

Appendix C. New Activity Applications

This section details infrastructure measure applications for new approaches.

C.1 Public Charging - Municipal Charging Collaboration and Electric Avenue

PGE is combining Electric Avenue and our new proposed program the Municipal Charging Collaboration into a new activity portfolio called Public Charging. Several reasons exist for this new categorization. First, PGE continues to have a role in public charging whether as the current owners and operators of Electric Avenue or as the provider of public charging solutions for underserved communities through the Municipal Charging Collaboration. Second, PGE will have a long-lasting role in serving public charging load. Third, PGE intends through customer collaboration, programs, as well as rates and tariffs to serve as a partner in the design and build of public charging sites. Electric Avenue is not new work but a continuation of an investment which originated in 2016. PGE is not proposing to expand Electric Avenue, simply to continue operating through this Plan period. Further, to limit risks associated with maintenance and operation of these site PGE is assessing whether to open a dialogue to explore partnerships or passing ownership of these sites to other entities. Electric Avenue continues to provide insights and to be utilized and relied upon by electric vehicle drivers. The data and lessons learned from owning Electric Avenue has informed the development of many of the activities proposed in this TE Plan. This work was prior approved and is well known to the Commission and stakeholders, therefore, this section of the appendix is dedicated to detailing the Municipal Charging Collaboration.

The Municipal Charging Collaboration is an approach wherein PGE designs, owns, operates, and maintains EV chargers in the ROW and on public property. PGE deploys this infrastructure in collaboration with public entities such as municipalities, regional governments, school districts, counties, and state government. The pilot version of this program was approved by the OPUC in October 2022 as part of PGE's 2022 Monthly Meter Charge Budget and included funding for 60 Level 2 Pole Chargers. PGE's 2023 Monthly Meter Charge Budget, which was approved in April 2023, included funding for an additional 100 Level 2 Pole Chargers.

In the scaled-up version of this approach, which PGE proposes as part of this TE Plan, PGE will install 180 utility pole-mounted or curbside pedestal Level 2 chargers in its service territory, for a total of 340 L2 Public Charging Ports under this program.³¹² Chargers under this program will utilize Schedule 50. PGE will collaborate with public entities and communities in its service territory to identify the best locations to install chargers. Our priority is to install chargers within underserved communities as they are least served by the existing market and would benefit the most from the switch to electric transportation. During the 2023-2025 funding cycle PGE will also attempt to find a market partner interested in owning these chargers or assisting PGE with our charger development as part of this program activity.

³¹² The following factors used to identify potential pole locations, include, but are not limited to: Proximity of the pole in the ROW to the parking spot, proximity to an ADA ramp (corner or a driveway), proximity to the curb (far enough for car doors to not hit), age of the pole (preference for poles installed after 1980), size and height of the utility pole, transformer location on the pole, climbing space and presence of other devices on the pole to ensure crews can safely work on the pole, and parking availability near the pole. Census data will also influence potential pole locations, including median household income in the area, percentage of BIPOC communities, and environmental justice tract ID from EJScreen.

The overall budget for this three-year program is \$15.6 million. In this TE Plan, PGE is requesting an incremental \$10.1 million (which is included in the above three-year program cost).

C.1.1 Program/Measure Details

C.1.1.1 Elements, objectives, timeline, and expected outcomes

Program Objectives

This program aims to:

- Improve charging adequacy for PGE’s customers and identify how pole and curbside chargers create access for those particularly in underserved communities by targeting areas of high density of rentals, multi-family housing, low-income families, BIPOC communities, and other traditionally underserved communities, as defined by HB 2165
- Demonstrate the demand for EVSE in underserved communities and identify how the private market can meet these communities’ needs
- Validate whether Schedule 50 is appropriate to address the needs of underserved communities or requires further revision
- Help municipalities reach their climate action and sustainability goals
- Design, own, operate, and maintain EVSE for municipalities unable to fund this work
- Use existing franchise agreements and ROW ordinances to fairly compensate municipalities for the use of their property
- Install appropriate charging infrastructure based on ODOT’s TEINA estimates
- Collect Clean Fuels Credits to help offset costs
- Explore private partnership opportunities for ownership of chargers

Program Elements

From the municipal customer’s perspective, key features of the program include:

- Close partnership to determine the best locations to help underserved communities
- PGE ownership and maintenance of EVSE and make-ready equipment
- Affordable and equitable pricing for all customers
- Knowledge of where to find public charging infrastructure
- PGE will offer Schedule 50 rates on all public charging infrastructure installed under this program

PGE will ask municipalities commit to:

- Provide written approval for PGE to install EVSE on identified public property
- Correct and expedited permits for different applications of installations
- Mutually agreed upon terms between PGE and municipality
- Outreach to communities regarding upcoming EVSE installations
- Notification of vandalism, questions, or concerns they receive around EVSE installed under this program

PGE will commit to:

- Site Selection: PGE will work with internal and external stakeholders to select locations that best provide charging to underserved communities at the lowest cost.
- Equipment Selection: PGE will seek equipment designs and specifications that meet the unique combination of requirements for utility pole-mounted applications, as put forth by the

National Electrical Code and National Electrical Safety Code. PGE will ensure proposed designs are supported by internal and external stakeholders, including OPUC safety staff.

- Design and Engineering: PGE will design and engineer sites to ensure conformance with all applicable codes, regulations, and standards.
- Permitting and Installation: PGE will permit and install all chargers to meet all applicable codes, regulations, and standards set forth by the authority having jurisdiction.
- Operations and Maintenance: PGE will operate and maintain all make-ready and charging infrastructure for the duration of the program. Operations and maintenance tasks include remote monitoring, testing and inspection, routine, maintenance, and emergency repair.

PGE will track the uptime and first pass charge rate of each individual charger. PGE will target 98 percent uptime and 93 percent first pass charge rate. PGE will consider replacement of individual units if they are found to consistently underperform these targets.

Customer Journey

For municipal customers:

- PGE reaches out to municipality about the PGE program
- Municipality expresses interest in program
- Municipality provides target neighborhoods or areas
- PGE conducts preliminary assessment of viable locations
- Municipality signs agreement
- PGE shares viable locations with municipality
- Municipality conducts community outreach with PGE support
- Municipality and PGE agree upon final locations
- Project proceeds through building and enablement
- Municipality marks off an "EV parking only" space and appropriate signage at each location
- Chargers online, EV drivers take service
- PGE maintains pole charging, exploring options for pedestal charging

For customers, education and outreach materials, such as mailers and emails, will be sent to customers in the immediate area of the chargers. Additionally, charger locations will be available on PGE's website, Plugshare, and Chargeway. Customers must utilize the appropriate charging vendor's app and sign up for an account and have a payment card available.

For customers:

- EV Driver finds a neighborhood charger near them via PGE's website, Plugshare, or Chargeway
- EV Driver reviews instructions on the pole or charger
- EV Driver scans the QR code to initiate session
- EV Driver plugs in their vehicle to start their charging session
- EV Driver is charged the Schedule 50 rate for their session
- EV Charger can monitor charging progress via vendor app
- EV Driver unplugs their vehicle when the charging session is finished
- EV Driver leaves the charger and parking spot so others may utilize the charger

Education and Outreach

Supporting the successful adoption of EVs requires PGE to educate the public on how to use chargers and where to find them. Education and outreach activities, such as advertising and

informational materials, are an essential component of outreach efforts. These activities can help customers understand how to use the chargers and identify where the chargers are located. Proper signage and instructions on the chargers can help drivers understand how to use them and who to contact if they are not operational. Without proper education and outreach activities, customers may not be aware of the location of chargers or how to operate them. This can lead to lower utilization rates and dissatisfaction with PGE's charging infrastructure. By implementing education and outreach programs, we can ensure higher satisfaction with chargers. Education and outreach represent roughly five percent of the total program budget.

Program Timeline

PGE plans to launch the program in Q2 2024, with additional signed agreements and EVSE installations occurring as early as the end of Q3/early Q4 2024. PGE will reassess public infrastructure needs and conduct surveys of municipalities and neighborhoods where chargers have been deployed on an annual basis. PGE plans to make this information available to all municipalities (cities, counties) and managers of public property (i.e., Metro, school districts).

Expected Outcomes

- Enable adoption and equitable access of transportation electrification in underserved communities and support fueling and availability of transportation electrification.
- Reduction in greenhouse gas emissions and criteria air pollutant emissions as well as improvement in water quality in PGE's service territory and beyond
- Beneficial partnership that helps both PGE and municipalities achieve their climate goals
- Streamlined data collection from EVSE to better understand customer charging
- Promote the use of public facilities such as library and parks

C.1.1.2 Market Baseline Assumptions

The State of Oregon has a goal of growing ZEV adoption to 250,000 registered vehicles by 2025.³¹³ The Company forecasts that approximately 115,000 of those light duty vehicles will be registered in PGE's service territory (up from 31,000 in 2021). EV drivers who own their homes and have access to off-street parking are likely to perform the majority of their vehicle charging at home overnight. However, many potential EV drivers—such as those who rent their home or live in multi-unit dwellings (MUD)—lack dedicated off-street parking at their current residence and cite this as a main barrier to their EV adoption. A recent PGE survey found that, within the population of renters, 44 percent of MUD residents and 32 percent of single family housing residents responded that they were more likely to consider an EV or Plug-in Hybrid Electric Vehicle (PHEV) if they had access to a utility-pole mounted charger in their neighborhood. Furthermore, within the population of customers without access to off-street parking, 55 percent of MUD residents and 48 percent of single family housing residents noted that they would be much more likely to consider an EV if they had access to utility-pole mounted EV charging in their neighborhood.

