



Portland General Electric
121 SW Salmon Street · Portland, Ore. 97204

July 15, 2020

Public Utility Commission of Oregon
Attn: Filing Center
201 High Street, S.E.
P.O. Box 1088
Salem, OR 97308-1088

RE: Advice No. 20-18, NEW Schedule 8, Residential Electric Vehicle Charging Pilot

Portland General Electric Company (PGE) submits this filing pursuant to Oregon Revised Statutes 757.205, 757.210, and Oregon Administrative Rule (OARs) 860-022-0025, for filing proposed tariff sheets associated with Tariff P.U.C. No. 18, with a requested effective date of **October 23, 2020**:

Twenty Seventh Revision of Sheet No. 1-1
Original Sheet No. 8-1
Original Sheet No. 8-2
Original Sheet No. 8-3
Original Sheet No. 8-4

PGE hereby submits Schedule 8, PGE's Residential Electric Vehicle (EV) Charging Pilot. This Pilot, more fully described in Attachment A, offers rebates for the purchase or installation of Level 2 Electric Vehicle Supply Equipment (L2 EVSE) that helps manage and increase the flexibility of load associated with residential EV charging. This pilot will be active through February 22, 2024.¹ Specific learnings include:

- Increase adoption of electric vehicles and home charging stations by enhancing the customer value proposition for going electric.
- Identify and test how grid connected EVSEs and smart home charging practices decrease the costs to serve EV loads by minimizing bulk system capacity needs and constraints, as well as non-coincident peak loads to minimize the need for distribution system upgrades.
- Provide PGE the learnings and experience necessary to efficiently scale this and similar pilots to a full-scale program.
- Increase visibility of home charging load profiles and awareness of charging deployments across the distribution system.
- Enable future offerings that leverage home charging telemetry (e.g. specialized billing, such as sub-metered time-of-use).

¹ The term date was chosen to be three years in duration and then to align with the UM 2003 deferral expiration date. This is in response to Staff's prior request that pilot terms align with the deferral.

This filing aligns with and supports PGE's and the State's commitment to transportation electrification (TE) by providing an incentive to install charging infrastructure. PGE is committed to leading the transformation to a clean energy future for its customers and region by decarbonizing its energy supply, electrifying customer end uses, and delivering operational excellence. This pilot aligns with the guidance and actions directed by Oregon Senate Bills 1547 and 1044. In addition, as most recently articulated in Executive Order No. 20-04,² Governor Kate Brown calls for substantial reductions in GHG (i.e. reduce GHG emissions to 45% below 1990 levels by 2035) and there is urgency to act now as they "present a significant threat to Oregon's public health, economy, safety, and environment" and "the transition from fossil fuels to cleaner energy resources can significantly reduce emissions and increase energy security and the resilience of Oregon communities in the face of climate change."

As informed by its 2019 TE Plan (UM 2033), PGE identified three goals for 2025 to address critical barriers to accelerating TE and ensuring efficient integration into the grid. This pilot supports the charging optimization goal by developing grid-connected flexible load through this pilot.

This pilot is supported by OPUC Docket No. UM 2003, PGE's application to defer costs associated with this pilot for future ratemaking.

To satisfy the requirements of OAR 860-022-0025(2), PGE responds as follows:

Schedules 8 does not increase, decrease, or otherwise change existing retail rates or have anything other than a de minimis impact on revenues.

Please direct any questions regarding this filing to Kalia Savage at (503) 464-7432.

Please direct all formal correspondence and requests to the following email address pge.opuc.filings@pqn.com

Sincerely,

Is\ Robert Macfarlane

Robert Macfarlane
Manager, Pricing & Tariffs

Enclosures

Cc: UM 1811 Service List
Eric Shierman, OPUC

² Brown, Kate. "Executive Order No. 20-04." Office of the Governor. State of Oregon. 10 Mar 2020, page 8. Retrieved from <https://drive.google.com/file/d/16isIO3GTqxVihqghlciGYH4Mrw3zNNXw/view>

SCHEDULE 8 RESIDENTIAL ELECTRIC VEHICLE CHARGING PILOT

PURPOSE

This Residential Electric Vehicle Charging Pilot (Pilot) is applicable to Residential Customers who own or lease an Electric Vehicle (EV). The Pilot offers rebates for the purchase or installation of Level 2 Electric Vehicle Supply Equipment that helps manage and increase the flexibility of load associated with residential EV charging. The Pilot is expected to operate from October 23, 2020 to February 22, 2024.

AVAILABLE

In all territory served by the Company.

APPLICABLE

This Pilot is available to up to 5,000 eligible Residential Customers that elect to enroll and participate in the Pilot. Qualifying Customers will remain on Schedule 7 and be eligible for rebates and incentives described in this schedule.

DEFINITIONS

Active Charging Session – A period of time during which an EV is plugged into an EVSE for the purposes of having electricity supplied to the vehicle through the EVSE.

Direct Load Control – A remotely controllable switch that allows the utility to operate an appliance/equipment, often by cycling.

Electric Vehicle Supply Equipment (EVSE) – The device, including the cable(s), coupler(s), and embedded software, installed for the purpose of transferring alternating current electricity at 208 or 240 volts between the electrical infrastructure and the EV.

Event Notification – The Company may issue a notification of a Managed Charging Event to participating Customers. Notification methods may include email, text, auto-dialer phone call, or via mobile app notification.

Holidays – The following are holidays for purposes of the Pilot: New Year's Day (January 1), Memorial Day (last Monday in May), Independence Day (July 4), Labor Day (first Monday in September), Thanksgiving Day (fourth Thursday in November), and Christmas Day (December 25). If a holiday falls on a Saturday, the preceding Friday will be designated the holiday. If a holiday falls on a Sunday, the following Monday will be designated the holiday.

SCHEDULE 8 (Continued)

DEFINITIONS (Continued)

Income-Eligible Customer – A verified Residential Customer at 80% or below the area median income as defined by the US Department of Housing Urban Development, or the home qualifies for Section 8 housing.

Managed Charging Event – A period during which the utility will provide Direct Load Control by sending communication signals to a customer's vehicle or EVSE to adjust the rate or time of charge.

Participation Year – Twelve consecutive months from the anniversary date of a Qualifying Customer's enrollment in the Smart Charging Program.

Qualifying Customer – A Residential Customer in an existing single-family residence, including separately metered residences with assigned parking, with a Qualified L2 EVSE (excludes new construction or multifamily property).

Qualified Level 2 Electric Vehicle Supply Equipment (L2 EVSE) – A pre-approved L2 EVSE that meets the program's connectivity and controllability criteria.

ELIGIBILITY

Eligible Customers must be a Qualifying Customer with a Qualified L2 EVSE and agree to the following minimum participation requirements: (1) the Qualified L2 EVSE is successfully connected to the Smart Charging Program for at least 50% of the participation year, (2) the Qualified L2 EVSE participates in six Managed Charging Events, and (3) the Qualified L2 EVSE completes 25 Active Charging Sessions.

ENROLLMENT

Qualifying Customers can enroll in the Pilot at PortlandGeneral.com through September 30, 2023. Unless PGE terminates this Pilot, customers will remain enrolled in the Smart Charging Program for the entire Pilot term. Qualifying Customers that reenroll in the Pilot are not eligible for a second payment for installation of a single Qualified L2 EVSE. A Qualifying Customer continuing service at a new residence is not considered a new enrollment.

SCHEDULE 8 (Continued)

INCENTIVES

Qualifying Customers with more than one Qualifying L2 EVSE are eligible for the following incentives per each unique EV and EVSE pair during their participation in the Pilot:

<u>Incentive</u>	<u>Description</u>	<u>Amount</u>
Standard EVSE Installation Rebate	A one-time rebate for the purchase and installation of a Qualified L2 EVSE. PGE will automatically enroll Qualifying Customers into the Smart Charging Program. Qualifying Customers will receive the rebate by check or bill credit from the Company upon approval of rebate qualification.	Up to \$500; capped at price paid
Income-Eligible EVSE Installation Rebate	A one-time rebate for Income-Eligible Qualifying Customers for the purchase and installation of a Qualified L2 EVSE. PGE will automatically enroll Qualifying Customers into the Smart Charging Program. Qualifying Income-Eligible Customers will receive the rebate by check or bill credit from the Company upon approval of rebate qualification.	Up to \$1,000; capped at price paid
Bring Your Own Charger Rebate	A one-time rebate for Qualifying Customers with an existing Qualified L2 EVSE at a Qualifying Home, who enroll in the Smart Charging Program.	Up to \$50
Smart Charging Participation Incentive	For Qualifying Customers enrolled in the Smart Charging Program who participate in the minimum number of Managed Charging Events and Active Charging Sessions as described in this schedule. This incentive will be sent by check or as a bill credit at the next billing statement following the end of the interval period.	Up to \$50 per participation year
Smart Charging Program Reconnection Incentive	A one-time promotional incentive to encourage Qualifying Customers who unenrolled (intentionally or unintentionally) from the Smart Charging Program to re-enroll. This offer is available once per participant and at the discretion of the Company.	Up to \$25

SCHEDULE 8 (Concluded)

MANAGED CHARGING EVENTS

Customers will be randomly assigned into one of three groups: A, B, or C. Group A will be the control group and will have no demand response tactics scheduled. Group B will participate in load shifting events where charging times will be shifted away from system peak periods. Group C will have their charging slowed or stopped during event periods. The Company will strive to maintain the equal number of participants and EVSE models in each group. Managed Charged Events may be called at any hour and any weekday excluding Holidays. During Managed Charging Events, the Customer will allow the Company to control their Qualified L2 EVSE for the duration of the event. The Customer has the option not to participate by overriding via the manufacturer's mobile application.

SPECIAL CONDITIONS

1. If a Qualifying Customer moves to a different residence, the customer may continue participation in the Smart Charging Program at the new residence if the Customer meets the eligibility requirements.
2. The Company will defer and seek recovery of all Pilot costs not otherwise included in rates.
3. The provisions of this schedule do not apply for any period that the Company interrupts the Qualifying Customer's load for a system emergency or any other time that a Qualifying Customer's service is interrupted by events outside the control of the Company. The provisions of this schedule will not affect the calculation or rate of the regular service associated with the Qualifying Customer's Schedule 7 charges and associated charges.

TERM

This pilot begins October 23, 2020 and ends February 22, 2024.

