for this field testing and assessment. In addition, many of the IT systems and operational schemes needed to unlock this value remain undeveloped. Developing these protocols and the associated business practices would also then wait for market maturation, as allocation of resources to that work in the absence of a near term need is unlikely.

#### H.5 How this Demonstration Project Fulfills Testbed Proposal Work

This proposal focuses on identifying and quantifying the value of grid services and the extent to which specific DERs can provide them. This project represents the leading edge of PGE's Virtual Power Plant business planning process and is helping the company identify and address personnel, technological, and operational barriers with widespread deployment of a customer centric operational framework. Once complete, this project will improve our understanding of the value these services provide, informing program cost effectiveness and supporting increased incentives, helping to drive customer adoption and the development of PGE's overall flexible load resource base. In addition, this work will support system integrations and operational learnings that will be critical to future dispatch and control of DERs for uses beyond bulk capacity, as well as enhancing and expanding PGE's coordination with Energy Trust, which are key aspects of the overall Testbed goals.

#### H.6 How the Demonstration Project informs Pilot and Program Development (Including potential scale)

As outlined in the previous section, the results of this demonstration will have an impact on all future pilot and program activities by increasing cost effectiveness. These impacts are expected for both new and existing measures, as the results of this work will inform the quantification of value streams beyond their use as a bulk capacity resource. This project will also quantify the co-benefits of efficiency and demand response, as well as the enhanced benefit of co-adoption. As these values are quantified and tested, PGE will explore the extent to which they can be incorporated into incentive frameworks, enhance the value proposition for customers, and increase program participation. In addition, the operational lessons learned in this demonstration will help drive program innovation and incorporation of new dispatch strategies and value streams.

#### H.7 Funding Source and Total Costs (Including: O&M expenses and revenues, broken down by FERC account, capital costs, number of FTE employees, and number of contractors.)

Funding for the Flexible Feeder project is closely coordinated with the DOE grant-funded SALMON project as discussed in Section H.3. While the two projects are financially



independent, PGE’s Flexible Feeder project will benefit from alignment with activities supported by the federal funding.

As outlined in Table 4, below, PGE is proposing \$3.54M in SGTB Phase II funding to support implementation activities, including project management, customer incentives, customer engagement, partnerships, special projects, contractors, and evaluation; the table below represents the details of this request.

Table 4: Years 3 - 5 Proposed Project Budget

Budget Item	Amount	Notes
<b>PGE Staffing</b>	\$450,000	Project Coordinator staff
<b>Customer Incentives</b>	\$1,625,500	Incentives for development and operation of customer DERs, including incentives and customer services administered by Energy Trust and CEP
<b>Software &amp; Controls</b>	\$250,000	Enablement of DR technologies connectivity pathways
<b>Customer Engagement</b>	\$116,250	Customer outreach and education activities
<b>Contract Support</b>	\$650,800	Technical support on metering, modeling and DER impacts
<b>Evaluation</b>	\$450,000	Third party evaluation contractor
<b>Total</b>	\$3,542,550	

#### H.8 Timeline of Flexible Feeder Implementation Activity (Including: Milestones and evaluation)

##### Incentive design (Q3 2022 - Q3 2023)

The Testbed team examined the market adoption of targeted energy efficiency and flexible load measures within the study area. Using this information, the team developed a package of incentives, including upfront, enrollment, and ongoing incentives required to drive adoption and meet demonstration project goals. The team will present the proposed package of incentives to the DRRC for consideration and approval at the Q3 2023 meeting. Once incentive structures are finalized and approved, PGE will update the existing Schedule 13 Tariff language.

Milestone: Develop and secure approval of demonstration project’s incentive package and update Schedule 13 tariff to enable go to market and customer recruitment.

##### Customer engagement and recruitment (Q4 2023 - Q3 2026)

The SGTB team will begin its customer engagement and recruitment effort with the initiation of a field marketing campaign and launch of the program website. For residential customers, the campaign will include canvassing the study area by CEP to educate customers about the project goals and special offers available to them, including free Home Energy Scores. The website will serve as a secondary, self-service pathway for customer engagement, with information on special incentives, offers, and pathways to connect with qualified contractors.

In addition, we plan to offer residential customers in the study area a Sense meter, which provides real time information and disaggregation of home energy usage through a smart phone app and web portal. Small business customers will be engaged through direct outreach and offered special incentives for HVAC and water heater controls. Large commercial customers are being engaged individually and assessed as potential hosts for special projects, focused on distributed solar, energy storage/resiliency, and EV charging.

Milestone: Successfully recruit customers and enroll DERs incrementally over the three-year timeline targeting a total flexible load capacity of 1.4 MW by the end of the recruitment period.