Forty-nine percent of residents in the PGE's service territory currently live in renter-occupied dwellings. BIPOC communities and/or traditionally underserved communities disproportionately rent

³¹³ Oregon Revised Statutes, Volume 7, Title 26, Chapter 283 (ORS 283.401), https://oregon.public.law/statutes/ors_283.401.

their residence³¹⁴. ODOT’s TEINA mentions that overnight home charging is the highest importance for widespread and equitable adoption of EVs. TEINA shows that by 2025, a four-fold increase in the total number of charging ports (over 2020 levels) will be needed to support urban LDV requirements, particularly in areas of high populations of rentals and MUDs. TEINA goes on to show that vehicle registrations are 11 percent lower in underserved communities, and these customers currently have no way to charge an EV near their home and therefore are unlikely to consider acquiring one.³¹⁵ These customers may be unable to enjoy the benefits of owning an EV, which include decreased maintenance costs, better air quality, and the convenience and cost savings of electric “fuel”. To ensure that all residents may enjoy these benefits, customers need:

- Reliable access to public charging infrastructure close to their residence
- Charging locations where their vehicles are likely to be parked for long periods of time
- Charging available at a price comparable to what they might pay to charge at home

PGE recognizes that to increase EV adoption, there needs to be an emphasis on installing charging equipment where the vehicles currently park for long periods of time. This program will focus on underserved communities, where the private sector is least likely to invest. PGE expects that the installation of EVSE in these areas will help underserved communities gain access to the benefits EV ownership.

Table 72, below, illustrates how the usage of PGE’s two pole chargers compares to that of PGE’s Electric Avenue L2 public chargers. PGE acknowledges that not all pole chargers will demonstrate these relatively high usage levels.

Table 72. PGE Public L2 Usage Data (2022)

Station Name	Total Usage (kWh)
Pole Chargers	
Pole Charger 29th Ave.	10,439
Pole Charger 35th Ave.	19,951
Electric Avenue L2 Public Chargers	
Electric Avenue World Trade Center	18,162
Electric Avenue Hillsboro	590
Electric Avenue Eastport Plaza	6,451
Electric Avenue Wilsonville	2,319

³¹⁴ Portland Housing Bureau (2020). *State of Housing Report*. Retrieved from <https://www.portland.gov/phb/state-of-housing-report>.

³¹⁵ Oregon DOT. *TEINA Study*, retrieved from <https://www.oregon.gov/odot/Programs/Pages/TEINA.aspx>.

Station Name	Total Usage (kWh)
Electric Avenue Beaverton	7,031
Electric Avenue Milwaukie	3,726

To determine total port need, PGE reviewed total residential charging demand and estimated the portion of unmet charging demand that requires additional public charging infrastructure to serve EV load. PGE then reduced the total port needed to reflect various important factors to the design of the Municipal Charging Program, including a preference for serving unmet needs of multi-family renters, providing infrastructure in low-income census areas, and serving unmet charging need due to a lack of on-site parking.

Based on the methodology above, the following port needs were estimated for the 2024-2025 program:

Table 73. Public Charging - Municipal Charging Collaboration Ports

Metric	2024 Ports	2025 Ports
Total unmet residential charging need	19,583	21,677
Total in MF renters	1,000	1,220
Total in MF renters due to the lack of garage	784	960
Total in MF renters due to the lack of garage, in <120 percent state median income census blocks	695	859
Percentage market reach	6%	16%
Final port count	40	140

C.1.1.3 Major Performance Milestones

- New Schedule 50 rate implemented by Q1 2024
- Third party partnership agreement explored by Q2 2024
 - If applicable, signed by Q4 2024
- 20 Pole Charging Locations identified by mid-Q3 2024
- Agreements with municipalities signed in Q4 2024
- Engineering and Safety Design Standards for curbside charging by Q1 2024
- 80 Curbside Locations (each charger will have 2 ports) identified by Q4 2024
- Pole Charging Locations Finish Installation by Q2 2025

- Begin Curbside Charging Installation by Q1 2025
- Curbside Charging Finish Installation by Q4 2025 (this is dependent on the identification of suitable multi-family locations, and may therefore extend into 2026)

C.1.1.4 Program/Measure Phases

PGE seeks to leverage utilization and evaluation data to determine if the current selection criteria for charger location is appropriate and to assess the efficacy of ROW and curbside charging. Evaluation data will also be used to determine if Schedule 50 is the correct rate for a program like this, or if a new one should be introduced. Lastly, PGE plans to conduct an RFP with third-party entities to determine ownership model of ROW charging.

PGE plans to complete the installation of all chargers under this program by 2025; as noted above, this is dependent on the identification of suitable multi-family locations, and may therefore extend into 2026. These chargers are expected to have a life expectancy of 10 years. However, PGE may explore the option of a pole charging ownership partnership before the end of the 10-year period. In addition, PGE is currently exploring potential partnerships for curbside ownership, which can be implemented in the near future. Following the installation of these chargers, we anticipate developing a rate structure that will better align to our evolving role to support, rather than accelerate, EV charging expansion.

Over the duration of the program, PGE will evaluate utilization of and general awareness of the chargers in areas where they are located. While low utilization is expected at the start, if chargers continue to show low utilization overtime, PGE will increase education and outreach activities in those areas. Continued low charger utilization overtime and long-term evaluation in low utilization areas can help determine if PGE's location selection criteria needs to be re-evaluated.

The long-term evolution of this program is to inform appropriate rate design for this program, along with a potential public charging rate, ownership model of chargers in the ROW, inform a long-term approach for serving underserved communities (especially those who lack off-street parking), and exploration of flex load opportunities with municipal chargers.

C.1.1.5 Utilization, Eligibility, Incentive Structures

Municipalities and public entities that manage or own public property (including cities, counties, school districts, state agencies, and regional agencies) are eligible to partner with PGE to offer this product. PGE encourages any municipality in its territory to apply. PGE will use geospatial analysis to highlight those historically underserved communities most in need of EV charging infrastructure. Public property managed by the municipality will be overlaid on this map and PGE's program team will evaluate key areas to determine the best locations to place EVSE.

Chargers installed under the Municipal Charging Collaboration will utilize Schedule 50. Learnings from the program will help PGE understand if the current Schedule 50 rate is appropriate or requires tariff revision. PGE will also attempt to find a market partner interested in owning these chargers or assisting PGE with our charger development as part of this activity. The rate is currently being revised to better reflect a rate closer to residential rates to promote parity between customers who can charge their vehicles at home and those who must rely on the availability of public charging infrastructure. PGE recognizes the importance of affordability and equitable access to charging infrastructure, particularly for underserved communities, and is committed to developing a rate structure that supports these objectives.

C.1.1.6 Market and Implementation Barriers Addressed

PGE found that current EV owners have a higher level of home ownership (94 percent) compared to that of all respondents (67 percent).³¹⁶ Only 3 percent of current EV owners surveyed lived in multi-family housing, compared to 22 percent of all respondents.³¹⁷ These data points indicate an issue with equitable access for non-homeowners, as 63 percent of vehicle purchasers surveyed reported the ability to charge at home as a major barrier.

Additionally, we found that current EV owners reported higher household incomes, with 59 percent of reporting household income of over \$100,000, compared to 25 percent of all respondents.³¹⁸

ODOT’s TEINA study identifies the following as additional barriers to light-duty vehicle charging:

Table 74. Municipal Charging Collaboration Market Barriers and Mitigants

Barrier	How Addressed
Cost of electric power upgrades and charging port installation	Utility covers costs for electric upgrades for public charging
Inconsistent fees and/or rates for public charging	Chargers installed under this program will be subject to PGE’s Schedule 50 pricing, which is meant to be easy to understand, equitable, and grid friendly
Limited multi-unit dwelling and workplace charging	The site selection process which PGE will undertake with municipalities and communities will include a prospective site’s proximity to MUDs and rentals
Limited EV focused government planning, programs, policies, and resources	PGE will leverage its expertise in charger ownership and management, and also use existing assets to reduce the complexity of these projects for municipalities
Limited government planning, guidance, or resources for EV infrastructure needs	PGE already assesses and plans for EV infrastructure needs and can provide this information with municipalities
Limited venues capable of providing power, safety, and amenities	Placing charges on utility poles will provide charging at/or near residences, where it most benefits customers
Further Barriers for Underserved Communities:	
Need for DCFC charging in areas of high transportation network company use or near drivers’ homes	Future phases of this pilot will take into consideration the placement of utility-owned DCFC on public property

³¹⁶ Opinion Dynamics (May 19, 2022). *Evaluation of Portland General Electric’s Transportation Electrification Pilot Programs*: Figure 31, retrieved from <https://edocs.puc.state.or.us/efdocs/HAD/um1938had165623.pdf>.

³¹⁷ Ibid, Figure 32.