**PORTLAND GENERAL ELECTRIC COMPANY
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PGE's Residential Electric Vehicle Charging Pilot

July 2020



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Acronyms

Acronym	Agency/Entity/Term
AC	Alternating Current
BEV	Battery Electric Vehicle
BIPOC	Black, Indigenous, and People of Color
DEQ	Department of Environmental Quality
DER	Distributed Energy Resource
DR	Demand Response
DRMS	Demand Response Management System
EE	Energy Efficiency
EV	Electric Vehicle
EVSE	Electric Vehicle Supply Equipment
GHG	Greenhouse Gas Emissions
IOU	Investor-Owned Utility
IRP	Integrated Resource Plan
L1 EVSE	Level 1 Electric Vehicle Supply Equipment

Acronym	Agency/Entity/Term
L2 EVSE	Level 2 Electric Vehicle Supply Equipment
NPV	Net Present Value
O&M	Operations and Maintenance Costs
OAR	Oregon Administrative Rule
ODOT	Oregon Department of Transportation
OEM	Original Equipment Manufacturer
OPUC	Public Utility Commission of Oregon
ORS	Oregon Revised Statutes
PGE	Portland General Electric Company
PHEV	Plug-In Hybrid Electric Vehicle
PTR	Peak Time Rebate Program
RECAP	Renewable Energy Capacity Planning
TE	Transportation Electrification
TEAM	Transportation Electrification Assessment Methodology
TOU	Time of Use

Key Terms and Concepts

Term	Definition
Coincident Peak	For the purposes of this report, defined as the peak demand expressed as a percent of nameplate capacity by site type during peak system demand (3 PM to 8 PM on weekdays).
Clean Fuels Credits	The Oregon Clean Fuels Program ¹ requires a ten percent reduction in the average carbon intensity of Oregon’s transportation fuels from 2015 levels by 2025. Clean Fuels Credits are generated when the carbon intensity of a specific fuel is lower than the clean fuel standard each year.
Electric Vehicle (EV)	An electric vehicle is any vehicle propelled in whole or in part by electric energy stored on board for the purpose of propulsion, and where charging of the on-board electrical storage is provided in whole or in part, through a connection to the utility distribution system. Types of EVs include, but are not limited to, plug-in hybrid EVs and battery electric vehicles.
Electric Vehicle Supply Equipment (EVSE)	The device, including the cable(s), coupler(s), and embedded software, installed for the purpose of transferring alternating current electricity at 208 or 240 volts between the electrical infrastructure and the EV.
Demand Response (DR)	Demand response programs allow electric utilities to balance the short-term supply and demand of power. It is a non-persistent intentional change in net electricity usage by end-use customers from normal consumptive patterns in response to a request by the utility. ² If demand for electricity is greater than the available supply, blackouts and brownouts can occur. To minimize the risk of both, utilities may ask customers to participate in demand response by 1. Voluntarily shifting their energy usage to off-peak hours or 2. Agreeing to allow the utility to remotely control their connected device (e.g. EVSE).
Demand Response Management System (DRMS)	System used to monitor, control, schedule, and manage PGE’s Smart Charging Program.
Incentive	A payment made to PGE employees or market partners for each new enrollment via their channel into the Pilot.

¹ Oregon Department of Environmental Quality. *Oregon Clean Fuels Program*. Retrieved from <https://www.oregon.gov/deq/aq/programs/Pages/Clean-Fuels.aspx>

² Northwest Power and Conservation Council. *Demand Response Advisory Committee*. Retrieved from <https://www.nwcouncil.org/energy/energy-advisory-committees/demand-response-advisory-committee>

Term	Definition
Level 1 Electric Vehicle Supply Equipment (L1 EVSE)	<p>EVSE that provides charging through a 120-volt (V) AC plug. Most, if not all, EV/PHEVs manufacturers will provide a L1 EVSE with the purchase of the vehicle. L1 EVSEs yield 2 – 5 miles of range per 1 hour of charging.</p> <p>Alternatively known as Chargeway Level 1.</p> <div data-bbox="544 441 982 577" style="text-align: center;"> </div>
Level 2 Electric Vehicle Supply Equipment (L2 EVSE)	<p>EVSE that provides charging through a 240V (typical in residential applications) or 208V (typically in commercial applications) AC plug. L2 EVSEs yield 10 – 20 miles of range per 1 hour of charging. Some vehicles can charge at 40 – 80 miles per 1 hour of charging.</p> <p>Alternatively known as Chargeway Level 2.</p> <div data-bbox="535 840 982 976" style="text-align: center;"> </div>
Line Extension	<p>Distribution facility upgrades (located on PGE’s side of the meter) to obtain additional capacity or a change in service conditions, such as to serve new electric vehicle charging loads. Excludes modifications to transmission or sub transmission voltage facilities or substations.</p>
Load Factor	<p>The ratio of average load over a given period to the maximum peak load in that period.</p>
Original Equipment Manufacturer (OEM)	<p>The company that manufactured the EVSE and offers cloud services and a mobile app to customers.</p>
Plug-In Hybrid Electric Vehicle (PHEV)	<p>Vehicle powered by an internal combustion engine that can run on conventional or alternative fuel and an electric motor that uses energy stored in a battery. The vehicle can be plugged into an electric power source to charge the battery. Some can travel more than 70 miles on electricity alone, and all can operate solely on gasoline (like a conventional hybrid).</p>
Port	<p>Physical plug that delivers a charge to an EV. There are commonly one or two ports per EVSE.</p>
Qualified EVSE	<p>A pre-approved L2 EVSE that meets the program’s connectivity and controllability criteria.</p>

Term	Definition
Range	The maximum amount of distance that a vehicle can travel on a single charge.
Rebate	One-time payment to motivate customer to purchase/install an asset or join one of PGE's flexible load programs (e.g. Smart Thermostats, Residential Battery Storage, Residential/Nonresidential EV charging).
Site	A physical location housing one or more EVSEs.
Smart Charging Program	Program offering EV owners monetary and/or non-monetary benefits in exchange for permitting PGE to periodically adjust the EV owner's rate or time of charge, according to the EV owner's charging needs and preferences and electric system needs.
Transportation Electrification (TE)	The empowerment and acceleration of customer's transition to electric transportation.

Preface on Procedural History

This document supersedes Section 2, Residential Charging of Portland General Electric Company's (PGE) proposal filed on February 15, 2019, in Docket No. UM 1811. Herein, PGE submits a compliance filing for a residential electric vehicle (EV) charging Pilot, separate from the business EV charging rebate pilot.³

³ Portland General Electric Company. *UM 1811 Transportation Electrification Compliance Filing*. UM 1811. Public Utility Commission of Oregon. 15 Feb 2019. Retrieved from <https://edocs.puc.state.or.us/efdocs/HAD/um1811had151943.pdf>.

Executive Summary

Portland General Electric Company (PGE) is pleased to submit our Residential Electric Vehicle Charging Pilot (Pilot) for consideration by our customers, stakeholders, and the Public Utility Commission of Oregon (OPUC or Commission). This filing satisfies the amended stipulation in OPUC Docket No. UM 1811 and the intent of the Oregon State Legislature,^{4,5} and is one of the many proposals that carries out the transportation electrification vision set forth in our 2019 Transportation Electrification (TE) Plan. PGE's TE portfolio of offerings, including the Pilot proposed herein, will play a critical role in powering the advancement of Oregon's transition to a clean energy future. Our programs will support the state's goals to decarbonize the transportation sector while ensuring that we are building a grid that can maximize value from new distributed energy resources (DERs).

PGE is committed to delivering clean, reliable, and affordable transportation fuel to our customers.

Our goals and commitments align with and support the State's commitment to TE. In 2016, the Oregon State legislature passed Senate Bill (SB) 1547, which notes "transportation electrification is necessary to reduce petroleum use, achieve optimum levels of energy efficiency and carbon reduction, meet federal and state air quality standards, meet this state's greenhouse gas emissions reduction goals" and "improve the public health safety". In 2019, SB 1044 established state-wide goals for zero-emission vehicle (ZEV) adoption, including that the vehicle market must be transformed by 2035 to meet statewide GHG reduction goals.⁶ Furthermore, in 2020, Oregon Executive Order 20-04, established that "the rapid transition from internal combustion engines to zero-emission vehicles will play a key role in reducing emissions from the transportation sector and advancing the state's GHG emissions reduction goals," and "it is in the interest of utility customers and the public generally for the utility sector to take actions that result in rapid reductions of GHG emissions... including... expanding low carbon transportation choices for Oregonians."⁷

In 2018, PGE made a commitment to lead the transformation to a clean energy future for our customers with a focus on three objectives: decarbonize our generation mix, electrify end uses, and perform efficiently and reliably. This commitment was the solidification of multiple years of working with policymakers, environmental groups, community organizations, and our customers to create the policies and programs necessary to support Oregon's overall clean energy goals. As a result of this work and because the transportation sector is Oregon's largest and fastest growing contributor to state-wide greenhouse gas emissions (GHGs),⁸ PGE is taking specific steps to ensure that clean electricity is the fuel source for Oregon's transportation system.

As a result of SB 1547, the OPUC promulgated Oregon Administrative Rules (OARs), Chapter 860, Division 087, Transportation Electrification Programs. OAR 860-087-0001 and -0020, directs PGE to file a TE Plan that sets forth the programs that PGE will propose "to accelerate transportation electrification" in its service territory. OAR 860-

⁴ In the passing of Chapter 28, Oregon Laws 2016, the state legislature acknowledges that there is a role for electric companies to play in accelerating TE.

⁵ Senate Bill (SB) 1547, Section 20.1, 78th Oregon Legislative Assembly, 2016 Regular Session. Chapter 28, 2016 Oregon Laws. Retrieved from https://www.oregonlegislature.gov/bills_laws/lawsstatutes/2016orlaw0028.pdf

⁶ SB 1044, <https://olis.leg.state.or.us/liz/2019R1/Downloads/MeasureDocument/SB1044/Enrolled>

⁷ Executive Order No. 20-04. Retrieved from https://www.oregon.gov/gov/Documents/executive_orders/eo_20-04.pdf

⁸ Oregon Department of Environmental Quality. *Statewide Greenhouse Gas Emissions*. Retrieved from <https://www.oregon.gov/deq/aq/programs/Pages/GHG-Oregon-Emissions.aspx>

087-0030, sets forth that “[a]n electric company must file an application with the Commission for each program to accelerate transportation electrification,” and the requirements for that application.

In February 2018, the OPUC adopted in part and modified in part a stipulation which included an agreement for future TE program proposals, specially a residential home charging, workplace, and/or fleet charging programs.⁹ In PGE’s 2019 TE Plan, we estimated about 100,000 EVs in PGE’s service territory by 2025, powered by over 40,000 residential Level 2 electric vehicle supply equipment (L2 EVSE).¹⁰ In response to these changing legislative and market dynamics, PGE proposes the following Pilot.

Faster, reliable, and convenient home charging is critical to the clean fuel transformation.:

This Pilot is one of the many offerings PGE will implement under our TE Plan portfolio of programs—designed to promote customer choice and utility product innovation.¹¹ PGE designed this Pilot to:

- Increase adoption of EVs and home charging stations by enhancing the customer value proposition for going electric.
- Identify and test how grid connected EVSEs and smart home charging practices decreases the costs to serve EV loads by minimizing bulk system capacity needs and constraints, as well as non-coincident peak loads to minimize the need for distribution system upgrades.
- Provide PGE the learnings and experience necessary to efficiently scale this and similar pilots to a full-scale program.
- Increase visibility of home charging load profiles and awareness of charging deployments across the distribution system.
- Enable future offerings that leverage home charging telemetry (e.g. specialized billing, such as sub-metered time-of-use, or TOU).

The Pilot includes rebates and incentives designed to encourage participation, which will allow PGE to test key elements of our ability to accelerate TE along with critical aspects of EV grid integration through our Smart Charging Program. By limiting the scope in the form of a pilot, PGE can assess the impact on customers, our business processes, the market, and other key factors before rolling out a full-scale program to all customers.

The Pilot consists of three components, which PGE will offer to single-family customers¹² over a three-year period:

1. Installation of a qualified L2 EVSE (customers with existing chargers may also qualify for a rebate);
2. Participation in PGE’s Smart Charging Program; and
3. Market partner referrals.

⁹ OPUC. *Order No. 18-054. OPUC Docket No. UM 1811*. 2018 Feb 16. Retrieved from <https://apps.puc.state.or.us/orders/2018ords/18-054.pdf>

¹⁰ PGE 2019 Transportation Electrification Plan, Table 21 – PGE Service Area EV Forecast through 2050 by Vehicle Type (Reference Case) and Table 22 – EV Charging Future Needs: Port Count, by Use Case, Year, and Charger Type. <https://www.portlandgeneral.com/-/media/public/our-company/documents/pge-2019-transportation-electrification-plan>.

¹¹ PGE 2019 Transportation Electrification Plan, Sec. 2.2.2.3.3.

¹² Single family includes separately metered apartment or condominium units.

