PACIFIC POWER
A DIVISION OF PACIFICORP

825 NE Multnomah, Suite 2000
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June 30, 2021

VIA ELECTRONIC FILING

Public Utility Commission of Oregon
Attention: Filing Center
201 High Street SE, Suite 100
Salem, OR 97301-3398

RE: Advice No. 21-016
Transportation Electrification Residential Charging Pilot – Schedule 117
Transportation Electrification Nonresidential Charging Pilot – Schedule 118
Transportation Electrification Outreach and Education Pilot

Pursuant to Oregon Revised Statute 757.205 and Oregon Administrative Rule (OAR) 860-022-0025, PacifiCorp d/b/a Pacific Power submits for filing the following proposed new tariff pages relating to PacifiCorp's Residential Charging Pilot (Schedule 117), and PacifiCorp's Nonresidential Charging Pilot (Schedule 118). PacifiCorp respectfully requests an effective date for August 11, 2021 for both tariffs.

Sheet	Schedule/Rule	Title
Original Sheet No. 117-1	Schedule 117	Transportation Electrification Residential Charging Pilot
Original Sheet No. 117-2	Schedule 117	Transportation Electrification Residential Charging Pilot
Original Sheet No. 118-1	Schedule 118	Transportation Electrification Nonresidential Charging Pilot
Original Sheet No. 118-2	Schedule 118	Transportation Electrification Nonresidential Charging Pilot

Purpose

With this filing, PacifiCorp proposes a portfolio of three new transportation electrification pilot programs to accelerate the adoption of electricity as a transportation fuel in Oregon: the Residential Charging Pilot, the Nonresidential Charging Pilot, and the Outreach and Education Pilot. Together, these programs will advance achievement of the strategies and objectives identified in PacifiCorp's 2020 Transportation Electrification Plan, and Oregon's transportation electrification goals as they relate to climate change.[1] This filing package includes as Exhibits all the materials relevant to the establishment of each of these programs, including the program applications, tariff sheets (where applicable), and supporting documentation (where applicable).

[1] Ore. Exec. Order No. 20-04 (March 10, 2020).

The Exhibits attached to this filing include:

1) Exhibit 1 – Residential Charging Pilot application
2) Exhibit 2 – Schedule 117 – Residential Charging Pilot
3) Exhibit 3 – Nonresidential Charging Pilot application
4) Exhibit 4 – Schedule 118 – Nonresidential Charging Pilot
5) Exhibit 5 – Outreach and Education Pilot application
6) Exhibit 6 – Outreach and Education Pilot supporting documentation – C2 Report – Electrification Outreach
7) Exhibit 7 – Outreach and Education Pilot supporting documentation – Navigant – EV Baseline Survey Results

1. Residential Charging Pilot

In accordance with Senate Bill 1547, Section 20, [2] and the requirements of OAR 860-001-0400 and OAR 860-087-0030, PacifiCorp submits its Residential Charging Pilot application as Exhibit 1 to this Advice Letter. In this application, PacifiCorp seeks Commission authorization to spend up to $2,615,444 over the course of three program years to develop and implement its Residential Charging Pilot.

Authorization by the Commission will permit PacifiCorp to offer residential customers an incentive of up to $500, or up to $1000 for income-qualified residential customers, to install qualifying electric vehicle (EV) charging equipment. Non-income-qualified participating customers will be automatically enrolled in PacifiCorp's time-of-use rate, with enrollment being optional for income-qualified participants. At a high level, this program will accelerate EV adoption by reducing costs for residential customers, promote efficient charging habits through time-of-use pricing, and provide data on EV owner charging behavior, among other benefits.

PacifiCorp respectfully requests that the Commission authorize the Residential Charging Pilot after consideration of the attached application (Exhibit 1) and Schedule 117 – Residential Charging Pilot (Exhibit 2).

2. Nonresidential Charging Pilot

In accordance with Senate Bill 1547, Section 20, and the requirements of OAR 860-001-0400 and OAR 860-087-0030, PacifiCorp submits its Nonresidential Charging Pilot application as Exhibit 3 to this Advice Letter. In this application, PacifiCorp seeks Commission authorization to spend up to $2,039,300 over the course of three program years to develop and implement its Nonresidential Charging Pilot.