³¹⁸ Ibid, Figure 34.

Barrier	How Addressed
Economics of installing and operating charging ports (upfront, demand charge costs)	PGE will own, install, maintain, and operate these chargers, leveraging existing assets to keep costs low and capturing economies of scale

The above barriers can result in a lack of charging infrastructure (colloquially referred to as a “charging desert”) and is a particular issue in BIPOC communities.³¹⁹ PGE’s 2022 TE Evaluation found that the same lack of infrastructure was cited by 45 percent of survey respondents as a reason for not considering an EV/PHEV.³²⁰ This program seeks to address this barrier with:

- Focus on deployment in underserved communities
- Access to public property for charger placement
- Skilled owner/operator (the utility)
- Help for local governments to plan for and deploy chargers in their communities

Implementation Barriers

PGE anticipates several implementation barriers for this program and has applied lessons learned from its Fleet Partner program, along with lessons from similar utility programs, in considering how to mitigate these. Key barriers and mitigation plans include:

Table 75. Public Charging - Municipal Charging Collaboration Implementation Barriers and Mitigants

Barrier	How Addressed
Rising costs resulting from macroeconomic conditions, including the COVID-19 pandemic, supply chain constraints, and rising interest rates	PGE will keep continue to assess and evaluate these changing factors, as well as the availability of infrastructure and charging equipment, and commercial lending rates. Our goal is to ensure that our incentives are not overcompensating for the costs and perceived benefits of adding EV charging to these properties. PGE will monitor the situation to ensure we are making informed decisions.
Long equipment lead times leading to installation delays	Ordering equipment ahead of time alleviates any delays that may pop up or make us aware of potential delays in installation due to long equipment lead times

³¹⁹ Englund, Will (December 2021). Washington Post. *Without access to charging stations, Black and Hispanic communities may be left behind in the era of electric vehicles*. Retrieved from <http://www.washingtonpost.com/business/2021/12/09/charging-deserts-evs/>.

³²⁰ See footnote 316.

Barrier	How Addressed
<p>Low applicant success rate due to lack of experience installing electric charging infrastructure and underestimation of process and costs.</p>	<p>PGE will manage this risk by pre-qualifying sites. Up front engagement, and assistance with site design and business case development. Long-term site engagement for the collection information and data will inform PGE of the success and hurdles these early adopter experience thus informing PGE role an activity.</p>

C.1.1.7 Performance Area Categories

PGE’s proposed design addresses relevant Division 87 performance area categories in the following ways:

- **Environmental benefits including greenhouse gas emissions impacts.**
- **Increased access to electricity as a transportation “fuel” will reduce greenhouse gas emissions across PGE’s service area.**
- **Electric vehicle adoption:** Increased charging adequacy, including chargers that are visible and available at the retail, workplace, multi-family, and other destinations residential customers frequent, may help potential EV drivers feel more confident in their ability to successfully transition to electric “fuel”, thus boosting EV adoption across PGE’s service area.
- **Equity of program offerings to meet underserved communities:** The expansion of public and semi-public charging that is anticipated to take place as a result of this program will better meet the needs of underserved communities, including BIPOC communities, renters, multi-family residents, and others who lack access to charging at home.
- **Distribution system impacts and grid integration benefits:** PGE does not anticipate distribution system impacts stemming from this program at present size. Grid integration benefits are largely represented by the networked and DR-capable requirements in the technical standards that PGE sets.
- **Program participation and adoption:** PGE anticipates that approximately 340 L2 ports will be constructed under this program. The plurality of ports (75 percent) will be installed near underserved communities as defined by HB 2165. All ports installed under this program will be publicly available.
- **Infrastructure performance including charging adequacy which considers, but is not limited to reliability, affordability, and accessibility:** PGE tracks charger uptime and cost-to-charge across its fleet of utility-supported chargers and will report on this information in future TE Plan Reports. If the site host elects to bill EV drivers, PGE requires multiple forms of payment be available. This requirement increases accessibility of chargers to all types of residential customers.

C.1.1.8 PGE's Role in the Program

Utilities play a central and critical role in advancing transportation electrification. PGE owns infrastructure in public rights of way that can serve as the location for public charging or home charging for those without off-street parking. Utilities have an obligation to serve all customers, not just the most profitable use cases, and we apply an equity lens to all of our customer programs, including our TE programs.

The Oregon Legislature has found that “widespread transportation electrification requires that electric companies increase access to the use of electricity as a transportation “fuel” in low and moderate income communities” (ORS 757.357). Utilities are well positioned to provide public charging based on where communities will need it, rather than where usage will be maximized. Private charging business models may depend on high utilization and may therefore leave behind underserved communities, where EV adoption is expected to be slower and later. EV adoption in these communities is still dependent on charging availability as a key part of the decision to drive electric. To choose charger locations, PGE will use in-house mapping of underserved communities and work with municipalities and their communities, who are also the customers we serve.

PGE's role in the program includes supporting municipalities in:

- Planning for public charging infrastructure
- Public outreach to neighborhoods identified through mapping
- Designing, owning, and maintaining EVSE in service to local climate and transportation electrification goals
- Other technical services

While utilities play a central role in transportation electrification, the breadth and speed required for the EV transition requires an “all-of-the-above” approach. Partnerships, investments, and coordination amongst utilities, charging networks, businesses, local governments, states, fleets, and communities are essential. This proposal is an example of such collaboration.

C.1.1.9 Resulting Distribution Upgrades

PGE does not expect the program to trigger any significant distribution system upgrades. However, as part of our data gathering work, the Company will monitor transformers and substations to proactively identify any needed upgrades.

C.1.1.10 Ownership Structure

PGE will own the make-ready infrastructure and the EVSE. PGE will procure, install, operate, and maintain any EVSE installed under this program.

In discussions with municipalities, many have expressed the need of public charging to help in the transition to electric vehicles. Municipalities also believe that many underserved communities could be left behind that without a program such as this or without PGE's help. In additional discussions, PGE has learned that, while many municipalities want to provide public charging for their constituents, they don't believe they are well suited to own and operate the equipment. They look for PGE to help fill this role and their guidance.

This approach addresses the barriers which municipalities without the resources or inclination to own and operate EVSE face when considering public EV charging. ROW charging is particularly well suited to this purpose, as EV charging can be deployed on assets already located in the public right-

of-way. The program also allows PGE to offer local and visiting customers in its service area a consistent user experience with equitable, affordable, and easy-to-understand pricing. PGE ownership, operation, and maintenance of EVSE in the ROW in collaboration with municipalities helps ensure that chargers are located strategically, with an eye toward an equitable transition to electric vehicles.

PGE will also explore potential private partnerships around ownership and maintenance of all chargers installed in the program. Potential private partnerships would have to comply with Schedule 50 or another tariff that is specifically tailored for this purpose. There is the risk of a lack of willing market actors to agree to private partnerships and adhere to PGE's Schedule 50. If PGE is unable to create a private partnership, PGE will continue to own, operate, and maintain the chargers unless and until the private market is meeting the needs of underserved communities.

C.1.1.11 EVSE Requirements (Equipment Interoperability and National Standards)

PGE utilizes a single Qualified Products List (QPL) to determine eligible EVSEs for all of PGE's non-residential EV programs. EVSE vendors must submit a Request for Qualification (RFQ) if they want their products added to the QPL. PGE engineers review each RFQ for completeness and against the predefined qualification requirements, listed below. If the vendor receives technical approval, they must also execute a Data Sharing Agreement with PGE before their products will be added to the QPL.

Hardware requirements (Level 2 and DCF):

- National Electrical Manufacturers Association (NEMA) Type 3R or 4, which certifies that equipment is weatherproof and certified for either indoor or outdoor use.
- Compliant with Federal Communications Commission Part 15, which sets limits on the amount of electromagnetic interference allowed.
- Compliant with National Electric Code, National Fire Protection Association (NFPA) article 625, which covers wires and equipment used to supply electricity for EV charging.
- Compliant with the Americans with Disabilities Act (ADA), which ensures that the EVSE is ADA accessible, if installed according to the manufacturer's instructions.
- EVSE model must have a cellular connectivity option, either 4G LTE or 5G.
- Compliant with Open Charge Point Protocol (OCPP) v1.6 or later, enabling the flexibility to operate with a variety of network service providers. It also must be remotely upgradable to support future versions of OCPP.
- Must include a standard warranty of 1 year or greater
- Must have an operating range of at least -22F to 122F, ensuring it can withstand extreme environments

Level 2-specific requirements:

- Compliant with Society of Automotive Engineering (SAE) J1772, the standard Level 2 connector that is compatible with all road-legal EVs for sale in the United States, including plug-in hybrids (PHEVs), battery electric vehicles (BEVs), and Tesla vehicles using an adaptor.
- Listed by a nationally recognized test lab to the requirements of UL 2251 and 2594, demonstrating that products are tested to UL's recognized safety standards.