Table 1: Summary of Pilot’s Offerings

Pilot Component	Offering	Amount
Installation	Standard EVSE Installation Rebate	up to \$500; capped at price paid
Installation	Income-Eligible EVSE Installation Rebate ¹³	up to \$1,000; capped at price paid
Installation	Bring Your Own Charger (BYOC) Rebate	up to \$50
Smart Charging	Smart Charging Participation Incentive	up to \$50
Smart Charging	Smart Charging Reconnection Incentive	up to \$25
Referral	Referral Incentive	up to \$100

Eligible expenses for the installation rebates include product costs, applicable permits, and installation costs. Qualification for and acceptance of either the Standard EVSE Installation Rebate, Income-Eligible EVSE Installation Rebate, or the BYOC Rebate, along with verified installation of the EVSE, will automatically enroll customers into PGE’s Smart Charging Program. PGE will use referral incentives to leverage key market partnerships (e.g. dealership networks, community-based organizations or CBOs) to bring awareness of the Pilot to residential customers.

PGE will monitor the participation, adoption, customer satisfaction, and customer effort rates of the various offerings and incentives and adjust aspects of the Pilot as needed to achieve the participation rates and grid benefits needed across the Pilot and our TE portfolio. We will further evaluate the Pilot based on phases and metrics designed to guide PGE’s pilot to program decision-making for this offering. Should the Pilot prove mature enough to move to a program before the end of the three-year period, PGE will submit to the Commission the necessary evaluation report and details to support full-scale deployment of a program.

As our customers’ trusted energy partner, PGE brings a balance of technical knowledge and customer acumen to deliver programs that accelerate TE and create value for the grid. We believe this Pilot (and eventually the program) will make installing home EVSEs more affordable, simplify the experience around installing charging infrastructure, increase the number of charging points in PGE’s service territory, and create a pathway to capture and quantify new flexible energy resources.

Comprehensive electrification of the transportation system must be equitable and cost effective.

PGE understands that focusing solely on private vehicle electrification would allow most of the TE benefits to flow to wealthier communities, leaving our more vulnerable, frontline communities¹⁴ to continue to be impacted from transportation emissions. To ensure an equitable and just transition to the clean energy future, PGE’s evolving TE Portfolio provides solutions to address the access and affordability gaps that otherwise exist in the transportation sector. For example, PGE’s Electric Avenue network has paved the way for more charging infrastructure to be accessible to all EV drivers. Our work with TriMet is focusing on the electrification of the mass transit system, which is the dominant means of transportation for many in our community, including Black, Indigenous, and people of color (BIPOC), and low-income individuals. Our proposed TE line extension allowance updates to PGE’s Schedule 300 to will allow us the opportunity to make transformative investments in TE such as more charging

¹³ The amount of the participant’s rebate is based on the participant being at 80% or below the area median income as defined by the US Department of Housing Urban Development, or the home qualifies for Section 8 housing.

¹⁴ Frontline communities include, but are not limited to, Black and Indigenous people, communities of color, immigrants, refugees, people with disabilities, and low-income individuals.

infrastructure at multifamily residential buildings and assisting our municipal partners in electrifying their fleets.¹⁵ This holistic approach is necessary to deliver the charging infrastructure our customers need, while addressing the air quality and public health impacts of the transportation sector’s emissions on our communities, particularly frontline communities. Moreover, a broader approach allows PGE to align the proposed Pilot with other incentive programs, such as the Energy Trust of Oregon’s Savings Within Reach program, to ensure the benefits of the program flow to more communities.

In addition to an equitable approach, PGE has designed the Pilot’s incentives to deliver benefits to participating and non-participating customers. PGE **Table 2** shows some of the associated benefits for the Pilot offerings and incentives.

Table 2: Pilot Benefits to Customers and PGE

Offering/Incentive	Customer Benefits
Standard EVSE Installation Rebate	<ul style="list-style-type: none"> ▪ Lowers the upfront purchasing costs of a qualified L2 EVSE which lowers the total cost of EV ownership ▪ Streamlines the charger purchase and installation process, eliminating the need for customers to navigate the market and installation process on their own ▪ Increases energy sales and overall billing determinant (potential for downward rate pressure) ▪ Enrollment in PGE’s Smart Charging Program
Income-Eligible EVSE Installation Rebate	<ul style="list-style-type: none"> ▪ Increases equitable access to L2 EVSEs and the use of electricity as a fuel source ▪ Streamlines the charger purchase and installation process, eliminating the need for customers to navigate the market and installation process on their own ▪ Increases energy sales and overall billing determinant (potential for downward rate pressure) ▪ Enrollment in PGE’s Smart Charging Program
Bring Your Own Charger (BYOC) Rebate	<ul style="list-style-type: none"> ▪ Increases energy sales and overall billing determinant (potential for downward rate pressure) ▪ Enrollment in PGE’s Smart Charging Program
Smart Charging Participation Reward	<ul style="list-style-type: none"> ▪ Participation in a clean energy future ▪ Potential to reduce energy usage and earn money that reduces their utility bill or total cost of EV ownership
Smart Charging Reconnection Incentive	<ul style="list-style-type: none"> ▪ Re-engagement with Smart Charging Program ▪ Renewed potential to reduce energy usage and earn money that reduces their utility bill or total cost of EV ownership
Referral Incentive	<ul style="list-style-type: none"> ▪ Increased customer education/outreach

As demonstrated in **Table 3**, PGE estimates that the proposed Pilot will have a 14-year net present value (NPV) net cost of -\$0.4M (which includes \$11.4M in benefits and \$10.9M in costs).

¹⁵ PGE will be filing updates to the line extension allowance in Schedule 300

Section 5: Cost Effectiveness provides a more detailed breakdown of the benefits and costs of this pilot.

Table 3: Estimated TE Program Financial Summaries (14-year NPV)

Estimated NPV of Pilot	Pilot \$M
Program Benefits ^A	\$11.4
Program Costs ^B	\$10.9
Net Cost	-\$0.4

Notes:

The net cost is the NPV of the costs less the NPV of the benefits over the lifetime of the program. For this Pilot, the Smart Charging Program is assumed to continue for 14 years, as chargers have a useful life of 10 years and participants are enrolled in the Pilot and receive incentives over a four-year period.

^A Program Benefits include increased revenues from new electricity sales and avoided capacity costs (estimated for residential demand response, or DR).

^B Program Costs include incremental supply costs (capacity and energy), administrative costs, incentives, and capital costs.

As we move forward our transformational approach to TE to address the impacts of climate change, we are also mindful of the economic realities created by the COVID-19 pandemic that our customers are facing. Consequently, we will use prior customer surveys and a continuous assessment of the market and/or policy landscape to guide us in how and when we launch, market, and move between the different phases of the Pilot.¹⁶ We look forward to working collaboratively and expeditiously with the Commission and stakeholders to launch this Pilot in 2020 and support our communities' clean energy goals.

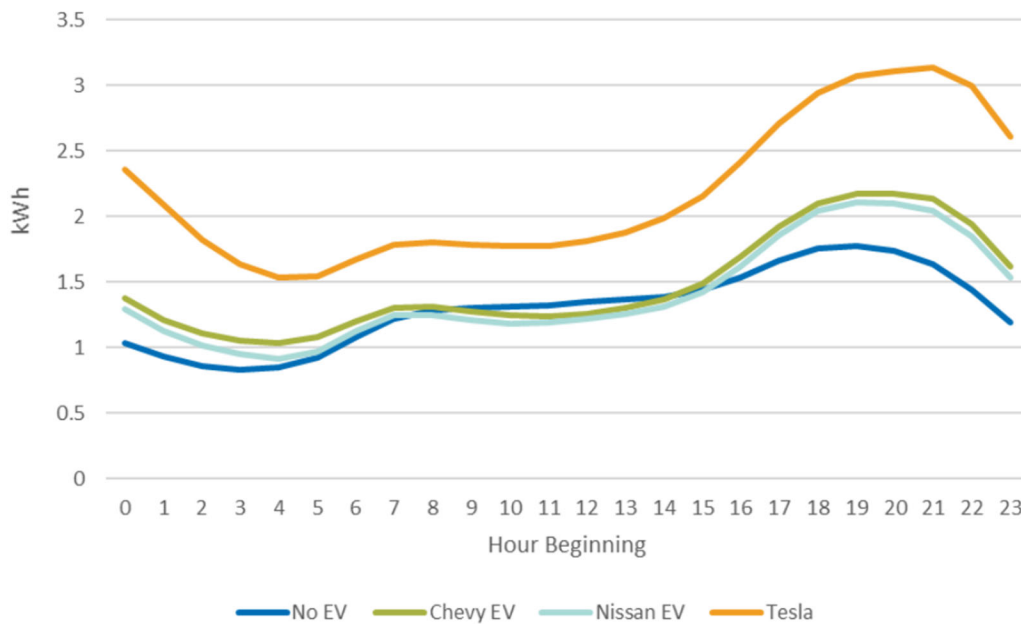
¹⁶ Portland General Electric – EV Community Research – Synthesized Report (December 2019)

Section 1: The Case for Residential Charging

Transitioning fossil-fueled vehicles to EVs is critical to the transformation of the transportation sector. Residential charging squarely addresses SB 1547’s mandate that directs Investor-Owned Utilities (IOUs) to file applications with the Commission for programs to accelerate TE and states that “transportation electrification is necessary to reduce petroleum use, achieve optimum levels of energy efficiency and carbon reduction, meet federal and state air quality standards, meet this state’s greenhouse gas emissions reduction goals” and “improve the public health and safety.”¹⁷ Such programs “may include prudent investments in or *customer rebates for EV charging* and related infrastructure (emphasis added).”¹⁸ These programs are to be consistent with the Oregon Legislative Assembly’s findings related to TE, including that widespread TE requires that: 1) Electric companies “increase access to the use of electricity as a transportation fuel” (especially in “low and moderate income communities”); and 2) “The purchase and use of EV should assist in managing the electrical grid.” Moreover, TE programs create the potential for attaining a “net benefit for the customers of the electric company.”¹⁹ PGE’s proposed Pilot addresses each of these requirements.

Additionally, PGE’s 2019 TE Plan estimates there will be approximately 100,00 EVs in our service territory by 2025, powered by over 40,000 residential L2 EVSE.²⁰ **Figure 1** estimates the impacts of different types of EV on the average annual load profile of a home (pre-COVID).

Figure 1: Residential Average Annual EV Home Load Shape by Car Manufacturer in PGE’s Service Area²¹



¹⁷ SB 1547, Sec. 20.1. SB 1547 also focused on eliminating coal from the electricity supply, increasing renewable energy production, promoting alternative technologies that reduce carbon and/or aid the efficient integration of renewables onto the grid.

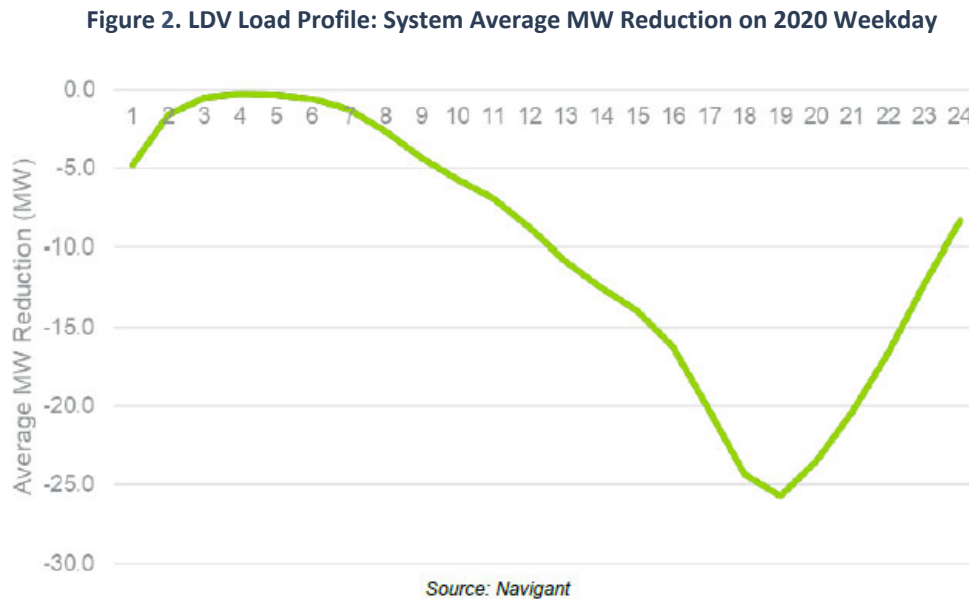
¹⁸ Ibid, Sec. 20.3

¹⁹ Ibid, Sec. 20.2

²⁰ PGE 2019 Transportation Electrification Plan, <https://edocs.puc.state.or.us/efdocs/HAA/haa102039.pdf>, Table 21 – PGE Service Area EV Forecast Through 2050 by Vehicle Type and Table 22 – EV Charging Future Needs: Port Count, by Use Case, Year, and Charger Type.