Authorization by the Commission will permit PacifiCorp to offer nonresidential customers an incentive of up to $1000, or up to $3000 for multi-unit family dwellings, to install qualifying EV charging equipment. This program will accelerate EV adoption by increasing charging access to EV owners, including to customers in multi-unit family dwellings, promote efficient charging

[2] Senate Bill 1547 §20(3), codified in Oregon Laws 2016, Chapter 028.

habits through time-of-use pricing, and provide data on EV owner charging behavior, among other benefits.

PacifiCorp respectfully requests that the Commission authorize the Nonresidential Charging Pilot after consideration of the attached application (Exhibit 3) and Schedule 118 – Nonresidential Charging Pilot (Exhibit 4).

3. Outreach and Education Pilot

In accordance with Senate Bill 1547, Section 20, and the requirements of OAR 860-001-0400 and OAR 860-087-0030, PacifiCorp submits its Outreach and Education Pilot application as Exhibit 5 to this Advice Letter. In this application, PacifiCorp seeks Commission authorization to spend up to $2,178,750 over the course of three program years to develop and implement its Outreach and Education Pilot.

Authorization by the Commission will permit PacifiCorp to implement expanded outreach and education efforts in three broad categories, decision-making support, high quality EV experiences, and planning and studies. This program will educate customers on EV and charging equipment technologies and reduce market barriers to EV adoption.

PacifiCorp respectfully requests that the Commission authorize the Outreach and Education Pilot after consideration of the attached application (Exhibit 5) and review of the supporting documentation (Exhibits 6 and 7).

Tariff changes and impacts

OAR 860-022-0025 requires that PacifiCorp submit a statement of the tariff schedule change, the number of customers affected, the change in revenue, and the grounds supporting the change. For both Schedule 117 and Schedule 118, the number of customers affected is unknown, and this proposed change does not increase or decrease customer prices.

PacifiCorp respectfully requests that all formal data requests regarding this matter be addressed to:

By email (preferred): datarequest@pacificorp.com

By regular mail: Data Request Response Center
PacifiCorp
Lloyd Center Mall, Room 2265
Portland, OR 97232

Please direct any informal questions about this filing to Cathie Allen, Regulatory Affairs Manager, at (503) 813-5934.

Sincerely,

Shelley McCoy

Director, Regulation

Enclosures

Exhibit 1

PACIFIC POWER

TRANSPORTATION ELECTRIFICATION PROGRAM

RESIDENTIAL CHARGING PILOT PROGRAM

JUNE 30, 2021

Executive Summary – Residential Charging Pilot

Pacific Power proposes a three-year pilot to offer a cash or on-bill incentive for residential customers to install qualifying Level 2 (L2) electric vehicle (EV) charging infrastructure and enroll in a whole house time-of-use (TOU) rate. The proposed incentives will directly lower the cost of the participant's investment in installing networked L2 charging and can reduce market barriers and access to affordable charging infrastructure. The pilot program will also provide benefits to the utility with additional revenue, Clean Fuels Credits, and data for promoting charging efficiency. The majority of EV charging occurs at home, which provides an opportunity to incentivize affordable charging while increasing customer knowledge around off-peak charging benefits and encourage customers to charge during off-peak times.

The Residential Charging pilot represents one component of Pacific Power's continued efforts to accelerate transportation electrification in its Oregon service area. These growing efforts recognize the diverse and dispersed nature of Pacific Power's service area, including regions of the state that can present unique challenges with respect to adoption of emerging technologies. This new phase of the Company's longer-term transportation electrification strategy is designed to continue to build a foundation by which Pacific Power can partner with its customers and communities and better understand the most effective long-term roles for the Company in expanding support for transportation electrification as this dynamic market continues to mature.

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1 Introduction and Description of Pilot

The State of Oregon has broad goals to increase the number of EVs on the road and reduce emissions from the transportation sector. Pacific Power (Pacific Power or the Company) recognizes its unique role in the evolution of electric transportation as an opportunity to facilitate and accelerate this transition. As a component of its broader TE initiatives, Pacific Power proposes to offer a cash or on-bill incentive for residential customers to install qualifying L2 charging infrastructure and enroll in a whole house TOU rate.

This application is structured to demonstrate how this pilot program complies with the Transportation Electrification Program Application Requirements under OAR 860-087-0030. Additional strategic insights to the pilot program proposed by the Company are included in in its February 3, 2020, Transportation Electrification Plan (TE Plan).[1] The Residential Charging Incentive Pilot program is identified in that plan as a key short-term intervention strategy.