DCFC-specific requirements:

- If the EVSE includes a Combined Charging System (CCS) connector, it must be compliant with SAE J1772.
- Listed by a nationally recognized test lab to the requirements of UL 2202, demonstrating that products are tested to UL's recognized safety standards.
- Equipment compliant with recommended practice SAE J2894/1_201112 or later (power quality requirements for EVSE).
- If the EVSE includes an automated conductive charging mechanism (pantograph), it must meet SAE J3105.
- DCFC EVSE efficiency must be greater than 92 percent

Software requirements:

- Software platform must be responsive to grid services, modifying charger power output levels, using either one of the following methods
 - Certified OpenADR 2.0b Virtual End Node (VEN)
 - Application Programming Interface (API)
 - IEEE 2030.5 (SEP 2.0)
- Software must also be compliant with Open Charge Point Protocol (OCPP) v1.6 or later, enabling the flexibility to operate with a variety of EVSE hardware.

Through the RFQ process, PGE collects additional technical information from vendors that aren't requirements but help inform PGE programs and potential future requirements. This includes items such as:

- Compliance with ISO/IEC 15118
- Payment methods and pricing options
- Compliance with OCPI v2.2 or later
- EVSE metering accuracy
- Bi-directional charging capability
- Lead time and indicative pricing
- Installation manuals
- The vendor's sales point of contact to post on PGE's QPL webpage so customers know who to contact when interested in a specific product

As of 4/28/2023, PGE has qualified 137 EVSE models from 18 different EVSE vendors.

C.1.2 Program/infrastructure coordination

C.1.2.1 Stakeholder involvement in development

PGE will design, own, operate, and maintain pole charging infrastructure installed under the program. Both PGE and municipalities recognize the importance of gaining constituent support for the siting and location of chargers. PGE is coordinating with municipalities to streamline site host

agreements, determine the best location for chargers, and conduct public engagement and outreach. Municipalities will take the lead on public engagement, with PGE support as needed.

Given that both PGE and municipalities share a focus on equitable deployment to underserved communities, PGE will assist with engagement strategies to reach those constituents. To that end, PGE will share community input from our ongoing underserved engagement (see [Section 5.1.1](#)) with municipalities so that they can more effectively communicate with underserved communities. PGE will also help with targeted education and outreach regarding how to use different charging equipment, including the utility pole mounted charger, as well as additional education and outreach on PGE's Retail Electric Charging Rate. Additionally, PGE is actively partnering with municipalities to mitigate concerns (e.g., regarding loss of parking spots) with this program and intends to send proactive communication to alert residents in the area.

In conversations with stakeholders, PGE agreed to move dollars from its Business and Multi-family Make-ready Solutions program to the Municipal Charging Collaboration program. This adds make-ready for approximately 50 additional curbside L2 chargers (approximately 100 ports). PGE will collaborate with municipalities to site these chargers in locations near or adjacent to multi-family housing.

C.1.2.2 Coordination with State Programs

PBOT has applied for and been awarded a Department of Energy (DOE), Office of Energy Efficiency and Renewable Energy grant to leverage utility pole-mounted chargers for overnight EV charging. This will help PBOT with the permitting, engagement, and related processes. PGE joined the City of Portland as a partner in this grant application. PGE will utilize funds awarded to offset expenses to install pole charging in Portland.

C.1.2.3 Coordination with Market Actors and Activities

PGE has coordinated closely with a variety of market actors including network service providers, EVSE manufacturers, and other utilities to better understand the most promising technology and strategies used in ROW charging. Conversations have helped inform PGE's requirements for EVSE technology and program designs. Currently, only one manufacturer has brought a charger to market that is both ADA-compliant and capable of meeting NEC and NESC requirements for mounting on an electric utility pole.

Both the Los Angeles Department of Water and Power (LADWP) and National Grid have piloted EVSE on their utility-owned poles in the right-of-way. LADWP has deployed over 400 of these chargers on light poles throughout their city. National Grid has deployed 16 chargers on utility poles in Melrose, Massachusetts. Both utilities shared engineering standards which helped inform how chargers were mounted on PGE utility poles. PGE has also been part of the World Research Institute's working group on pole mounted charging, where we shared program design and strategies with other utilities.

Since 2020, PGE has operated a pole charging demonstration project on two utility poles in the SE Clinton neighborhood in Portland, Oregon. PGE has been in discussion with two well-established network service providers (and also one start-up) to discuss how to improve the technology and user experience for this program.

PGE also intends to explore opportunities for a market actor to agree to a private partnership and adhere to Schedule 50. If PGE is unable to create a private partnership, PGE will continue to own, operate, and maintain the chargers unless and until the private market is meeting the needs of

underserved communities. Funding has been reserved through our Clean Fuels Program; should funding not be needed, the funds will be released for further program development.

C.1.3 Learning Objectives, Evaluation of Effectiveness, and Data Collection Methods

PGE intends to evaluate the effectiveness of this program and determine whether Schedule 50, which governs public charging infrastructure, is the appropriate rate for these installations. If necessary, PGE may revise Schedule 50 or introduce a new tariff that specifically addresses municipal chargers or all public charging.

As part of our commitment to providing affordable and equitable access to transportation electrification, PGE will utilize utilization data to determine the appropriateness of our public charging rate (Schedule 50) for the chargers installed under this program. Specifically, we will analyze usage data, load profile information, dwell time, maintenance costs, and electricity costs to inform any necessary updates or revisions to the rate structure. This analysis will ensure the provision of fair and affordable access to charging infrastructure for all customers, particularly those in underserved communities. This data will help PGE understand how to serve this load, which can create benefits for the whole system.

The following high-level metrics have been identified as indicators of success:

- Increased awareness of chargers, as measured via customer surveys
- Increased EV consideration in neighborhoods where chargers are deployed, as measured via customer surveys
- Unique customers leveraging our charging portfolio via analysis of charger data
- Increased utilization of chargers via analysis of charger data

To assess these indicators, PGE will be drawing data on charger utilization monthly and status reports on where chargers are in the build process. Evaluations will also assess the collocation of chargers with Business and Multi-family Make-ready Solutions, contingent upon said successful collocation. Evaluations will be conducted on an ongoing, annual basis. The first evaluation will begin in 2024 and run until 2026.

C.1.4 Program and Infrastructure Costs

C.1.4.1 Estimated Total Costs, Including Incentives, Program Delivery, Evaluation, Marketing, and Program Operations Costs

PGE's Pole Charging Demonstration and Municipal Charging Pilot informs the proposed costs. Costs are also reflective of current market costs of charging and electric supply infrastructure (e.g., meter base, meters, and conduit), and anticipated inflation. As the activity continues through 2024 and 2025, PGE will work to bring costs down, including through exploration of partnerships for chargers to mitigate ongoing O&M costs. If costs are lower than anticipated, PGE will install additional chargers as the budget allows.

PGE is seeking an additional \$10.1 million for the program. The decision to request additional funding without evaluation is due to the program's initial delays, causing PGE to begin the work as soon as possible in smaller segments. Pole charging installation is the most cost-efficient way to deploy charging infrastructure in underserved communities. However, PGE has included curbside charging for underserved community areas where viable poles are not readily available. To date, \$5.2 million has been approved and \$0.49 million has already been spent. PGE has initiated the process of identifying a suitable number of pole locations, ordering the first batch of chargers and meter bases,

and working with municipalities. The first chargers are expected to be ready for installation in late Q4 2023.

Table 76. Municipal Charging Collaboration 2023 TEP Budget: Forecast of Operating and Capital Expenditures (2023-2025)

Programs	2023	2024	2025	2023-2025 Total
OpEx				
Incentives				
Program Ops				
O&M on Investments - Electric Avenue				
O&M on Investments - Municipal Charging Collaboration				
Evaluation - Electric Avenue				
Evaluation - Municipal Charging Collaboration				
Education and Outreach				
Infrastructure				
CapEx				
Total	\$4,927,903	\$2,941,812	\$7,779,689	\$15,649,404

C.1.4.2 Estimated participant costs

PGE will design, own, operate and maintain charging infrastructure installed under this program. Residential customers will pay a Schedule 50 rate, priced as follows:

- Flat fee (all hours): \$3 for 4 hours
- An additional peak-time fee of \$0.19 per kWh will be assessed on weekdays between 3 PM and 8 PM.

Should PGE find a private market partner, we would expect the private market partner to use a Schedule 50 rate (or a new tariff introduced for this program).

C.1.5 Fit with Long-Term TE Strategy

As a public utility, PGE is obligated to ensure equitable and affordable access to electricity for all customers. PGE is further guided by legislation in HB 2165 to serve underserved communities. PGE is committed to meeting this obligation by ensuring that all communities have access to reliable and affordable charging infrastructure.

Through the Public Charging – Municipal Charging Collaboration program, PGE will determine if owning and operating chargers based on policy (HB 2165) is the right approach or if a potential private partnership would make more sense. PGE also intends to gain insights into the appropriate tariff rate for these chargers and whether Schedule 50, its current public charging rate, needs to be revised or if a new tariff rate needs to be introduced. We also hope that the program will help inform the private market of the viability of installing infrastructure in traditionally underserved communities.

The Public Charging – Municipal Charging Collaboration program fits into PGE’s overall retail charging strategy to support EV adoption by increasing access to charging infrastructure for customers. To achieve this, we recognize there need to emphasize the installation of charging equipment where customers park today, particularly those parked for an extended period of time (e.g., in residential areas without off-street parking). PGE plans to focus the program on underserved communities, where the private sector is least likely to direct their investments. Installation of EV charging in these areas with a high density of MUDs and rentals will help residents in underserved communities gain access to the benefits that owning an EV offers.