Risk and Mitigation Strategy:

- Risk - Customers do not respond to the offers

Mitigation Strategy - Increase customer incentives, including adding an upfront incentive to entice enrollment. The project team may also seek other research dollars or R&D funds both with PGE and/or from partner organizations.

#### DER dispatch and control (Q3 2025 - Q3 2027)

Following enrollment of customer resources and finalization of the ADMS/DERMS implementation, the project team will begin dispatching DERs in its testing of bulk system and distribution operations use cases. Use case testing will be done in coordination with NREL, who will use the digital twin of the study area to model baseline operational conditions and assess impacts. Testing will also be coordinated with the wider Virtual Power Plant team, including Distribution Planning, Distribution Operations, Power Operations, and Integrated Grid. Lessons learned during grid testing will be used to inform ongoing business enhancement processes related to VPP rollout.

Milestone: Complete field testing of grid operations use cases. In alignment with our DOE scope, the team will demonstrate that the DER dispatch models are operational in PGE's ADMS/DERMS platform, including end to end testing of commands with field deployed assets.

Risk and Mitigation Strategy:

- Risk - Customers drop out of program

Mitigation Strategy - Continually engage customers in the research and findings, provide regular updates on energy savings and incentives earned. Proactively solicit feedback on customer experience (e.g., bill savings, comfort, etc.) and take corrective actions for negative experiences associated with program design/delivery.

#### H.9 Lessons to be learned (Learning Objectives)

Once complete, this project will:

- Provide insights into the technical potential of DERs to serve as a resource for distribution and transmission operations,

- Demonstrate the combined value of building efficiency and flexible load technology to deliver grid services, while improving occupant comfort and satisfaction,
- Develop and deploy grid controls focused on scalability, resilience, and grid services,
- Develop insights into low income / underserved customer adoption of EE/DR measures.

#### H.10 Benefit to Customers and Ratepayers

##### More cost-effective programs design and delivery

- This research will provide insights into the co-benefits of energy efficiency and flexible loads, allowing for more cost-effective programs for technologies that provide both benefits.
- The demonstration provides an opportunity for PGE and Energy Trust to jointly implement a complex customer-facing initiative, providing lessons that will inform future collaborations leading to lower cost design and delivery.
- Supports greenhouse gas reduction goals set out in Executive Order 20-04 by exploring the capabilities of energy efficiency and flexible loads to provide grid services that contribute to the transition away from fossil fuels. GHG impacts are a required metric to meet DOE and LBNL's evaluation criteria and will be assessed in the project reporting.

##### Optimize ratepayer dollars

- Through this project, PGE will quantify and document the value of flexible loads and efficiency in utility operations, enhancing the company's framework for making capital investment decisions.
- The project leverages customer funding by heavily relying on federal funding awarded under the SmartGrid Advanced Load Management & Optimized Neighborhood (SALMON) Connected Communities grant project through US DOE, enabling a significantly more ambitious project scope with relatively lower financial impact on PGE customers.
- This project will provide real world experience for grid operators on how to model, control and optimize the use of DERs, including the software, sensors and protocols that are required.

##### Greater value to customers

- The combination of energy efficiency and flexible loads will provide participating customers with greater cost savings and improved comfort.
- The demonstration project is specifically designed to ensure benefits to environmental justice communities within the study boundary, and findings will inform future strategies to increase enrollment and participation of these communities. As part of the demonstration scope, Community Energy Project is providing whole home retrofits to income-qualified customers at no cost. In addition, Energy Trust is working to contract with only women and minority business enterprise (WMBE) or veteran owned installer/contractors.

### H.11 Evaluation Strategy (Including a Final Report)

PGE and ETO will evaluate and report progress and results to the OPUC and DRRC during and following completion of this demonstration. These findings will include impact results related to the ability of DERs to function as an operational resource for PGE across all tested value streams (bulk system and distribution operations, as well as the value of incorporating energy efficiency into flexible load measure deployment). In addition, the project will report on qualitative, process evaluation impacts related to the lessons learned in joint PGE-ETO program design, delivery, and evaluation. There will also be lessons learned related to PGE grid operations, including any new processes or protocols developed to support the operationalization of DERs as a grid resource.

PGE has scoped the evaluation plan leveraging analytical and evaluation work within NREL's scope supported by federal grant funding. PGE ran an RFP to establish a pool of eligible third-party evaluators who specialize in the different areas we will evaluate as part of this and the federal project. PGE shared the outcome of the RFP with the DRRC in Q4 2022 and proposes an evaluation budget of \$450,000 for this work.