The vast majority EV charging takes place at home, especially in the rural markets that comprise much of Pacific Power's service territory and where Pacific Power also sees lower penetration rate of EVs within the service territory.[2] Public charger access per customer is also much lower in these rural areas.[3] In these markets, private electric vehicle supply equipment (EVSE) developers have not made significant inroads to support non-residential charging due to lower EV market penetration. Additionally, the availability of L2 home charging is especially important in rural geographies to advance market penetration, because EV drivers regularly deplete significant charge in the course of routine trips due to the distance between destinations.[4] Standard Level 1 (L1) charging may be inconvenient and disincentivize EV ownership due to the length of time required to charge a vehicle. An incentive will lower the cost of L2 EVSE, supporting purchase and installation costs including licensed electrician labor, materials, and permits. Adoption of the incentive would be supported through marketing and outreach to dealers and EVSE installers.

To be eligible for the incentive, a residential customer would be required to enroll in Pacific Power's residential TOU rate. This requirement is a critical component of the pilot program because it will provide the necessary data for Pacific Power to better understand the potential for a direct load control program to efficiently manage increased charging load on Pacific Power's system.

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[1] Pacific Power.(2020). Oregon Transportation Electrification Plan. Public Utility Commission of Oregon. https://edocs.puc.state.or.us/efdocs/HAA/haa17127.pdf

[2] Oregon Department of Energy. (2021, April 15). Oregon Electric Vehicle Dashboard. Oregon.gov.https://www.oregon.gov/energy/Data-and-Reports/Pages/Oregon-Electric-Vehicle-Dashboard.aspx.

[3] US Department of Energy. (2021, March 18). Alternative Fuel Data Center. https://afdc.energy.gov/fuels/electricity_locations.html#/find/nearest?fuel=ELEC

[4] Hardman, S., Tal, G., Turrentine, T., Axsen, J., Beard, G., Daina, N., Wiekamp, B., (2017). Driving the Market for Plug-in Vehicles - Developing PEV Charging Infrastructure for Consumers. Retrieved from https://phev.ucdavis.edu/wp-content/uploads/infrastructure-policy-guide.pdf

The transition to electric transportation must be equitable and address barriers faced by rural and frontline communities.[5] Equity must be addressed holistically across Pacific Power's portfolio of TE programs and initiatives. While residential customers will receive $500 as the standard incentive, Pacific Power proposes an additional EVSE incentive of up to $500 (for a total incentive amount of up to $1,000) for income qualified customers,[6] and a waiver of the requirement to participate in a TOU rate. Adoption would be supported by partnership with Community-Based Organizations.

As articulated in Pacific Power's TE Plan, Pacific Power's objective in developing a residential charging incentive pilot is to increase access and economic viability of charging, a persistent barrier to TE faced by Pacific Power's customers. The specific elements of the pilot proposal are designed consistent with requirements set forth in the Public Utility Commission of Oregon's (Commission) Transportation Electrification Program Rules.[7] This pilot filing also addresses Senate Bill (SB) 1547's mandate that directs investor-owned utilities 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."[8] Utility programs "may include prudent investments in or customer rebates for EV charging and related infrastructure."[9]

1.1 Objectives, Pilot Elements, Timeline and Expected Outcomes

1.1.1 Objectives

The objective of this pilot is to improve the access and economic viability of home charging for residential customers, including low-income customers and customers in rural areas where there remain relatively high levels of range anxiety (compared to urban areas).[10] Improving the

[5] Frontline communities include, but are not limited to, Black and Indigenous people, communities of color, immigrants, refugees, people with disabilities, and low-income individuals. Frontline communities experience higher pollution exposure and lower investments in infrastructure and resources. These low-income neighborhoods and communities of color experience disproportionate cumulative health impacts, are often affected first and worst by climate change, and are less able to access mitigated and adaptive measures like EV mobility.