C.1.6 How Infrastructure Measure Addresses Oregon Administrative Rule and Oregon Law

Table 77. Public Charging – Municipal Charging Collaboration with OAR 860-087-0020(4)

OAR 860-087-0020(4)	Section of Application Addressing the Rule
A description of the infrastructure measure;	C.1.1
Data used to support the description;	C.1.1
A description of infrastructure measure coordination;	C.1.1.5 - C.1.1.11 C.1.2 - C.1.5
A description of how the proposed infrastructure measure fits within the electric company's long-term strategy to support TE;	C.1.5
A description of costs;	C.1.4
A description of learning objectives and how the electric company will evaluate the infrastructure measure; and	C.1.3
For infrastructure measures, a description of how the measure addresses the considerations of ORS 757.357	Table 78

Table 78. Public Charging – Municipal Charging Collaboration Concordance with ORS 757.357

ORS 757.357	How Application Addresses the Law
<p>(1) (b) (A) "Infrastructure measures" includes, but is not limited to, investments in, expenses related to or rebates for:</p> <ul style="list-style-type: none"> (i) Distribution system infrastructure that supports transportation electrification; (ii) Communication and control technologies that support transportation electrification; and (iii) Behind-the-meter infrastructure that supports transportation electrification and is owned by an electric company or by a customer. 	<p>The investments proposed in this application meet the description of infrastructure measures in (iii), as they are issued for behind-the-meter infrastructure that supports transportation electrification</p>
<p>(b) (B) "Infrastructure measures" does not include investments in or expenses related to education and outreach activities related to transportation electrification, or other transportation electrification-related activities determined by the Public Utility Commission to be separate and distinct from the development of infrastructure.</p>	<p>While this infrastructure measure has an associated education and outreach budget, it is for enrollment only, rather than general education and outreach to advance transportation electrification</p>
<p>(5) If undertaken by an electric company, an infrastructure measure to support transportation electrification is a utility service and a benefit to utility customers if the infrastructure measure can be reasonably anticipated to:</p>	
<p>(a) Support reductions of transportation sector greenhouse gas emissions over time; and</p>	<p>C.1.1.7</p>
<p>(b) Benefit the electric company's customers in ways that may include, but need not be limited to:</p> <ul style="list-style-type: none"> (A) Distribution or transmission management benefits; (B) Revenues to utilities from electric vehicle charging to offset utilities' fixed costs that may otherwise be charged to customers; (C) System efficiencies or other economic values inuring to the benefit of customers over the long term; or (D) Increased customer choice through greater transportation electrification infrastructure 	<p>C.1.1.7 C.1.2.3</p>

ORS 757.357	How Application Addresses the Law
deployment to increase the availability of and access to public and private electric vehicle charging stations.	

C.2 Business and Multi-family Make-ready Solutions

PGE's proposed Business and Multi-family Make-ready Solutions program will expand charging access for current and future EV drivers by supporting commercial installation of public or "semi-public" EV charging including multi-family locations, workplaces, retail locations, destination centers, schools, and houses of worship. "Semi-public" EV charging is defined as charging that may be restricted to certain groups as allowable by law (e.g., employees or multi-family residents) but is not intended to support vehicles owned by the business (such as fleet vehicles).

This program intends to address the barrier that multi-family property owners and developers have few incentives to install EV charging for residents, and even fewer incentives to install the type of right-sized, future-proofed, networked, and demand response-capable EV charging that will be required for widespread EV adoption. This solution will extend two major benefits of driving electric not widely available to multi-family residents today: the convenience of home charging and the affordability of electricity as a "fuel". These barriers are exacerbated for low-income customers and other underserved communities, who comprise a significant portion of the multi-family market. PGE will issue charger rebates to incentivize equitable pricing for those underserved communities, and will also deploy right-of-way chargers through our municipal program at or near multi-family properties in underserved communities.

For customers participating in the program, PGE proposes to design, install, own, and maintain electrical infrastructure behind the customer meter to support 100 customer-installed, -owned, and -maintained EV chargers at approximately 8-12 different locations. This approach leverages PGE's expertise in service design and installation and relieves customers of the logistical burden of managing these projects. Customers can install EV chargers from a pre-qualified list and receive a rebate for a portion of their costs. For its part, PGE will receive charging session data to better understand the grid impacts of EV charging and plan for more widespread passenger vehicle fleet electrification in the future. The data and experience gathered during the 2023-2025 program activity will be used by PGE to develop rates and tariffs. We will also explore program designs to enable EV adoption in underserved communities in a scalable way.

The overall budget for this three-year program is \$2.5 million. In this TE Plan, rather than a request for additional incremental funding for this program, PGE instead requests incremental dollars to expand the Public Charging - Municipal Charging Collaboration and Electric Avenue program, utilizing MMC funds and credits from the Clean Fuels program toward the installation of right-of-way charging near multi-family locations under our municipal charging offering.

C.2.1 Program/Measure Details

C.2.1.1 Elements, objectives, timeline, and expected outcomes

Program Objectives

This program aims to:

- Expand charging access and adequacy for current and future EV drivers in multi-family, commercial, and workplace locations
- Support business customers by reducing the cost and complexity associated with installing EV charging
- Create a network of DR-enabled EV charging that can support efficient grid operations and future renewables integration

- Better understand the customer and market barriers and opportunities in the EV charging space
- Identify areas for utility process improvement with respect to EV charging
- Explore patterns of use and users of multi-family charging on-site vs. right-of-way charging located near or adjacent to multi-family locations
- Generate an empirical data set for EV charging that:
 - Supports PGE in managing electric vehicle load, thereby increasing grid utilization and mitigating increases to system peak loads
 - Informs existing utility analyses and helps PGE develop future products and programs.
 - Informs program design decisions on cost effectiveness and utilization between on-site multi-family charging compared to right-of-way charging near multi-family locations.

Program Elements

From the customer's perspective, key features of the offering include:

- Site planning services
- Product qualification of Level 2 EVSE
- Vendor qualification of electric vehicle service providers
- PGE ownership of make-ready assets located behind-the-meter
- Turnkey design and installation of electrical infrastructure up to, but not including, the EVSE
- Custom PGE capital contribution based on the type of charging offered (public, multi-family, or workplace charging)
- Rebates for the purchase of L2 EVSE based on the type of charging offered (multi-family or other)
- Other technical services, as appropriate

PGE's proposed design is intended to future-proof sites: the EVSE will be metered separately from existing site load, and also networked and DR-ready. This will facilitate adoption of follow-on products such as EV rates or flex load programs.

PGE has designed the terms and conditions for participation to extend benefits to all customers and reduce the risk of stranded utility assets. To this end PGE will require that participants:

- (Multi-Family Housing only) have a minimum of 10 percent affordable units and be in a census tract with greater than 50 percent of the premises meeting the underserved criteria as defined by HB 2165.
- Submit a refundable deposit to cover final site design, should extensive engineering be required
- Install qualified, networked, DR-enabled EVSE upon PGE's completion of make-ready infrastructure
- Keep EVSE operational and on a cost-of-service rate for 10 years
- Release charging data to PGE
- Reimburse PGE for pro-rata capital and rebate costs, should the participant breach any of the above commitments

Customer Journey

- PGE partners with CBOs, housing bureaus, and local non-profits to identify potential sites
- PGE's Technical Outreach team engages property owners to determine interest and feasibility
- Customer (building owner) submits application
- PGE constructs preliminary engineering assessment and site walk to develop engineering scope and cost estimate
 - Preliminary design approval; fund reservation
 - Final design approval
 - Make-ready installation
 - EVSE installation and commissioning
 - Chargers online, EV drivers take service
- Customers responsible for data transmission, pricing, associated data fees, and ongoing maintenance

Education and Outreach

The success of this program relies on the participation of low/medium income multi-family properties in the adoption of Electric Vehicle charging infrastructure. However, as the target demographic of this program may be unfamiliar with EVs and EV charging, PGE must provide focused education and outreach and communications to inform them. The communications will primarily focus on the benefits of Electric Vehicle ownership, financial assistance for EV purchases through State and Federal offerings, and the differences between charging behavior versus fueling behavior. PGE will also explain the benefits of charging at home and the opportunities related to managed charging and incentive offerings available through PGE. Additionally, PGE will communicate the benefits of EV charging at MF locations and the benefits of EVs to MF tenants and underserved community members. Overall, communication and education efforts will be necessary to ensure the success of this program.

Guidelines and information on program participation will be available on a dedicated program webpage. This page will include information on how to apply including a high-level program overview, application, terms and conditions, Qualified Product List, incentive and rebate information, customer cost estimates and summary, and timeline. Customers will learn about the program through outbound recruitment coordinated in partnership with CBO's, Local Housing Bureaus, Local Non-Profits, PGE Key Customers and Commercial Energy Outreach Team.