²¹ PGE 2019 TE Plan, Figure 9 – Residential Annual Average EV Load Shape by OEM, PGE Service Area

Figure 2 from the 2019 Navigant *Distributed Resource and Flexible Load Study* (Navigant Study) conducted for PGE’s 2019 Integrated Resource Plan (IRP), shows the potential impact of light duty vehicle (LDV) charging on PGE’s evening system peak (pre-COVID).²²



While PGE is still assessing the impact of COVID-19 on the home hourly load shapes and will need to monitor this Pilot for any shifts in our assumptions regarding PGE’s peak load hours, it is still critical that we partner with our customers and market partners to understand home EV charging and to manage the impacts of residential EV charging on our system. This Pilot will allow PGE to gain the tools and competencies necessary for us to fully manage and influence the role of EVs as a flexible load resource in the future.

²² Navigant Consulting (April 2019). *Distributed Resource and Flexible Load Study*. Available: Portland General Electric Company’s 2019 Integrated Resource Plan, External Study C, Prepared for Portland General Electric. (<https://www.portlandgeneral.com/-/media/public/our-company/energy-strategy/documents/2019-integrated-resource-plan.pdf?la=en>).

Section 2: Pilot Overview

PGE’s Pilot encourages customers to deploy connected qualified L2 EVSE at their homes. The Pilot delivers on the criteria the Oregon Legislature directed the Commission to consider when evaluating utility investments in TE programs.²³ While PGE is proposing a Pilot and not a program, we believe our proposed Pilot accomplishes these objectives by applying the following criteria:

- **The program will be in the utility’s service territory.** PGE will incent the installation of chargers in up to 5,000 single-family homes in our territory.
- **The program will be prudent.** While prudence is ultimately at the discretion of the OPUC, PGE will work to ensure all Pilot expenditures are reasonable and designed to maximize benefits for customers and maximize learnings.
- **The program’s offerings will be used and useful.** By providing more customers the option to charge their vehicles at home, PGE will be able to use these assets to explore the challenges and benefits of various load management services, including demand response (DR) events, dynamic pricing, and other offerings that are used and useful for all customers.
- **The program will improve grid efficiency and operational flexibility (including renewable integration).** The Pilot’s incentives will require EVSEs to be connected and available for control by the utility to support the integration of renewables on the grid.
- **The program will stimulate innovation, competition, and customer choice.** The Pilot will facilitate and accelerate the adoption of EV chargers, and indirectly, EVs in PGE’s service territory. It will also support the marketplace and customer uptake for networked, controllable L2 EV chargers, while exploring different pricing options and data collection technologies.

2.1. Pilot Rebates and Incentives

PGE is limiting this pilot to 5,000 participants, who can receive an installation rebate. **Table 4** describes the Pilot’s specific participation goals. **Table 5** summarizes the incentives that the program will offer to support and facilitate the above-referenced Pilot features.

Table 4. Projected Program Participation (~3-year period, Residential EV Charging)

Incentive	Projected Participation
Standard EVSE Installation Rebates	4,500 incentivized installations
Income-eligible EVSE Installation Rebates	500 incentivized installations
Total EVSE Installation Rebates	5,000 installations

Additionally, PGE will automatically enroll all customers that receive an installation rebate into the Company’s Smart Charging Program. The Smart Charging Program will allow PGE to control a customer’s EVSE to reduce load

²³ 78th Oregon Legislative Assembly, 2016 Regular Session. https://www.oregonlegislature.gov/bills_laws/lawsstatutes/2016orlaw0028.pdf Oregon Laws 2016.

on the grid, shift load to off-peak hours, integrate renewables, and a host of other flexible load events. In exchange, customers will receive an annual incentive of up to \$50. As shown in [Table 5](#), PGE will offer additional incentives and rewards to encourage and support customer participation in the Smart Charging Program. Table 5 also lists the maximum amount for each offering.

Throughout the Pilot, PGE will communicate the current offering amounts on the Company’s website, PortlandGeneral.com, and through Pilot applications and marketing materials. PGE will test the impact on customer adoption of the installation incentives or customer satisfaction with the Smart Charging Program by initially offering the maximum amounts to all customers and adjusting the amounts throughout the Pilot as needed. For the Referral Incentive, PGE will offer all market partners a lower amount than the maximum and adjust as needed. PGE will reevaluate the offering amounts prior to each phase and post any changes to the incentives on the Company’s website and all relevant marketing materials.

Table 5. Residential EV Charging Offering Details

Offering	Maximum Offering Amount	Frequency	Description
Standard EVSE Installation Rebate	up to \$500; capped at price paid*	One-time	For the purchase and installation of a Qualified L2 EVSE at a Qualifying Home. PGE will automatically enroll Qualifying Customers into the Smart Charging Program. <i>*Eligible expenses include product costs, applicable permits, and installation labor and material expenses.</i>
Income-Eligible EVSE Installation Rebate	up to \$1,000; capped at price paid*	One-time	For qualifying income-eligible Qualifying Customers for the purchase and installation of a Qualified L2 EVSE at a Qualifying Home. PGE will automatically enroll Qualifying Customers into the Smart Charging Program. <i>*Eligible expenses include product costs, applicable permits, and installation labor and material expenses.</i>
Bring Your Own Charger (BYOC) Rebate	up to \$50	One-time	For Qualifying Customers with an existing Qualified L2 EVSE at a Qualifying Home. PGE will automatically enroll Qualifying Customers into the Smart Charging Program.
Smart Charging Participation Incentive	up to \$50 per participation year*	PGE determined intervals	For Qualifying Customers enrolled in PGE’s Smart Charging Program and who participate in the minimum number of smart charging events as described in this schedule. The minimum participation requirements during the participation year include: <ol style="list-style-type: none"> 1. EVSE is successfully connected to the Smart Charging Program 50% of the participation year* 2. EVSE participates in six (6) events 3. Complete 25 active charging sessions <i>*Participation year is defined as 12 consecutive months from the anniversary date of enrollment into PGE’s Smart Charging Program.</i>
Smart Charging Program Reconnection Incentive	up to \$25	One-time; Promotional	To encourage Qualifying Customers who unenrolled (intentionally or unintentionally) from the Smart Charging Program to re-enroll. The offer is only available once per participant.

2.2 Pilot Test Launch

Upon approval by the Commission, PGE plans to conduct a Test Launch of the pilot. The Test Launch will allow PGE to test the market and key aspects of the pilot with a smaller group of customers. Specifically, PGE will test market messages, the enrollment experience, and technology integrations and connectivity necessary for the grid services aspects of the pilot. PGE would like to conduct this Test Launch in Q4 2020 with up to 100 participants but will adjust the launch and other portions of the schedule as necessary to align with regulatory approvals of the Pilot.

2.3 Pilot Grid Benefits

This program has two primary grid benefits: new revenues associated with electrification and reduced costs to serve EV loads through the grid services created by demand response. For evaluating the Pilot, PGE will allocate the costs associated with Standard and Income-Eligible EVSE Installation Rebates to the mass market electrification benefits, while the BYOC rebate and the Smart Charging Program incentives are allocated to the DR value. This is done, in part, because the participants accepting the Standard and Income-eligible rebates are automatically enrolled the Smart Charging Program where as BYOC participants are induced to participate with a \$50 incentive. In the future as this program scales, we may offer an electrification and a DR acquisition incentive to customers installing qualifying equipment. As we have learned from opt-out and opt-in Peak Time Rebate (PTR) DR value can be different depending upon the channel through which the customer engages. **Table 6** shows the initial rebate amounts that PGE is allocating to the EV program and the Smart Charging Program (DR value).

Table 6. Initial Cost-Effectiveness Values for EV Program and Smart Charging Program

Offering	Initial Rebate	EV Program Value	Smart Charging Program (DR) Value
Standard EVSE Installation Rebate	up to \$500	\$500	\$0
Income-Eligible EVSE Installation Rebate	up to \$1,000	\$1,000	\$0
Bring Your Own Charger (BYOC) Rebate	up to \$50	\$0	\$50

Section 3: Market Information

3.1 Pandemic Impacts

PGE acknowledges that we are in uncharted waters with the COVID-19 global pandemic. The impacts of this pandemic are manifesting daily. PGE conducted the market research in the subsequent sections before this pandemic. While PGE does not currently have updated research addressing the impact of COVID-19, PGE will consider and monitor the market to determine what adjustments, if any, we must make to the Pilot. PGE will also rely on customer surveys and feedback to guide the implementation and management of this Pilot.

3.2 EV Buyer Needs and Wants

Based on customer surveys²⁴ and PGE’s 2019 TE Plan,²⁵ EV buyers in PGE’s service territory continue to face many barriers to EV ownership (as shown in **Table 7**, and for the early adopters and innovators these barriers produce specific EV buyer motivations.

Table 7: Motivators and Barriers

Motivators	Barriers
<ul style="list-style-type: none"> ▪ Lower fuel costs ▪ Protecting the environment ▪ Less maintenance required ▪ Tax credits and other incentives 	<ul style="list-style-type: none"> ▪ Lack of Customer Awareness ▪ Significant cost or price premiums for EVs or Plug-In Hybrid EVs (PHEVs) ▪ Lack of available public charging infrastructure ▪ Driving distance between charges (fueling/range anxiety) ▪ Lack of equitable access to EVs and infrastructure

Specifically, early EV adopters and potential EV buyers want:

- Access to affordable, low carbon transportation;
- Easy, accessible, and fast charging; and
- Recognition for making smart, knowledgeable, and environmentally friendly technology choices.

To accomplish these goals, particularly in the context of residential charging, these customers need:

- Education to help quantify the benefits of EVs and home charging;
- Education on the tax credits and incentives available to reduce the high costs of an EV;
- Education and assistance with selecting smart home charging equipment; and
- Incentives to reduce the high cost of a home charger and installation.

EVSEs and their installation represent an incremental cost²⁶ for EV buyers, which neither EV manufacturers nor dealers address during the EV sales process. This Pilot seeks to address the barriers and support the needs and

²⁴ Market Strategies International. Portland General Electric 2018 Electric Vehicle Survey (Among Residential Customers). (October 31, 2018).

²⁵ PGE’s 2019 Transportation Electrification Plan, Section 1.2, Market Barriers at 24-8. <https://www.portlandgeneral.com/-/media/public/residential/electric-vehicles-charging-stations/documents/pge-ev-plan.pdf?la=en>

²⁶ Agenbroad, Josh (2014, April). *Pulling Back the Veil on EV Charging Station Costs*. Rocky Mountain Power Institute. Retrieved from <https://rmi.org/pulling-back-veil-ev-charging-station-costs/>

wants of customers seeking to make the transition from gas-fueled vehicle to EV, while increasing customers' connectivity and the opportunity for them to receive compensation for supporting PGE's grid operations.

3.3. EV Buyer Characteristics and Target Market Size

The annual household income for typical buyers of EVs is greater than \$60,000. Despite this, PGE found that all income groups desire to drive green, eliminate the use of fossil fuel to meet their transportation needs, and are generally supportive of and/or are existing participants in PGE's green programs (e.g. renewable power, DR, paperless billing).