[6] Low-income qualified customers demonstrate eligibility through participation in low-income programming, including the Oregon Energy Fund, Low Income Home Energy Assistance Program, or the Oregon Energy Assistance program. Information on these programs is available at: https://www.pacificpower.net/my-account/payments/bill-payment-assistance.html

[7] Oregon Administrative Rules. Transportation Electrification Programs # 860, § Division 87 (2017). https://oregon.public.law/rules/oar_chapter_860_division_87

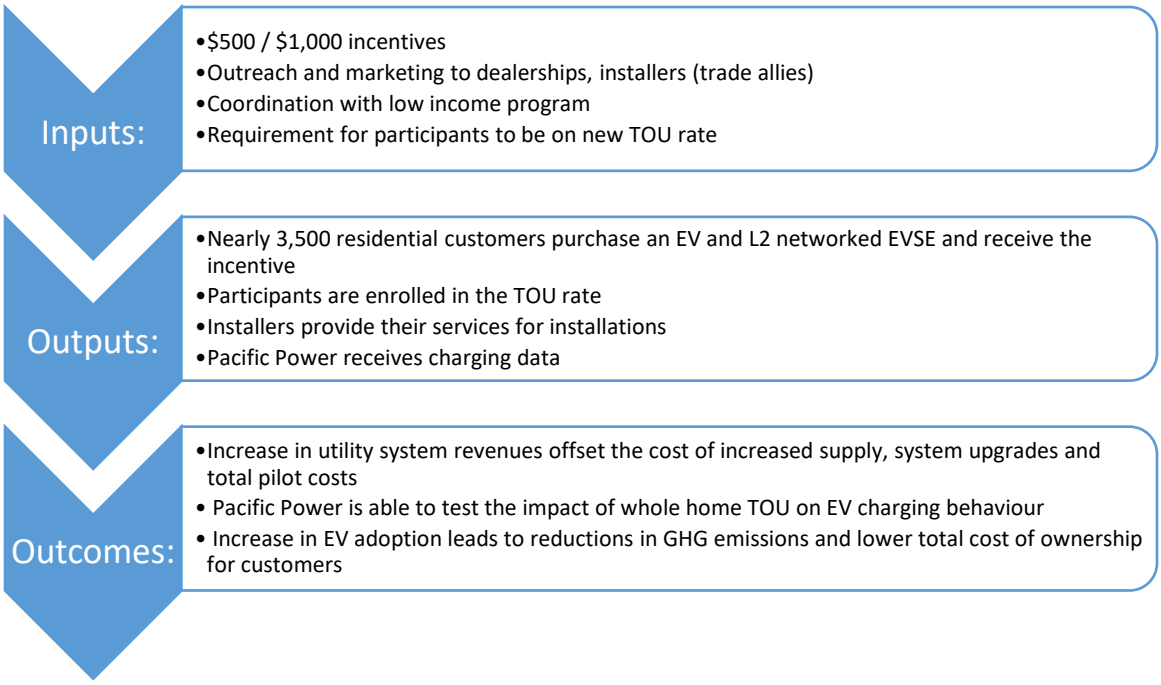
[8] Elimination of Coal from Electricity Supply. Oregon State Senate Bill 1547 §. 20.1.(2016).

[9] Elimination of Coal from Electricity Supply. Oregon State Senate Bill 1547 §. 20.3.(2016).

[10] Baatar, B. et al. (2019). Preparing Rural America for the Electric Vehicle Revolution. A Report for the American Center for Progress. Washington DC. Preparing Rural America for the Electric Vehicle Revolution.pdf (ucdavis.edu)

economic viability of charging, or otherwise increasing the availability of EVSE infrastructure, is critical in supporting long-term market development. Additional objectives included data collection that will support the design of future programming to advance the Company's TE strategy. Figure 1 identifies the inputs, outputs, and outcomes anticipated.

Figure 1. Anticipated Pilot Inputs, Outputs, and Outcomes



1.1.2 Pilot Elements

The proposed pilot is composed of a customer incentive, marketing and outreach activities, administration, and a qualifying products list. These elements are discussed below.

Customer Incentive: Eligible customers can receive an incentive of up to $500, capped at 75 percent of total costs for the purchase and installation of a L2 networked charger. Qualified costs include licensed electrician labor, materials, and permits. Participants will be required to provide copies of contractor invoices, required permits, and proof of purchase and installation of a qualifying L2 charger. Qualifying chargers will be determined from the Qualified Products List, described below. Participants will be required to enroll in a residential TOU rate for at least one year.

https://epm.ucdavis.edu/sites/g/files/dgvnsk296/files/inlinefiles/Preparing%20Rural%20America%20for%20the%20Electric%20Vehicle%20Revolution.pdf

For low-income qualified residential customers (customers who participate in low-income energy assistance programming[11] or who have received the State of Oregon's Charge Ahead Rebate for an electric vehicle), an additional $500 incentive amount will be available, up to $1,000, with no cap on the percentage of costs paid.[12] In contrast to non-qualifying participant programming, low-income participants will not be required to, but will have the option of, enrolling in a residential TOU rate for at least one year. Making this enrollment optional for qualifying participants provides flexibility for participants that may not have control over rate participation.