Program Timeline

- Q3 2023: Business and multi-family charging program launched. Funding will be available on a first-come, first-served basis until the funding for the program is fully reserved.
- Q1 2024: Completion of first site
- Q1 2024: Commencement of charging data collection
- Q3 2024: 50 percent of funding reserved
- Q3 2025: 100 percent of funding reserved

- Q2 2024/25/26: Status updates within TE Plan Report
- Q4 2025: Anticipated date for all sites to finish construction
- Q1 2026: Evaluation report

PGE intends to launch Business and Multi-family Make-ready Solutions program in Q3-2023. Funding will be available on a first-come, first-served basis, until the funding dedicated to this program is fully reserved. Customers reserve funding during the Preliminary Design Approval stage of the program. During this stage, the customer approves a final design and thereby reserves funding in accordance with the agreed upon site need. Construction will necessarily lag the enrollment window. PGE anticipates all sites will finish construction by the end of 2025.

Expected Outcomes

PGE expects this pilot to support adoption of light-duty EVs by providing convenient charging where current and future EV drivers work, learn, live, shop, play, and worship. Specific outcomes include:

- Increasing the number of EVs at locations with EV chargers
- Furthering the development of rates and tariffs to promote efficient charging behavior
- Enhancing efficiency of existing planning, engineering, and operations services to serve new TE loads
- Reducing greenhouse gas emissions, criteria air pollutant emissions, and water pollution in PGE's service area and beyond
- Increasing equitable access to electric mobility through the provision of EV charging ports in underserved communities in coordination with the municipal right-of-way chargers

C.2.1.2 Market Baseline Assumptions

Using the EV charging infrastructure needs forecasts from TEINA, adapted for PGE's service area and internal EV adoption forecasts, PGE forecasts the need for 6,015 L2 ports in public and workplace settings by 2025 to support the electric vehicles that will be adopted over that timeframe. Today, only 991 L2 ports exist in public and workplace settings within PGE's service area. This leaves a gap of over 5,000 L2 ports at public and workplace settings as the required investment to support new vehicles.

PGE has sized this program to partially fill this gap, with 100 of the proposed ports targeted for public, workplace, and multi-family settings. This limited scale will allow PGE to gather learnings regarding various use cases and what is needed to scale a future make-ready tariff or rate. It is assumed that the private market and/or other PGE programs will contribute to the charging infrastructure needed by 2025.

C.2.1.3 Major Performance Milestones

- From 2023 to 2025, installation of approximately 100 L2 charging ports at approximately 10 different workplace, commercial, and multi-family locations throughout PGE's service territory
- In 2024 and 2025, installation of approximately 100 ports in right-of-way near multi-family locations only, specifically targeting multi-family properties impacted by the criteria outlined in HB 2165.
- By the end of 2025, installation of 260 L2 charging ports in PGE's service territory including Business and Multi-family Make-ready Solutions and right-of-way make-ready through our municipal charging program.

PGE forecasts that approximately 10 sites will enroll in the Business and Multi-family Make Ready Solutions pilot. The specific number of sites for the program will depend heavily on how many ports customers decide to install.

Table 79. Business and Multi-Family Make-ready Solutions Forecasted Port Counts by Site Type

	Small Sites (8 ports)	Medium Sites (12 ports)	Large Sites (16 ports)	Total Sites
Multi-Family	1	3	-	4
Public	1	3	-	4
Workplace	1	1	-	2
Total	3	7	-	10

C.2.1.4 Program/Measure Phases

For 2023, PGE is proposing to fund approximately 100 ports at 10 different workplace, business, and multi-family locations throughout our service territory. This pilot is not anticipated to develop into a full program following 2025. Following the pilot, PGE anticipates developing a rate structure that is better aligned to our evolving role to support, rather than accelerate, EV charging expansion. This approach will enable PGE to have a more streamlined solution which can serve Fleet, Commercial, and Multi-family make-ready needs.

Recognizing that there are systemic, economic, and societal factors that limit adoption of EVs for low to medium-income customers, and based on the learnings from this pilot, PGE may explore an underserved EV charging rate or other solutions to meet the needs of this community. Data captured through the pilot expansion will be used to evaluate programmatic solutions that facilitate charging equity for customers.

C.2.1.5 Utilization, Eligibility, Incentive Structures

The program will be offered to non-residential customers in PGE’s service area including, but not limited to, workplaces, retail locations, destination centers, schools, houses of worship, and multi-family locations. PGE’s present understanding of L2 charger load shapes, utilization rates, uptime, and make-ready costs informs the following participation requirements for the program:

- PGE will require having a separate meter for each site to gather granular usage data and use this information to assess the performance of managed charging.
- Chargers must remain on an eligible cost-of-service rate schedule for the duration of the 10-year term (currently eligible rates include Schedules 32, 38, 83, 85, and 89³²¹).
- Customers may also participate in other PGE offerings such as EV-Ready Affordable Housing or the Drive Change Fund as appropriate. Customers may not cross-enroll the same site in

³²¹ The list of eligible rate schedules may be expanded at a later date to include new rates, including EV rates.

Business EV Charging Rebates (as EVSE rebates are already provided within the program design), or Fleet Partner and the Electric School Bus Fund (which are for fleet charging, which is not semi-public).

PGE’s contribution to make-ready will be capped at \$17,000 per L2 port. To qualify for incentive, customers must install compatible charging as defined by PGE’s Commercial Qualified Product List (QPL). PGE will offer the following incentive for each port installed:

- Standard rebate: \$1,000 per L2 port
- Multi-family rebate: Up to \$2,300 per L2 port; split as stated below:

The distribution of multi-family rebates for qualifying L2 chargers will be structured to allocate \$1,000 upon the installation of the chargers, and \$1,300 five years after installation, with the condition that the EV users’ cost-to-charge stays within an average range of 10% from the rate being charged through Schedule 50.

The incentive is structured in a manner to:

- Encourage participating sites to install EVSE that are compatible with PGE’s DRMS platforms and pricing programs
- Promote a greater number of EVSEs than historically experienced in underserved communities

PGE will revisit the incentive level in the event of significant costs above or below estimation of make-ready construction costs and/or underestimation of demand for chargers per location.

C.2.1.6 Market and Implementation Barriers Addressed

Market Barriers

This program design addresses several market barriers identified by TEINA, including:

Table 80. Business and Multi-family Make-ready Solutions Market Barriers and Mitigants

Barrier	How Addressed
Cost of electric power upgrades and charging port installation (conduit, trenching)	Contributions from PGE towards charging infrastructure
Limited multi-unit dwelling and workplace charging	60 percent of program resources to be allocated for charging at multi-unit dwellings and workplaces Coordination with the Public Charging – Municipal Charging Collaboration and Electric Avenue program to ensure 100 curbside charging ports are co-located at or near multi-family locations
Economics of installing and operating charging ports (upfront, demand charge costs)	PGE will own, operate, and maintain make-ready infrastructure, providing cost relief for

Barrier	How Addressed
	participants while leveraging existing assets and resources to keep overall costs low
Confusing and inconsistent user charging experience	<p>PGE to provide incentives on prequalified chargers which are compatible with A) commonly available charging standards, and B) have the ability to participate in future PGE EV pricing/DR offerings</p> <p>PGE is providing a charger incentive intended to encourage participating sites to increase EVSE installation that is compatible with PGE’s DRMS platform and pricing program</p>

Implementation Barriers

PGE anticipates several implementation barriers for this program and has applied lessons learned from its Fleet Partner program, along with lessons from similar utility programs, in considering how to mitigate these. Key barriers and mitigation plans include:

Table 81. Business and Multi-family Make-ready Solutions Implementation Barriers and Mitigants

Barrier	How Addressed
Rising costs resulting from macroeconomic conditions, including the COVID-19 pandemic, supply chain constraints, and rising interest rates	PGE will continue to assess and evaluate these changing factors, as well as the availability of infrastructure and charging equipment and commercial lending rates. Our goal is to ensure that our incentives are not overcompensating for the costs and perceived benefits of adding EV charging to these properties. PGE will monitor customer participation relative to the proposed incentive levels.
Long sales cycle inherent to projects of this scale.	PGE expects—and will be prepared to support—a six-month cycle time from customer application to commissioning of the charger. We anticipate construction of sites to last through 2025, subject to TE plan approval timing.
Low applicant success rate due to lack of experience installing electric charging infrastructure and underestimation of process and costs.	PGE will manage this risk by pre-qualifying sites. Up front engagement, and assistance with site design and business case development. Long-term site engagement for the collection information and data will inform PGE of the success and hurdles these early adopter experience thus informing PGE role an activity.