According to the Navigant Study, between 2020 and 2050, LDV adoption in PGE's service territory will grow about 60x what it was in 2019. Because of the lower Total Cost of Ownership, BEVs will slightly out pace PHEV adoption. Pre-pandemic, Navigant forecast PGE's service area to have approximately 27,000 vehicles by the end of 2020. This 27,000 represents approximately 1.4 percent of the market—growing to 35 percent of the market by the 2050 (i.e. 857,000 EVs in PGE's service territory).²⁷

Further, PGE estimates that the market size of potential EV adopters in our service territory (innovators through early majority) is approximately 240,000 households. Roughly 30% of these prospective customers are not able to install a home charger because they live in non-owner-occupied housing or have a physical/legal barrier to installing an off-street charger. This leads to a potential target market size of 160,000 installed home chargers (participating households).

3.4. EV Sales Medium Term Outlook (through 2025)

The Pilot addresses the need for convenient and fast home charging in pursuit of Oregon's state goal of 100,000 registered electric passenger vehicles by the end of 2025. For the 2019 IRP, PGE contracted with Navigant to conduct a DER Study,²⁸ which forecasts the adoption of 99,000 light duty EVs in PGE's service area by 2025. The Navigant study further estimates that Battery Electric Vehicle (BEV) and PHEV sales will reach a velocity of approximately 21,000 new registrations per year in PGE's service territory in 2025.²⁹

3.5. Eligible Target Market Size During Pilot Period

In August 2019, over 26,000 of the registered vehicles in Oregon were BEVs or PHEV. By June 1, 2020, that number has increased to just over 32,000.³⁰ To forecast program participation, PGE estimates that between Q4 2020 and 2023 there will be approximately 17,000 new, incremental EV sales in our service area.³¹ Adjusting this total for fleet sales, non-qualifying new installations of EV chargers, and customers that do not have the option to install

²⁷ Navigant (2019). *Distributed Resource and Flexible Load Study, External Study C of the PGE 2019 IRP*. See section 3.1 at 11. Available: <https://www.portlandgeneral.com/our-company/energy-strategy/resource-planning/integrated-resource-planning>

²⁸ Id. See section 5.1.

²⁹ The estimate does not include registrations of plug-in hybrid electric vehicles (PHEVs) in PGE's service territory. PHEVs have lower battery capacities than BEVs. PHEV owners are also less likely to install L2 home chargers.

³⁰ Go Electric Oregon. <https://goelectric.oregon.gov/50k-by-2020> (accessed on July 4, 2020).

³¹ The forecast model uses high-level macroeconomic factors like gross domestic product and population as well as vehicle density and historic sales data to project overall LDV market growth. These forecasts are helpful for sizing program adoption but are not intended to suggest that there is not a need to accelerate TE. There is a need to accelerate TE as the forecast levels of EV adoption are not on pace to meet the Governor's 50,000 EV goal by 2020, nor are they sufficient to meet the state's greenhouse gas reduction goals. PGE expects that programs like this one will add to the customers' value proposition when considering an EV and, in turn, will accelerate transportation electrification.

an EV home charger (among other factors), PGE estimates that greater than 7,700 qualifying EV home chargers will be installed during the approximately three-year term of the Pilot (see [Table 8](#) for details).

PGE expects that some of these EV chargers, despite being the correct model, will not receive incentives for the installation of the equipment and/or participation in DR events due to lack of awareness of the program and/or non-timely submission of incentive applications, among other factors. PGE will cap Pilot participation to 5,000 customers.

Table 8 Estimated Annual EV Sales and Installations of Eligible EV Home Chargers in PGE’s Service Territory

Sales by Year	Q4 2020	2021	2022	2023	Total
Annual New EV Sales³²	884	4,296	5,461	6,553	17,194
Annual Installations of Qualifying Charging Stations	398	1,933	2,457	2,949	7,737

³² Ibid.

Section 4: Pilot Details

4.1. Pilot Delivery

The Pilot will provide incentives to PGE customers for the installation of qualifying connected EV home chargers³³ as well as annual performance incentives for participation in the Smart Charging Program. PGE has structured the Pilot around delivery channels, qualified products, and incentives as detailed in the following sections.

4.2 Delivery Channels

PGE considered existing market realities, collaborative opportunities, and participation paths when identifying the delivery channels by which the Pilot will enter the market.

4.2.1 Dealerships

The first delivery channel is via EV dealers. PGE will recruit and train select EV dealerships (based on variables that include EV sales and willingness to engage) on EV charger rebates and the Pilot offering. PGE expects dealers to play a vital role in bridging the gap between the purchase of an EV and the need for fast and convenient charging infrastructure. At the start of the Pilot, PGE focus on the dealership's ability to influence customer interest in the Pilot at the time of purchase. PGE will offer dealerships a process where they can refer customers that would like to learn more about the Pilot's offerings. Once PGE can successfully contact the customer, PGE will provide the dealership the referral incentive. As the Pilot matures, PGE will evaluate the dealership's ability to influence a successful installation of a qualified EVSE and the best way to incorporate a referral incentive. By engaging with customers at the time of purchase, PGE expects higher Pilot participation.

4.2.2 BYOC Channel

The second delivery channel is "bring-your-own charger", which addresses customers that already had a qualified EVSE installed prior to the effective date of the Pilot. The customer will be responsible for meeting Pilot requirements and must provide supporting documentation. PGE will work with Original Equipment Manufacturer (OEMs) to promote the Pilot to existing users.

4.2.3 Trade Ally Network

The third delivery channel is a trade ally network. This network of electricians will have knowledge of qualifying EVSEs and the Pilot's offerings. PGE will promote these trade allies on the Pilot's product information page on the Company's website and heavily recommend customers use a trade ally. PGE will also refer customers to the Energy Trust of Oregon's trade ally portal, as well as work with them to ensure that its trade allies have sufficient information to market the Pilot's incentives in conjunction with any relevant Energy Trust incentives.

4.2.4 Self-Installation

The fourth delivery channel is via self-installations, which addresses customers who choose to install a qualified EVSE on their own, without the use of a trade ally. Customers are responsible for meeting Pilot requirements and must provide the supporting documentation set forth in the tariff. PGE will work with OEMs to promote the EVSE installation rebates and Smart Charging Program to new and potential buyers.

³³ The exact characteristics of a qualifying charger will be based on an RFI and related responses by vendors.

4.2.5 *Community Based Organizations*

The fifth delivery channel is local CBOs and agencies. By working with local CBOs, PGE can leverage the relationships these organization have with low- and moderate- income communities—allowing PGE to tailor its education and outreach to serve the specific needs of the communities which often have less access to charging infrastructure. PGE believes that this outreach will encourage low- to moderate- income households to gain more knowledge and awareness on EVs, the state and federal incentives available towards the purchase or lease of an EV, and ultimately to enroll in PGE’s Pilot. Additionally, information we gain from CBOs may help PGE in determining the right amount for the Income-eligible EVSE installation incentive, another reason why PGE is requesting flexibility in setting the amount of the incentive for all participants.

4.3. Qualified Product List

PGE will maintain a list of qualified EVSEs to ease the charger selection process, as well as to ensure customer and Pilot success. The Qualified Product List (QPL) provides customers the information on which L2 EVSEs qualify for the Pilot’s rebates. PGE will establish the QPL before the official launch of the Pilot and make the list available on the Company’s website, and to dealers, trade allies, and community organizations.

Selection criteria for PGE’s QPL will include:

- EVSE must be a UL-listed, Level 2 EVSE and capable of operating with an input voltage of at least 208/240VAC, a maximum output amperage of a least 20 amps, and designed for residential use.
- EVSE must be capable of connecting to a customer’s local area network via wired or wireless protocols.
- EVSE must be capable of participating in demand response events by reducing the power output of, stopping, and starting active charging sessions.
- EVSE must be capable of integration with a third-party distributed energy resource management platform of PGE’s choosing.
- EVSE must provide a satisfactory user experience, including unboxing, installation, set-up, and control via mobile and web-based applications.

4.4. OEMs & DRMS

Given the financial investments, staffing needs, and information technology resources required to establish connectivity between the OEM and Demand Response Management System (DRMS), it is essential for PGE to be rigorous in its selection and commitments. The DRMS will dispatch participating chargers during grid services events. L2 EVSE in the field will connect to the OEM’s operating system via an interconnection supported by the customer’s local area network. This standard practice allows customers to check on their charging status via a web-based or mobile application. The OEM operating system in turn will connect to the DRMS. This connection allows the DRMS to manage the charger (within OEM’s and Pilot’s parameters) during Smart Charging Program events.

4.5. Rebates & Incentives

PGE will use a mixture of rebates and incentives to help customers overcome the financial burden to EV adoption and home charging installation. Additionally, incentives will help encourage collaboration by market actors (midstream incentive) as well as customers (Smart Charging Program participation). The Pilot includes:

- Installation Rebates;
- Enrollment Rebate;
- Smart Charging Participation Incentive; and
- Midstream referral incentive as detailed in the following sections.

PGE will reserve the right to adjust the rebate and incentive levels during the Pilot period. The Pilot design assumes that there will be an ability to reduce the incentive levels in future periods, if necessary, depending on the Pilot uptake and whether it is necessary to prevent free ridership. Customer may enroll into the program through September 30, 2023.

4.6. Installation Rebate

The installation rebate will help lower the total costs involved in installing a qualifying connected EVSE and can increase depending on the participating customer's income level. Customers are eligible to receive an installation rebate of **up to \$500** towards the installation of a qualified EV charger installed at the customer's home. Income-eligible customers are eligible to receive an installation rebate of **up to \$1,000** toward the installation of a qualified EV charger installed at the customer's premise. During the application process, customers will have the opportunity to opt-into PGE's Schedule 7 TOU rate. PGE will automatically enroll all applicants into the Smart Charging Program.

Customers with an existing qualified EVSE are *not* eligible to receive an installation incentive if they submit their application for the incentive more than 90-days after the qualified equipment is purchased (for self-installs) and/or more than 90-days after a qualified trade ally installation has occurred.

4.8. BYOC Incentive

Customers with an existing qualifying EVSE that have not received (and are not eligible for) an Installation Incentive, but exhibit verified charging activity, are eligible for a one-time incentive **up to \$50**. During the application process, customers will have the opportunity to opt-into PGE's Schedule 7 TOU rate. PGE will automatically enroll all applicants into the Smart Charging Program.

4.9. Smart Charging Participation Incentive

PGE will utilize the smart charging incentive to encourage customers to keep their EVSE connected to PGE's DRMS and participating in flexible load events. Qualifying Customers will receive this incentive either annually or at intervals PGE determines is appropriate to incent and maintain customer participation. PGE will pay customers **up to \$50** for their successful participation in the Smart Charging Program. [Table 5](#) and the proposed operating tariff for this Pilot provide PGE's minimum participation requirements.

Customers must successfully complete the minimum requirements over the participation year to receive the incentive. The Smart Charging Participation incentive is subject to change depending on the Pilot’s uptake, with the goal of encouraging participation in this component during the Pilot period to ensure adequate learnings.