Table 1. Summary of Proposed Incentives

Incentive	Description
Standard EVSE Installation Rebate Up to $500; capped at 75 percent of EVSE eligible costs paid	A one-time rebate for the purchase and installation of a Qualified L2 EVSE. Eligible Customers will receive the rebate by check or bill credit from the Company upon approval of rebate qualification. Customers will be automatically enrolled in the residential TOU rate for a minimum of one year.
Income eligible EVSE Installation Rebate Standard **incentive of $500, plus an additional $500 for income-qualified customers**; capped at total EVSE eligible costs paid	A one-time rebate for the purchase and installation of a Qualified L2 EVSE. Eligible Customers will receive the rebate by check or bill credit from the Company upon approval of rebate qualification. Customers will have the option to enroll in the time-of use rate.

Market and Customer Outreach: Pacific Power will expand current communications with residential customers to incorporate information on this new pilot offering through traditional channels including social media, website, email, and bill inserts.

To successfully meet participation goals for this pilot, Pacific Power recognizes the need to work closely with auto dealerships and electricians so that they may leverage this pilot program as they work directly with consumers who are in the process of deciding whether or not to acquire an EV and accompanying L2 charger. These market actors are key allies in the success of this pilot.

[11] Low-income programming includes the Oregon Energy Fund, Low Income Home Energy Assistance Program, or the Oregon Energy Assistance program. Information on these programs is available at: https://www.pacificpower.net/my-account/payments/bill-payment-assistance.html

[12] State of Oregon. (2021, April 15). The State of Oregon Requirements for Charge Ahead Applicants. Oregon.Gov. https://www.oregon.gov/deq/aq/programs/Pages/Charge-Ahead-Rebate.aspx

Important to the success of this pilot is the extent to which income qualified customers can achieve equitable access to L2 chargers. Pacific Power plans to work closely with Community-Based Organizations to integrate this pilot offering of up to $1,000 per installed charger, which can supplement other existing sources of funding support such as the Oregon Charge Ahead rebate. Pacific Power will work with its Regional Business Managers to identify and work closely with Community-Based Organizations to integrate this pilot offering of up to $1,000 per installed charger, which can supplement other existing sources of funding support such as the Oregon Charge Ahead rebate.

Administration: The Company anticipates issuing a competitive solicitation to identify a program management vendor to process the customer incentives. Outside of Oregon, the Company manages residential customer incentive programs for energy efficiency. Utility staff will leverage lessons learned from these programs and requests for proposals (RFPs) to select a qualified vendor.

Qualifying Products List: Pacific Power plans to account for several considerations in evaluating product eligibility. The Company recognizes that Portland General Electric Company (PGE) has an existing, similar residential L2 EVSE program[13] and sees value in consistency in program specifications across the state and so will consider potential alignment potential alignment as well as align with national resources such as Energy Star[14] which hosts an up-to-date list of qualified EVSE products and specifies if equipment has network capabilities. Moreover, the Company must ensure that charging equipment is valuable for potential load management programs and intends to conduct an RFP to identify qualifying equipment (See section 1.6).

[13] Portland General Electric. (2021, June 20). EV Charging Pilot Qualified Products List. PGN.Com. https://portlandgeneral.com/energy-choices/electric-vehicles-charging/charging-your-ev/ev-charging-pilot-program-home?utm_source=dmg&utm_medium=digitalad&utm_campaign=2021-4-11-res-ev-charging-pilot-spring-ads

[14] Energy Star. (2021, June 20). Energy Star's Qualified Products List. Energystar.gov. https://www.energystar.gov/productfinder/product/certified-evse/results

1.1.3 Timeline and Performance Milestones

Table 1 shows anticipated milestones for this pilot program.