C.2.1.7 Performance Area Categories

PGE's proposed design addresses relevant Division 87 performance area categories in the following ways:

- **Environmental benefits including greenhouse gas emissions impacts:** As the site is utilized PGE will be able to calculate illustrative emission reductions. The data can be used to draw correlations between the investment made and the driving and charging habits of those who utilize these chargers. The data may help us better understand how these investments affect the community where they are sited.
- **Electric vehicle adoption:** Increased charging adequacy, including visible and available chargers at the retail, workplace, multi-family, and other destinations frequented by residential customers. PGE expects this to help meet the needs of increased EV adoption across PGE's service area.
- **Equity of program offerings to meet underserved communities:** The program will target and prioritize public and semi-public charging for underserved communities including renters, multi-family residents, and others lacking access to charging at home. The program will coordinate with the municipal program to ensure approximately 100 curbside make-ready charging ports are located at or near multi-family locations.
- **Distribution system impacts and grid integration benefits:** PGE does not anticipate distribution system impacts stemming from this program. Grid integration benefits are largely represented by the networked and DR-capable requirements in the technical standards PGE sets. Data acquired will inform how growth of business and multi-family charging could affect the design and operation of the distribution system. Being DR capable these chargers will also inform how smart and managed charging can mitigate distribution system operation disruptions, support local grid and system reliability.
- **Program participation and adoption:** PGE anticipates that approximately 8-12 sites will be constructed under this program, representing approximately 100 L2 ports. Forty percent of ports will be installed at multi-family dwellings, with a further sixty percent installed at public or workplace sites. Half of those public ports (12.5 percent of all ports) will be located in geographically designated underserved communities.
- **Infrastructure performance including charging adequacy which considers, but is not limited to reliability, affordability, and accessibility:** PGE tracks charger uptime and the cost-to-charge across its fleet of utility-supported chargers and will report on this information in future TE Plan Reports. If the site host elects to bill EV drivers, PGE requires multiple forms of payment be available. This requirement increases accessibility of chargers to all types of residential customers.

C.2.1.8 PGE's Role in the Program

PGE's role in the program includes:

- Support for customers with site planning services and advising on charger deployment and potential pricing
- Qualification of EVSE products for inclusion in the program

- Ownership, operation, and maintenance of make-ready assets behind-the-meter up to, but not including, the EVSE
- Design and installation of electrical infrastructure from the existing distribution grid through the meter to the charger pad(s)
- Calculation of custom capital contributions and rebate amounts
- Issuance of rebates
- Other technical assistance, as appropriate
- Program administration

The customer's role in the program includes:

- Selection of qualified equipment from PGE's qualified product list
- Review and approval of preliminary and final site designs in a timely way
- Engaging a vendor to procure and install the EVSE
- Submission of invoices and other supporting documentation to PGE as requested
- Release of charger session data to PGE
- Maintaining an ongoing relationship with a qualified vendor for data and software services
- Maintaining the chargers in good working condition or replacing charger with equivalent port count, and on a cost of service rate, for up to 10 years
- Paying the retail energy rate at the meter
- Determining charger access and pricing for EV drivers, if any

C.2.1.9 Resulting Distribution Upgrades

The maximum site size that PGE has modeled for this program is under 150 kW of load. Aside from new or upgraded distribution-level transformers, both of which are accounted for in the budget in the Program Costs section below, PGE does not expect the program to trigger significant distribution system upgrades. PGE will work closely with customers to ensure that right-sized EVSE, managed charging, and planful siting are considered, which will help control distribution system costs and minimize potential impacts (including cost impacts) on both participating and nonparticipating customers.

C.2.1.10 Ownership Structure

To meet program objectives, PGE proposes to install and own the PGE and customer-side make-ready infrastructure, while the customer installs, owns, and maintains the EVSE. This approach allows PGE to reduce complexity for the customer by assuming the burden of designing, installing, and maintaining the make-ready infrastructure. It allows customers to focus on the aspects most important to their business objectives (e.g., chargers and driver experience). This approach is warranted because TE is changing how customers use energy, prompting a rethinking of the infrastructure necessary to provide customers flexible access to the grid. PGE successfully piloted this approach with its Fleet Partner pilot, where we found customers receptive to and enthusiastic about the approach.

PGE's market research indicates that multiple third parties (typically EVSE vendors) are engaged in the "Charging as a Service" (CaaS) space. Under this model, the vendor owns the EVSE at the customer site and the customer pays for charging service over time as an "off-balance-sheet" operating expense. In traditional CaaS, the vendor does not own or operate the make-ready infrastructure. Importantly, chargers installed under third-party CaaS contracts will also be eligible for rebates. In this case, the rebates will still be issued to the PGE customer (site host).

Third parties are beginning to explore and offer financing for turnkey make-ready infrastructure, acknowledging the market gap and significant cost outlay to design, install, and maintain such infrastructure. However, to PGE's knowledge, entrants in this space are either start-ups or are working with financing partners that are themselves new to this type of model. Furthermore, our market research suggests that this approach is more common in the fleet space than in the charging-as-an-amenity space. PGE continues to view this as an immature market and sees the need for trusted customer solutions today.

PGE will leverage this program to test the efficacy, customer value proposition, and cost-effectiveness of this approach to ownership of make-ready infrastructure in the public right-of-way and semi-public charging space.

C.2.1.11 EVSE Requirements (Equipment Interoperability and National Standards)

PGE utilizes a single Qualified Products List (QPL) to determine eligible EVSEs for all of PGE's non-residential EV programs. EVSE vendors must submit a Request for Qualification (RFQ) if they want their products added to the QPL. PGE engineers review each RFQ for completeness and against the predefined qualification requirements, listed below. If the vendor receives technical approval, they must also execute a Data Sharing Agreement with PGE before their products will be added to the QPL.

Hardware requirements (Level 2 and DCFC):

- National Electrical Manufacturers Association (NEMA) Type 3R or 4, which certifies that equipment is weatherproof and certified for either indoor or outdoor use.
- Compliant with Federal Communications Commission Part 15, which sets limits on the amount of electromagnetic interference allowed.
- Compliant with National Electric Code, National Fire Protection Association (NFPA) article 625, which covers wires and equipment used to supply electricity for EV charging.
- Compliant with the Americans with Disabilities Act (ADA), which ensures that the EVSE is ADA accessible, if installed according to the manufacturer's instructions.
- EVSE model must have a cellular connectivity option, either 4G LTE or 5G.
- Compliant with Open Charge Point Protocol (OCPP) v1.6 or later, enabling the flexibility to operate with a variety of network service providers. It also must be remotely upgradable to support future versions of OCPP.
- Must include a standard warranty of 1 year or greater
- Must have an operating range of at least -22F to 122F, ensuring it can withstand extreme environments

Level 2-specific requirements:

- Compliant with Society of Automotive Engineering (SAE) J1772, the standard Level 2 connector that is compatible with all road-legal EVs for sale in the United States, including plug-in hybrids (PHEVs), battery electric vehicles (BEVs), and Tesla vehicles using an adaptor.
- Listed by a nationally recognized test lab to the requirements of UL 2251 and 2594, demonstrating that products are tested to UL’s recognized safety standards.

Software requirements:

- Software platform must be responsive to grid services, modifying charger power output levels, using either one of the following methods
 - Certified OpenADR 2.0b Virtual End Node (VEN)
 - Application Programming Interface (API)
 - IEEE 2030.5 (SEP 2.0)
- Software must also be compliant with Open Charge Point Protocol (OCPP) v1.6 or later, enabling the flexibility to operate with a variety of EVSE hardware.

Through the RFQ process, PGE collects additional technical information from vendors that aren’t requirements but help inform PGE programs and potential future requirements. This includes items such as:

- Compliance with ISO/IEC 15118
- Payment methods and pricing options
- Compliance with OCPI v2.2 or later
- EVSE metering accuracy
- Bi-directional charging capability
- Lead time and indicative pricing
- Installation manuals
- The vendor’s sales point of contact to post on PGE’s QPL webpage so customers know who to contact when interested in a specific product

As of 4/28/2023, PGE has qualified 137 EVSE models from 18 different EVSE vendors.

C.2.2 Program/infrastructure coordination

C.2.2.1 Stakeholder involvement in development

PGE discussed this concept with stakeholders in workshops we held on April 28, June 14, July 12, and October 6, 2022. Updated versions of this program were discussed with stakeholders at the April 20, 2023 Learning Lab and the PUC-led UM2033 workshop on June 15, 2023. We specifically discussed the concept of make-ready ownership at business charging sites in our February 2019 UM 1811 compliance filing, our July 2020 Transportation Line Extension Allowance filing, and also in early 2021 discussions with stakeholders regarding PGE’s Fleet Partner pilot.

During review of the draft TE Plan, stakeholders urged PGE to consider program changes to improve underserved communities’ access to equitable charging. As a result, PGE has scaled the program down to approximately 100 ports and requests funds for an additional ~100 ports to be located near multi-family properties, to be delivered through our Municipal Charging offering. PGE has also split

the charger incentive for the Business and Multi-family Make-ready Solutions program to encourage property owners to provide equitable pricing in line with that available through PGE's Schedule 50. These two adjustments are intended to better serve underserved communities with access to charging, while at the same time providing incentives to keep prices down for users.

C.2.2.2 Coordination with State Programs

PGE will make customers aware of, and support customers in relaying information regarding, the Oregon Clean Vehicle Rebate, the Oregon Clean Fuels Program, and other relevant state programs, as appropriate.

PGE anticipates that some customers may elect to stack this program with ODOT's deployment of NEVI funding, or other federal, state and/or local funding sources such as grants. PGE welcomes this type of coordination and will work as necessary with federal, state, and/or local entities to ensure a smooth incentive delivery for customers.