4.10. Smart Charging Reconnection Incentive

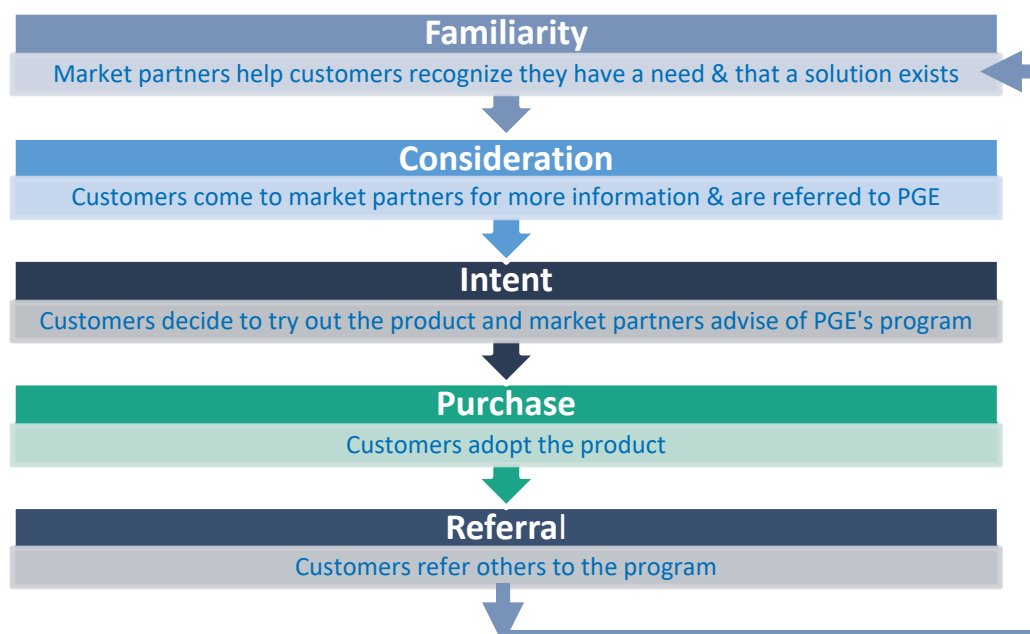
PGE estimates that roughly 25% of customers automatically enrolled into the Smart Charging Program will stop actively participating (events, active charging, connection to DRMS) due to several reasons (e.g. connectivity issues, loss of engagement) during the Pilot period. PGE reserves the right to pay a one-time promotional incentive of **up to \$25** to encourage customers to re-engage with the Smart Charging Program, offered at PGE’s discretion. PGE plans to use this offering to maintain active enrollment levels in the Smart Charging component of the program, and to better understand customer engagement and communication issues specific to EVs and EVSEs ownership.

4.11. Referral Incentive

Referral incentives are an established practice in the appliance industry to encourage market partners to promote products and provide guidance towards good customer solutions. PGE believes that offering these incentives will increase customer awareness and enrollment into the Pilot.

PGE will utilize Referral Incentives to engage various market partners (e.g. dealers, trade allies, PGE employees, community-based organizations) to drive the adoption of new and existing qualified EVSE. PGE intends to offer **up to \$100** Referral Incentives to market partners for customer referrals. Initially, PGE will provide smaller incentives for referrals of qualified leads (i.e. contact information for PGE customers expressing an interest in an L2 EV charger). These initial incentives will assist PGE in understanding each market partners’ influence at various stages of the customer buying cycle, as shown in [Figure 3](#).

Figure 3. General Customer Buying Cycle



PGE will measure the success rate of our market partners to determine such things as which channels have a higher referral to enrollment conversion rate for the Standard and Income-eligible EVSE Installation rebates. The Company will also provide market partners with sufficient Pilot details and resources to learn more about the Pilot, EVs, EVSEs, and other incentives. As PGE gains understanding of the influence market partners have on customer interest in the Pilot, we may increase or decrease the referral incentive accordingly, with the intent of driving more referrals leading to the purchase of a qualified EVSE and/or installation of a Qualified EVSE. PGE will work with market partners to implement referral caps at the beginning of each phase of the Pilot.

4.14. Smart Charging Program

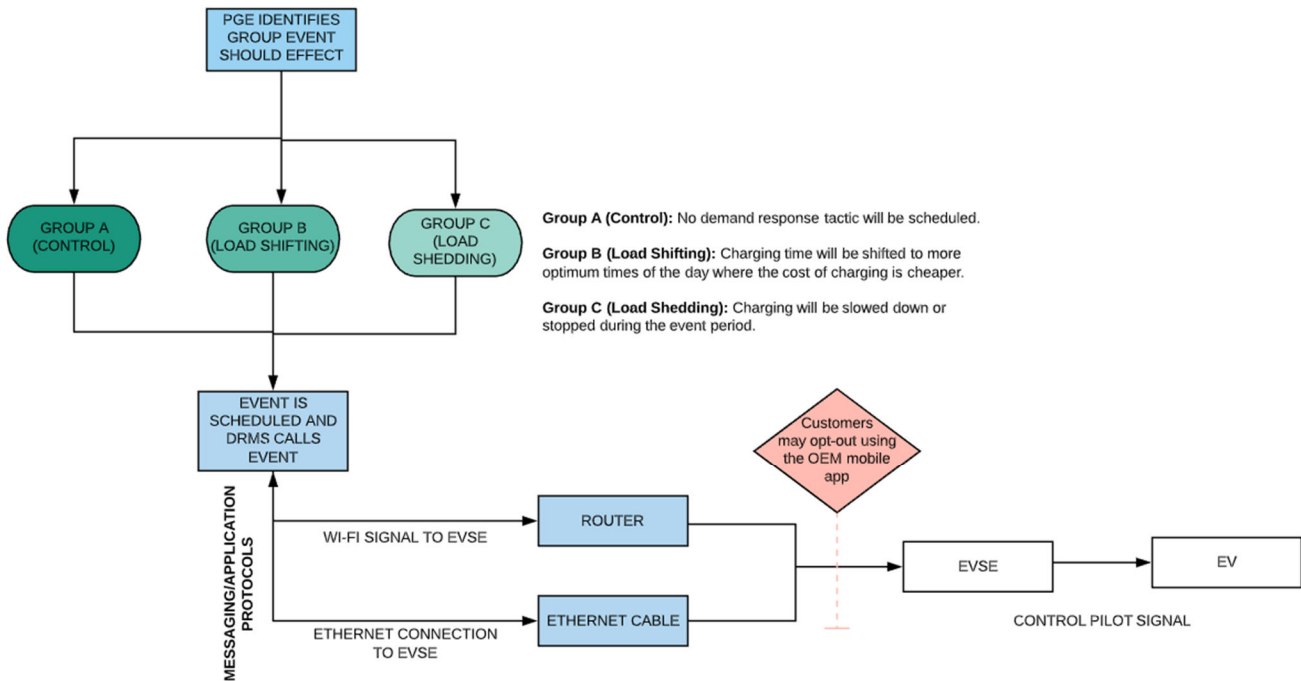
This section provides a broad overview of the mechanics of Smart Charging (e.g. demand response, load shifting, load shedding). PGE will integrate select OEM cloud services into its DRMS. The smart charging component will then be available all year.

PGE will use customers' EV chargers for flexible load events throughout the year. PGE will use load shedding as its initial or primary test case. Load shifting will be the secondary use case during this Pilot, with PGE testing other flexible load use cases as the Pilot progresses (e.g. voltage and frequency response, renewables integration).

To test use cases, PGE will randomly assign participants to one of three groups (A, B, or C), where one is used as a control group, while the remaining two groups will be the experimental groups for testing DR use cases. Each experimental group will be assigned one use case and customers will not be informed as to which group they have been assigned. Additionally, PGE will evaluate which specific use cases and DR protocols to test (e.g. when to call, how to call) as the Pilot progresses. Upon completion of communications and controllability for DR events, the Pilot will aim to identify and deliver solutions for additional flexible load services. PGE will implement the OEM-to-DRMS integrations with this aspect in mind.

However, PGE will not begin calling events or engaging in managed charging until a minimum of 300 EVSEs are participating in the Smart Charging Program. PGE will work with the DRMS provider to test equipment, operationalize assets, call test events to ensure connectivity, establish an initial baseline, identify any issues, and optimize the Pilot, as the integrations are complex dispatch scenarios and require a very solid communication and control protocol that must be thoroughly tested. [Figure 4](#) visualizes the process.

Figure 4: Smart Charging Event Process



4.15. Outreach and Recruitment

PGE will apply a variety of internal and external resources to facilitate customer uptake of installed qualified EVSEs and participation in the Smart Charging Program. The primary outreach targets are customers that are either actively buying or considering an EV and current EV owners that have a qualified EVSE.

The value proposition to drive customer recruitment is twofold. One centers around the purchase and installation of a qualified EVSE. The second focuses on participation in the Smart Charging Program.

The Pilot will employ the following outreach methods, among others:

- **Collaborative outreach with OEMs and EV dealers.** PGE will work collaboratively with OEMs and EV dealers to promote the Residential EV Charging Pilot, the purchase and installation of a qualified EVSE, and the enrollment of existing qualified EVSEs into the Pilot.
- **Residential EV Charging website.** PGE will create an online place that educates, informs, and coordinates customers in need of EV home charging equipment by bringing customers, EV dealers, OEMs, and PGE into one online location that allows customers to easily navigate the space and take advantage of rebates and/or incentives. PGE will use search engine optimization, online advertising, inbound OEM links, and other tactics to promote the website.
- **Targeted direct mail and email.** PGE will reach out to existing EV drivers in our service territory to inform them about the Pilot.

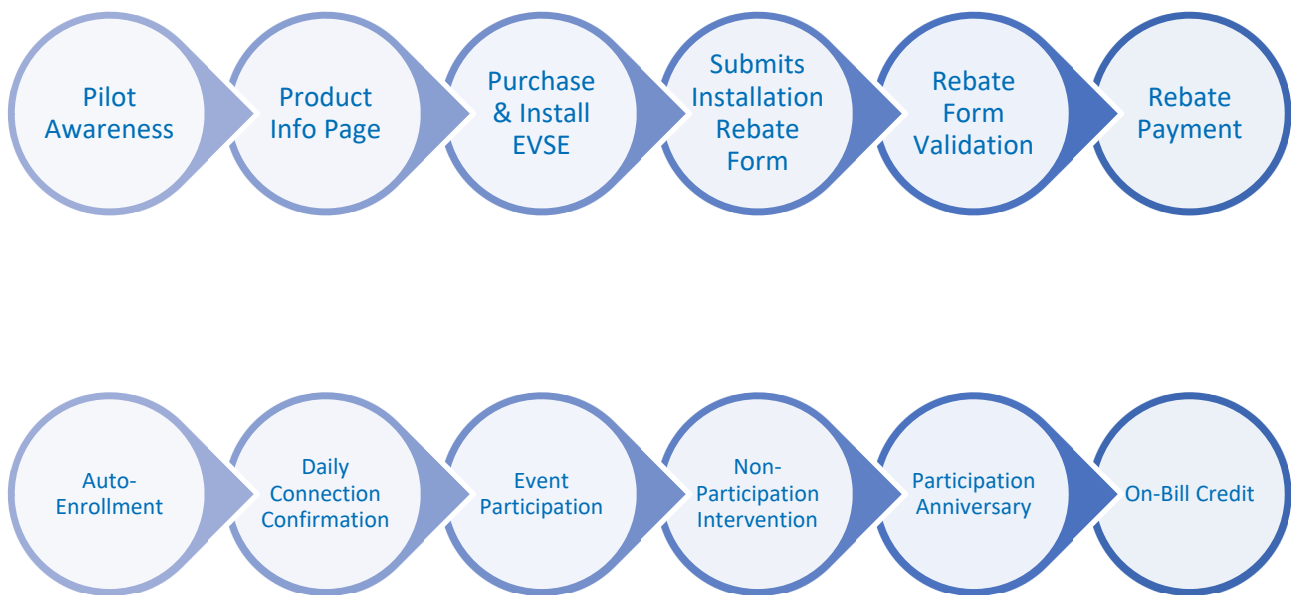
- **Outreach staff.** PGE will use outreach personnel to engage, inform, and sign up dealerships and trade allies to promote the Pilot.
- **PGE newsletters, etc.** PGE will create general awareness for the Pilot via its regular outreach channels, including the PGE Update newsletter, targeting customers that are likely to either currently own or purchase an EV in the future.