C.2.2.3 Coordination with Market Actors and Activities

PGE is pleased to support increased customer choice and increase the availability of and access to public and semi-public EV charging by working with EVSE hardware and software vendors in the execution of this program. Some of the ways we will work together include:

- PGE manages a qualification process for hardware and software for EV charging. PGE collects details and specifications about each of the hardware options on the qualified list and reviews this information to ensure the EVSE and software meet the technical requirements specified above.
- PGE has executed data sharing agreements with each of the vendors on the qualified list and will obtain charging session data directly from the vendors (customers will sign a data release as part of the enrollment process). This ensures that customers do not have to provide data directly to PGE on an ongoing basis.
- PGE also works regularly with the vendors on the qualified list to ensure that they are informed about PGE's various TE programs and have education and outreach and other collateral on hand to share with their customers. In this way, vendors play an integral role in raising customer awareness of PGE's programs. For its part, PGE shares EVSE options and details with customers, and will work directly with their selected vendors to ensure that PGE and the vendor are able to provide the most efficient customer experience.
- PGE will also coordinate with installers, dealers, and trade groups as appropriate to best serve the customer.

C.2.3 Learning Objectives, Evaluation of Effectiveness, and Data Collection Methods

Learnings from this program will further enhance PGE's understanding of how to manage this type of TE load. PGE is collecting data to determine the feasibility of managing commercial, multi-family, and workplace load, including data on load shape and utilization of charging. This data will inform hardware and software requirements that most effectively and efficiently communicate charging status and potential for load management. Additionally, this program will provide insight into EV usage for drivers who are using vehicles for more than personal transportation, but for income generation through Transportation Network Companies, meal delivery, and other jobs of convenience enabled by having access to transportation. This along with the usage and subscription

data from our Electric Avenue charging network, will provide a more comprehensive profile of EV drivers who use their vehicles to make a living.

PGE will utilize customer interviews, customer surveys, property ownership and management interviews, charging data, infrastructure and charger installation costs, and O&M costs to inform future program opportunities. These opportunities include, but are not limited to Make-ready Infrastructure rebates, Commercial Charger Rebates, and New Construction EV Infrastructure Rebates. PGE will design the pilot evaluation to measure the program's effectiveness in meeting its objectives, identify areas for continuous improvement, and also assess energy impacts on PGE's system. Data will be used to determine direction for a future rate/tariff design for make-ready programs beyond 2025.

High-level learning objectives include:

- Identifying specific programmatic opportunities that can positively influence accelerating EV adoption for low to medium-income multi-family residents who have historically been overlooked in the efforts to electrify multi-family residences due to lower EV adoption
- Gathering insight into the usage of EV charging in various commercial settings, with a focus on usage in multi-family housing, looking at metrics including:
 - kWh charged and corresponding revenue generated from charging activities
 - Charge time, including the length of typical charging sessions, which days charging occurs most frequently, and times of day with most frequent charging
 - Retail cost per charge
 - Dwell/idle time
 - Evaluation of utilization of charging at multi-family locations compared to right-of-way charging near multi-family, including but not limited to; make ready costs, charging revenue, and charging sessions.
 - Service levels, reliability, and maintenance costs will also be assessed to provide a comprehensive understanding of the program's effectiveness.

PGE will collect charging data daily and monthly and issue a final report at the end of the demonstration period in 2024-2025. PGE will also conduct an overall program/site evaluation in 2024-2025, depending on install rate/uptake at this time. These reports will provide customer feedback on process, costs, and experience with charging installation. These will also help us understand make-ready needs at MF sites, how to engage property owners and managers, and when to engage property owners. Evaluations will also assess the collocation of chargers with Public Charging - Municipal Charging Collaboration and Electric Avenue, contingent upon said successful collocation.

C.2.4 Fit with Long-Term TE Strategy

This program directly supports PGE's role to serve load and informs PGE on how to better serve TE customers and how to incorporate TE load and TE customer needs into current business practices and tools. This program is designed to address two pillars of PGE's long-term vision for TE:

- Charging is equitable, affordable, reliable, and accessible
- Electric vehicles are efficiently integrated into the grid

Make-ready programs offer an opportunity for utilities to efficiently support the deployment of EV charging. They leverage a favorable capital model while also allowing for significant customer choice and control over EVSE and shaping of the driver experience.

While this program does not have a formal flex load component at launch, it sets the stage for managed charging by building a network of grid-connected resources, supporting the efficient long-term grid integration of EVs. In the future, PGE anticipates introducing optional demand response programs for program participants. Meanwhile, both workplace and multi-family charging load shapes are generally favorable for the grid, with workplace charging predominantly during morning hours and multi-family charging predominantly overnight, both times of excess grid capacity.

C.2.5 Program and Infrastructure Costs

C.2.5.1 Estimated Total Costs, Including Incentives, Program Delivery, Evaluation, Marketing, and Program Operations Costs

The overall budget for this three-year program is \$2.5 million.

If construction, material, or EVSE costs end up being higher than expected, PGE may consider increasing the costs for either the make-ready or equipment incentives. However, if PGE overestimates the required incentives, we will keep an eye on macro-economic conditions to determine if additional incentives are necessary to justify the capital requirement for both PGE and customers to add EV charging. If there is a significant difference in the required incentive compared to the costs, PGE may need to revisit the commission mid-cycle to adjust the incentives accordingly.

If there is significant deviation between anticipated costs, actual costs, and incentive amount PGE would request a mid-cycle allowance to adjust based on market conditions.

We may find that the port count, customer contribution, and overall demand is not compatible with the needs of the underserved Low/Medium Income MF market, in which case PGE would request a mid-cycle allowance to different demographics to get the desired learnings for program period.

Table 82. Business and Multi-family Make-ready: Forecast of Operating and Capital Expenditures (2023-2025)

Programs	2023	2024	2025	2023-2025 Total
OpEx	██████	██████	██████	██████
Incentives	██████	██████	██████	██████
Program Ops	██████	██████	██████	██████
O&M	██████	██████	██████	██████
Evaluation	██████	██████	██████	██████
Education and Outreach	██████	██████	██████	██████
CapEx	██████	██████	██████	██████
Total	\$210,100	\$1,085,452	\$1,251,578	\$2,547,130

C.2.5.2 Estimated participant costs

Final costs to program participants are unknown and will vary by customer. Participants will be responsible for the costs associated with the following:

- Make-ready and line extension costs beyond that covered by PGE’s Line Extension Allowance and the custom PGE capital contribution for this program
- Acquisition of EVSE, less rebate amount
- Installation and commissioning of EVSE
- Maintenance of EVSE, including data/software fees
- Energy and other costs via the PGE bill, for the meters serving the EVSE

In order to help offset their out-of-pocket costs, participants will be encouraged to claim and monetize CFP credits generated at the EVSE, either directly or through a brokerage.

PGE acknowledges the risk for participants to commit to a larger number of charging ports than needed for the site in the near-term. To manage this risk, PGE may allow for variance on the number of EVSEs installed initially while maintaining the requirement that all make-ready needs to add ports must occur no later than five years after Make-ready infrastructure is installed.

C.2.6 How Infrastructure Measure Addresses Oregon Administrative Rule and Oregon Law

Table 83. Business and Multi-family Make-ready Solutions Concordance with OAR 860-087-0020(4)

OAR 860-087-0020(4)	Section of Application Addressing the Rule
A description of the infrastructure measure;	C.2.1
Data used to support the description;	C.2.1
A description of infrastructure measure coordination;	C.2.2
A description of how the proposed infrastructure measure fits within the electric company's long-term strategy to support TE;	C.2.4
A description of costs;	C.2.5
A description of learning objectives and how the electric company will evaluate the infrastructure measure; and	C.2.3
For infrastructure measures, a description of how the measure addresses the considerations of ORS 757.357	Table 57

Table 84. Business and Multi-family Make-ready Solutions Concordance with ORS 757.357

ORS 757.357	How Application Addresses the Law
<p>(1) (b) (A) "Infrastructure measures" includes, but is not limited to, investments in, expenses related to or rebates for:</p> <ul style="list-style-type: none"> (i) Distribution system infrastructure that supports transportation electrification; (ii) Communication and control technologies that support transportation electrification; and (iii) Behind-the-meter infrastructure that supports transportation electrification and is owned by an electric company or by a customer. 	<p>The investments proposed in this application meet the description of infrastructure measures in (iii), as they are issued for behind-the-meter infrastructure that supports transportation electrification.</p>
<p>(b) (B) "Infrastructure measures" does not include investments in or expenses related to education and outreach activities related to transportation electrification, or other transportation electrification-related activities determined by the Public Utility Commission to be separate and distinct from the development of infrastructure.</p>	<p>While this infrastructure measure has an associated education and outreach budget, it is for enrollment only, not more general education and outreach to advance transportation electrification.</p>
<p>(5) If undertaken by an electric company, an infrastructure measure to support transportation electrification is a utility service and a benefit to utility customers if the infrastructure measure can be reasonably anticipated to:</p>	
<p>(a) Support reductions of transportation sector greenhouse gas emissions over time; and</p>	<p>C.2.1.7</p>
<p>(b) Benefit the electric company's customers in ways that may include, but need not be limited to:</p> <ul style="list-style-type: none"> (A) Distribution or transmission management benefits; (B) Revenues to utilities from electric vehicle charging to offset utilities' fixed costs that may otherwise be charged to customers; (C) System efficiencies or other economic values inuring to the benefit of customers over the long term; or (D) Increased customer choice through greater transportation electrification infrastructure deployment to increase the availability of and access to public and private electric vehicle charging stations. 	<p>C.2.1.7 C.2.2.3</p>