4.16. Customer Journey

Figure 5 visualizes the customer’s ideal journey through the two components of the Pilot: Installation and Smart Charging. Throughout the Pilot period, PGE will be mindful of the customer’s journey with the intent of providing customers with a good experience through both the installation journey as well as the Smart Charging Program journey. Once customers have completed the installation journey and PGE approves them for the rebate, PGE will automatically enroll customers into the Smart Charging Program. Over the course of the Pilot, PGE will reevaluate the process and implement improvements to increase customer satisfaction and reduce customer friction.

Figure 5: Ideal Customer Journey

Smart Charging Program Journey



Section 5: Cost Effectiveness

PGE is utilizing the Transportation Electrification Assessment Methodology (TEAM) for cost effectiveness, which is a modified Ratepayer Impact Measure (RIM) test. TEAM includes monetizable environmental and societal benefits from decarbonization, including revenue from the Oregon Department of Environmental Quality Clean Fuels Program as well as potential future decarbonization benefits. The first component of the Pilot is the EVSE Installation Rebate (standard and income-eligible), which increases electricity consumption (and consequently the need for electricity infrastructure). The second component is the Smart Charging Program, which shifts energy consumption (and consequentially reduces the need for electricity infrastructure).

Post-pilot, PGE anticipates evaluating all the costs and benefits of mass-market vehicle electrification at a portfolio level, including all benefits and costs for all electric fuel sales and program offerings (for example, including residential, destination, and public charging). Further, PGE will evaluate all benefits and costs of smart charging as a portion of the Company’s DR portfolio. As the Pilot matures, PGE will also determine which costs the Company should allocate to electrification and to grid services as a customer acquisition cost and how best to make such allocations.

Table 9: Cost/Benefit Categories (Residential EV Charging)

	Cost/Benefit Category	RIM Test Results
1	Administrative Costs	COST
2	Avoided Costs of Supplying Electricity (DR Only)	BENEFIT
3	Bill Increases	N/A
4	Bill Reductions	N/A
5	Capital Costs to Utility	COST
6	Capital Costs to Participant	N/A
7	Environmental Benefits	N/A
8	Incentives Paid	COST
9	Increased Supply Costs	COST
10	Market Benefits	N/A
11	Market Participation Revenue	BENEFIT
12	Non-Energy /Monetary Benefits	N/A
13	Revenue Gain from Increased Sales	BENEFIT
14	Revenue Loss from Reduced Sales	COST
15	Tax Credits	N/A
16	Transaction Costs to Participant	N/A
17	Value of Service Lost	N/A

As per [Table 9](#) above, this Pilot includes various benefits and costs. Benefits include increased utility revenue from new electricity sales that cover the incremental supply costs (home charging stations only). Additionally, EV programs designed with DR components will provide the benefit of avoided supply costs (capacity and energy).

Costs of new TE programs include incremental supply costs (capacity and energy); program administrative costs; participant incentives (rebates); and capital costs for the utility (where necessary, transformer upgrades to support program implementation).

5.1. Recommended Plan Description and Key Assumptions

Over an approximate three-year period, PGE will distribute L2 EVSE installation rebates for up to 5,000 residential customers. In developing this Pilot and the cost-effective modeling provided herein, PGE made the following assumptions, which we will test over the life of the Pilot:

- 45% of EVs sold will buy a qualified EVSE;
- 75% of customers that purchase a qualified EVSE will receive an installation rebate;
- 10% of EVs sold from the previous year will participate in the BYOC rebate;
- 10% of installation customers will qualify for the Income-Eligible Installation rebate;
- 10% of installation customers will self-install the EVSE;
- 5% Smart Charging Program attrition rate;
- 25% of customers will require the Smart Charging Program Reconnection Incentive;
- 75% of installation participants will be referred by a dealer;
- Each charger is assumed to have a useful life of 10 years;
- Administrative incremental costs as listed in Table 11; and
- Average hourly demand reduction participation per event is 0.450 kW.

Table 10 shows the projected market size for EVSEs, as well as the Pilot goals.

Table 10: Projected Market Size for EV Chargers and Program Participation Goals (Residential EV Charging)

Participant Summary	Q4 2020	2021	2022	2023	2024	Total
# of EVs sold	884	4,296	5,461	6,553		17,194
# of Qualifying Charging Stations	398	1,933	2,457	2,949		7,737
# of Rebated Installed EVSEs	100	1,450	1,843	1,607		5,000
Income-Eligible	10	145	184	161		500
Standard	90	1,305	1,659	1,446		4,500
BYOC	10	354	430	546		1,340
Smart Charging Program*						
From Income-Eligible	0	10	145	184	161	500
From Standard	0	90	1,305	1,659	1,446	4,500
From BYOC	0	10	354	430	546	1,340

**Participation is counted the year the incentive would be provided to the customer.*

5.2 Administrative Costs

Table 11 shows estimated administrative costs for the Pilot. To reach the goal of incentivizing up to 5,000 L2 EVSEs, the Pilot must incur up-front costs. The Pilot will have costs such as outreach and education, digital automation, rebate platform infrastructure, dealer outreach, dealer referral, program management (e.g. application validation,

demand response event scheduling, evaluation support, customer service support, vendor management, etc.), and measurement and verification. The Smart Charging Program will have costs for asset management, DRMS licensing, DRMS connectivity, and evaluation. These costs average \$0.6 million per year for the Pilot period, at which time all Installation Incentives end.

Table 11: Estimated Administrative Costs for the Program Period (Residential EV Charging)

Administrative Costs – Years 1 - 5						
\$000S	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Smart Charging	450	164	202	219	193	1,227
EV	335	272	326	310	73	1,335
Total	805	435	528	529	266	2,562

5.3 Rebates Paid

As detailed in [Table 12](#) below, PGE will provide up to a \$500 Standard EVSE Installation Rebate to qualifying customers and up to a \$1,000 Income-eligible EVSE Installation rebate. Based on our costs of a Wi-Fi-enabled 7 kW L2 charger, the Standard rebates will cover more than one quarter of the total cost of a qualified EVSE and installation. For income-eligible customers, the rebate represents over half of the forecasted equipment and installation costs:

Table 12 Estimated Average Cost to Install a Qualifying EV Charger (Residential EV Charging)

EVSE Costs and Rebates	Electrician-Installed \$/Unit	Self-Installed \$/Unit
EVSE Costs		
Equipment Cost (EVSE)	600	600
Installation Cost (permit, conductors, conduit breaker, new receptable, and labor)	800	200
Electric Panel Replacement*	1,200	N/A
Total EVSE Costs	2,600	800
Income-Eligible EVSE Installation Rebate	1,000	1,000
Standard EVSE Installation Rebate	500	500
<i>*20% of participants estimated to require panel replacement</i>		

For the Smart Charging Program, PGE will pay participants an incentive either annually or at other PGE-determined intervals to keep their charger connected to PGE’s network and available to provide grid services.

5.3 Capital Cost to Utility

PGE assumes that all rebates are expensed; however, transformer upgrades (when necessary) will be capitalized. A preliminary planning estimate is that 3.5% of the total participants will require a transformer replacement over the duration of the Pilot. PGE estimates an average cost of \$3,315 to upgrade a 50kVa transformer to a 75kVA transformer. The forecast capital for transformer upgrades is \$0.6 million.

5.4 Increased Supply Costs

As this Pilot increases PGE's load, the incremental cost of energy and capacity are two of the key Pilot costs.

Energy Supply Cost are based on long-term power costs (2H19 AURORA forecast). Average hourly prices are matched with load shapes that correspond with Schedule 7.³⁴ PGE assumes that 80% of residential customers will use the standard volumetric block rate and 20% will use the TOU rate.

The calculation of Capacity Supply Costs utilizes several calculations derived from the 2019 IRP. The cost of capacity, \$103 per kW per year (2020\$) is based on the real-levelized net cost of the simple-cycle turbine capacity resource in the 2019 IRP.³⁵ PGE's IRP uses the Renewable Energy Capacity Planning (RECAP) model to calculate need and the capacity contribution of new resource options. The model is also used to calculate the Incremental Capacity Need (MWs of capacity per average MW of load) of new loads like EVs. Based on analysis of impact of residential EV load shapes through the RECAP model and outboard approximations, we derived an Incremental Capacity Need of 12% for the EV load shape for residential customers with standard residential pricing and 8% for the EV load shape for residential customers with TOU pricing.³⁶ The Capacity Supply Cost for each load shape is calculated as follows: # of Participants * Cost of Capacity (\$103/kW-yr) * L2 charger rating (7kW) * Incremental Capacity Need %.

5.5 Revenue from Increased Sales

The principal benefit of the Pilot is increased utility revenue from new electricity sales. PGE is estimating 3,724 kWh per year of electricity usage for EV charging for residential customers, relying on the base case assumptions from the 2019 Navigant Study which assumes 11,370 miles per year at an electric efficiency of 0.3275 kWh per mile.³⁷ Based on 3,724 kWh per year, the effective load factor for a 7 kW L2 EVSE is 6.1%. Revenue is then computed by applying the kWh of load to the energy portion of the tariff in the given hour(s) when charging occurs. PGE assumes that 80% of residential customers will use the standard volumetric block rate and 20% will use the TOU rate.

5.6 Market Participation Revenue

The Pilot assumes no revenues from Clean Fuels Credits as credits generated by residential customers are already assigned to PGE.

5.7 Cost Effectiveness Results

5.7.1. EVSE Installation Rebate Results

Table 13 shows the benefit/cost summary based solely on electrification. The installation rebate component of the Pilot has a benefit/cost ratio of 1.22. These results do not reflect the impact of the Smart Charging Program (i.e. DR).

³⁴ Includes both TOU and volumetric block rate of Schedule 7. An update to the TOU rate was as PGE Advice No. 19-03 with an effective date of May 1, 2019.

³⁵ PGE's 2019 IRP, page 166.

³⁶ These Incremental Capacity Need values are expressed as a percentage of the charger rating.

³⁷ Navigant (2019). *Distributed Resource and Flexible Load Study, External Study C of the PGE 2019 IRP, Final Base Case Assumptions*. Available: <https://www.portlandgeneral.com/our-company/energy-strategy/resource-planning/integrated-resource-planning>

Table 13 Benefit/Cost Summary Based Solely on Electrification (Residential EV Charging)

	EV	%
Avoided Cost of Supply	-	0%
Revenue Gain from Increased Sales	10,497	100%
Benefits	10,497	100%
Costs		
Administrative Costs	1,307	15%
Capital Costs to Utility	704	8%
Incentives Paid	2,276	27%
Increased Supply Costs	4,249	50%
Costs	8,536	100%
Benefit/Cost Ratio		
	1.23	
Key Measures		
Participants	5,000	
Total Rebate Cost \$000s	2,750	
AVG Energy Used (MWh)	10,061	
AVG Capacity Need (kW)	2,111	

Supply costs makes up almost half of the total costs. Administrative costs make up almost 20% of total. The remainder of costs are comprised of incentives and transformer upgrades.

5.7.2. Smart Charging (Demand Response) Results

Table 14 shows the benefit/cost summary solely based on smart charging. The smart charging component of the Pilot has a benefit/cost ratio of 0.49. In this analysis, the only smart charging tactic included in the benefit/cost test is DR. The main benefit in DR is the avoided cost of capacity due to the temporary reduction in customer demand when PGE calls an event. We assume DR events contribute no reduction in energy consumed. For the purposes of this analysis we did not include any value for ancillary services benefits, though the Pilot may demonstrate such use cases. We further assume the Smart Charging Program will continue for 14 years, as chargers have a useful life of 10 years and participants remain enrolled over a four-year period.

Table 14 Benefit/Cost Summary Solely Based on Smart Charging Program (Residential EV Charging)

	DR	%
Market Participation Revenue	-	0%
Avoided Cost of Supply	1,413	100%
Revenue Gain from Increased Sales	-	0%
Benefits	1,413	100%
Administrative Costs	1,843	62%
Capital Costs to Utility	-	0%
Incentives Paid	1,083	37%
Increased Supply Costs	-	0%
Costs	2,925	100%
Benefit/Cost Ratio	0.48	
Key Measures	DR	
Participants	6,340	
AVG Demand Reduction (kW)	1,670	

When PGE calls a DR event, we measure the reduction in customer load against a historical baseline. As PGE has no existing EV DR program, we are using recent residential charging pilots from Avista and Green Mountain Power to inform the value of demand reduction: 0.45 kW per participant per year. L2 EVSEs are always connected by Wi-Fi to the network and so we assume an availability factor of 85%. PGE calculates the ACC as follows:

$$\text{ACC} = [\# \text{ of Participants per Year} \times \text{average demand reduction (0.45 kw/participant)} \times \text{adjustment for line losses}] \times \text{Cost of Capacity (\$103/kw/yr)} \times \text{availability factor (85\%)}$$

Over the life of this Pilot, PGE expects to see an increase in the DR value. As shown by other utility EV programs, EVs are a valuable flexible load and play a key role in the reduction or shift of customers' electricity usage during PGE's peak period. EVs have the potential to deliver many grid benefits, including renewables integration, avoided distribution system upgrades, emergency load reduction, frequency response, and vehicle-to-grid. Together, these benefits make the grid less costly and more reliable to run. Through this Pilot and our Smart Charging Program, PGE will explore various grid services use cases. As a result, we expect to see a significant increase in the DR value of this Pilot—positively contributing to the Pilot's overall cost-effectiveness—as we evaluate the different use cases.

Incentive costs—including the Smart Charging Incentive, the one-time BYOC Incentive, and the Reconnection Incentive—are relatively low compared to the L2 EVSE installation rebate portion of the Pilot. Administrative costs, however, are higher as they include evaluation as well as DRMS connectivity costs and licensing fees which continue through the 14-year life of the Smart Charging program.

5.7.3. Total Pilot Results – EV Charging Rebate and Smart Charging

Table 15 shows the benefits and costs of the total Pilot, which includes charger installation rebate and smart charging program rebate (effectively this is a combined look at **Table 13** and **Table 14**, above). The combined benefit/cost ratio (rebate + smart charging program components) of the Pilot is 1.04.

Table 15 Blended Cost/Benefit Ratio Based on Combined Program Components (Residential EV Charging)

	EV	DR	Total	%
Market Participation Revenue	-	-	-	0%
Avoided Cost of Supply	-	1,413	1,413	12%
Revenue Gain from Increased Sales	10,497	-	10,497	88%
Benefits	10,497	1,413	11,911	100%
Administrative Costs	1,307	1,843	3,150	27%
Capital Costs to Utility	704	-	704	6%
Incentives Paid	2,276	1,083	3,358	29%
Increased Supply Costs	4,249	-	4,249	37%
Costs	8,536	2,925	11,461	100%
Benefit/Cost Ratio	1.23	0.48	1.04	
Key Measures	EV	DR		
Participants	5,000	6,340		
Total Rebate Cost \$000s	2,750	N/A		
AVG Energy Used (MWh)	10,061	N/A		
AVG Capacity Need (kW)	2,111	N/A		
AVG Demand Reduction (kW)	N/A	1,670		
Net Costs	(1,961)	1,512	(449)	

This Pilot anticipates enrolling participants over a period of three years. PGE assumes each charger has a life of 10 years. The total Pilot period stops 10 years after the last charger has been installed. While the initial number of participating chargers is increasing during the installation period (four years), PGE assumes the number of chargers participating in the program drops over time. Participation levels drop due to customers moving in and out, the charger losing its Wi-Fi connectivity, and other reasons. PGE will use data from the Pilot to assess whether the \$50 re-connection fee should continue after the four-year enrollment period.

Table 16 shows the energy use, benefits, and cost overview of the Residential EV Charging Pilot.

Table 16 Energy Use, Benefits, and Cost Overview (Residential EV Charging)

Project Summary	NPV \$000s	Total Nominal \$000s	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14
Units																
Energy Usage	MWh		177	2,909	8,588	14,261	16,391	15,571	14,793	14,053	13,350	12,571	10,215	6,033	1,886	0
Incremental Capacity Need (EV)	kW		37	610	1,802	2,992	3,439	3,267	3,103	2,948	2,801	2,637	2,143	1,266	396	0
Demand Reduction (Smart Charging)	kW		-	24	437	1,304	2,214	2,600	2,505	2,416	2,331	2,250	2,158	1,824	1,209	437
EV Participant Balance	#		95	1,468	3,145	4,515	4,289	4,074	3,871	3,677	3,493	3,259	2,228	1,013	0	0
Grid Services Participation Balance	#		-	106	1,838	3,958	5,885	5,670	5,465	5,271	5,087	4,912	4,679	3,429	1,943	0
Benefits																
Avoided Costs of Supplying Electricity	1,413	2,389	-	2	44	132	229	274	269	264	259	255	249	214	145	53
Revenue Gain from Increased Sales	10,497	16,453	20	333	1,000	1,691	1,980	1,915	1,853	1,793	1,735	1,664	1,377	828	264	0
TOTAL BENEFITS	11,911	18,842	20	335	1,044	1,824	2,209	2,189	2,122	2,057	1,994	1,919	1,626	1,043	408	53
Costs																
Administrative Costs – EV	1,307	1,660	355	271	326	309	73	34	34	35	36	36	37	38	38	39
Administrative Costs – Smart Charging	1,843	2,732	450	164	202	219	192	155	158	161	164	167	170	173	177	180
Capital Costs to Utility	704	1,330	2	23	50	73	72	71	69	68	67	66	64	63	62	579
Incentives – EV	2,331	2,822	55	798	1,032	907	30	-	-	-	-	-	-	-	-	-
Incentives – Smart Charging	1,027	1,727	-	3	52	95	164	195	192	188	185	182	178	153	103	38
Increased Supply Costs	4,249	6,715	7	129	383	652	749	761	773	754	712	705	597	371	120	0
TOTAL COSTS	11,461	16,986	869	1,387	2,046	2,256	1,280	1,216	1,226	1,207	1,164	1,156	1,046	798	449	835
NET COSTS	(449)	(1,856)	849	1,052	1,002	432	(928)	(973)	(896)	(850)	(830)	(762)	(580)	(245)	91	782

Section 6: Pilot Evaluation

6.1. Summary

The purpose of evaluation is to measure the effectiveness of the Pilot in meeting its objectives, identifying areas for continuous improvement, and understand and measure energy and capacity impacts on PGE's system. The following are some of the high-level learning objectives:

- Track customer participation and satisfaction levels with Pilot offerings (rebates, dealership assistance, and referrals);
- Understand the level of PGE's influence in customers' decisions to procure an EV and install qualifying EVSE;
- Document EVSE installation successes and challenges;
- Measure customer load impacts on PGE's system; and
- Identify Pilot implementation successes and challenges, and improvement opportunities.³⁸

6.2. Evaluation Methods

Below are brief descriptions of the anticipated evaluation methods.

6.2.1. Process Evaluation

Process evaluation of the Pilot will identify Pilot design and implementation success and problem areas. Process evaluation findings can provide periodic feedback to help the Pilot make continuous improvements. Expected process evaluation activities include:

- Logic Model – Early in the Pilot evaluation, PGE and its evaluation vendor will review the logic model and Pilot objectives included with this application. As the Pilot progresses, the logic model and evaluation activities will be updated or adjusted as needed. Ongoing review of the logic model and Pilot objectives will help organize all evaluation activities and identify any gaps or issues in the Pilot.
- Data Analytics – The evaluation will track and report Pilot participation levels by rebate type, vehicle type, charger type, acquisition source (partner dealer, bring-your-own-charger) and include demographic analysis to determine which types of customers are and are not participating.
- Pilot Staff Interviews – PGE's evaluator will conduct annual in-depth interviews with PGE Pilot staff on a wide range of Pilot topics. The initial interviews will focus on the launched Pilot design, customer targeting and outreach activities, Pilot implementation and staff coordination. Subsequent interviews will focus on implementation successes and challenges, Pilot design or delivery changes enacted and anticipated, and lessons learned.

³⁸ The program may also measure DR event energy impacts; to be determined later.

- Participant Surveys – These brief surveys will inquire about Pilot awareness sources, auto dealership assistance, satisfaction with the rebate application and installation processes, prior charging types used, experience using the new chargers, ease of Pilot participation, and other topics.
- Dealership Interviews – These interviews will inquire about the effectiveness of PGE training and outreach, EVSE sales trends and remaining barriers, the value of PGE financial incentives, customer feedback and other topics.
- Electrician Trade Ally Interviews – These interviews will cover satisfaction with PGE’s training, successes and challenges installing EVSE, impacts on their businesses, and ease of Pilot participation.

6.2.2. Impacts Evaluation

PGE’s evaluation vendor will analyze participating customer meter data and vehicle charging data to measure customer load impacts from new EVSEs, impacts to PGE’s system, and the value of DR from the EVSE. Expected impact evaluation activities include:

- Customer load shapes showing residential/system peak overlaps and peak to off-peak ratios
- Charger “up-time” statistics and communication issues
- Realization rate (event kW achieved versus 0.45kW DR assumption)
- Probability of charging during peak times with and without DR signal
- Differential charging patterns by customer segments and sub-segment (e.g. income, EV make + model)
- Differences in charging patterns between schedule 7 flat rate customers and TOU participants
- Analysis of any attempts at implementing ancillary services (e.g. load following, voltage regulation)

6.2.3. Reporting

PGE expects to submit findings in an interim report to the OPUC after Phase 1 (est. Fall 2021) and a final report to the OPUC in the spring of 2024.

Section 7: Operational Tariff & Cost Recovery

This operational tariff filing includes incentive structures. Through the Pilot period, PGE may update this operational tariff to reflect feedback from customers or to gain specific learnings (e.g. reducing the rebate incentive to test adoption and satisfaction at different incentive levels). Additionally, pursuant to Oregon Revised Statute (ORS) 757.259, PGE requested authorization to defer for later ratemaking treatment of the costs and revenues associated with this Pilot through OPUC Docket No. UM 2003. Only O&M expenses will be subject to deferral as reflected in [Table 17](#). PGE will also update its deferral filing to reflect the changes in the Pilot’s design and costs, as well as the Company’s overall TE Portfolio.

Table 17 Estimated O&M Deferral Costs (Residential EV Charging)

Cost Summary (Excl. Capital and Energy & Capacity Supply Costs)															
	Total Nominal \$000s	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14
Costs															
Administrative Costs	4,392	805	435	528	528	265	189	192	196	200	203	207	211	215	219
O&M Costs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Incentive Paid	4,549	55	801	1,084	1,002	194	195	192	188	185	182	178	153	103	38
TOTAL COSTS	8,941	860	1,236	1,612	1,530	459	384	384	384	385	385	385	363	318	256

Section 8: Conclusion

This pilot proposal to increase deployment of EV charging infrastructure is necessary and in our customers' interest. The proposal is in line with Oregon's climate goals, the legislative findings of SB 1547, the Governor's executive orders, and is likely to accelerate EV adoption by increasing the access to and the use of electricity as a transportation fuel. The proposal will facilitate the addition of a network of up to 5,000 grid-connected resources that will be able to support efficient grid integration and operation.

The Pilot will expand the value proposition for customers considering an EV purchase and will give PGE access to an important and rapidly growing customer asset.

We have taken appropriate steps to right-size this Pilot such that it meaningfully impacts the EV market while safeguarding non-participating PGE customers. Further, the Pilot has a pathway towards sustainable cost-effectiveness and will yield learnings that inform the Pilot's transition to a program and into PGE's operations and system planning efforts.

The time to decarbonize Oregon's transportation sector is now. PGE has a unique role to play in supporting EV adoption and grid integration, and we believe this Pilot will help the state accomplish its decarbonization and transportation goals. We look forward to the opportunity to work with Staff and stakeholders to move this proposal forward and accelerate our path to an equitable clean energy future.



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