1. **Table 2. Estimated Pilot Program timeline**

Major performance milestones	Start-up		Year 1				Year 2				Year 3				Year 4
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
Pilot Launch															
Develop team, undergo solicitation, select incentive delivery contractor															
Finalize contracting and agreements with contractors															
Build out comprehensive pilot program design (marketing & outreach plan, customer journeys, processes, file management, pipeline management, quality assurance)															
Establish key pipeline and pilot rebate management systems															
Undergo beta test of customer experience															
Launch Pilot															
Pilot Implementation															
Host kickoff events															
Conduct ongoing marketing and outreach															
Manage outreach and pipeline engagement with customers															
Process incentives															
Conduct quarterly and annual reporting															
Deliver quality assurance checks annually on product installations															
File program revision or extension (if recommended)															
Pilot Evaluation (shared between three pilot programs)															

Issue a request for proposals (RFP) for pilot evaluator															
Pilot evaluator selection and contracting															
Gather data to inform evaluation															
Complete evaluation															
Reporting															
Annual progress update to Public Utility Commission of Oregon (all three pilots)															

1.1.4 Expected Outcomes

This pilot will:

- Reduce the upfront cost of installing residential L2 chargers.
- Increase customer knowledge around off-peak charging benefits and encourage customers to charge during off-peak times.
- Provide data to Pacific Power that can inform future programs and planning, including:
    - Costs of purchasing and installing residential L2 charging in Pacific Power's Oregon service territory,
    - Location of EVs and charging equipment on Pacific Power's grid,
    - Customer choices and preferences for L2 charging equipment and extent to which that equipment may be able to be used as a resource in potential future load management programs,
    - Participant satisfaction with TOU rates and attrition rates after the mandatory one-year period, and
    - Estimates of peak charging load that can be feasibly moved to different times.

1.2 Market Baseline Assumptions, Market Barriers, Implementation Barriers, and Strategies to Overcome Barriers

Oregon has aggressive goals for EV adoption across the state. This section outlines the state of the market, major market barriers to widespread transportation electrification in Pacific Power's service area, and how this pilot aims to overcome those barriers.

1.2.1 Market Baseline Assumptions

As of June 2020, there were 6,709 Light Duty Vehicles (LDVs) registered in Pacific Power's Oregon service territory.[15] Approximately 85 percent of those vehicles are owned by residential consumers with the remaining owned by nonresidential entities for business use.

Although current registrations are close to what was projected in Pacific Power's 2020 TE Plan from February 2020, a recently revised forecast for long-term EV adoption shows some dampening effect to the market due to the economic disruption of COVID-19. Bloomberg New Energy Finance's EVO20 makes several statements about the effects of COVID-19 on the auto industry, specifically stating, "the long-term trajectory has not changed, but the market will be bumpy for the next three years". Further, they note that they expect "global passenger vehicle sales to plunge an unprecedented 23% in 2020, and EV sales to drop for the first time in the modern era."[16] Indeed, end of year sales figures confirmed the prediction as "US sales of plug-in light duty electric vehicles in 2020 totaled 296,000 units, which was down significantly from the 331,000 in sales in 2019 due largely to the coronavirus pandemic, according to Platts Analytics Future Energy Outlooks' report released Jan. 26."[17] These trends suggest the need for market intervention to assist in consumer adoption of EVs has not lessened over the past year but has grown more important.

Pacific Power also sees lower penetration rate of EVs within the service territory, which largely serves rural communities.[18] Public charger access per customer is also much lower in these rural areas.[19] Most residential charging needs are met by charging at home. To reduce charging times and provide greater certainty when charging from home, Pacific Power is seeking to better understand the most effective residential program intervention strategy.

1.2.2 Market Barriers

Pacific Power's TE Plan provides a general summary of EV and EVSE market barriers. In the Plan the EV and EVSE market barriers are broadly grouped across the following six categories: 1) awareness barriers, 2) decision-making barriers, 3) economic barriers, 4) policy and regulatory barriers, 5) technical barriers, and 6) supply chain barriers. This pilot will primarily target reducing decision-making and economic barriers, more specifically:

[15] Oregon Department of Energy. (2021, April 24). Oregon Electric Vehicle Dashboard. Oregon.gov.https://www.oregon.gov/energy/Data-and-Reports/Pages/Oregon-Electric-Vehicle-Dashboard.aspx.
[16] Bloomberg NEF. (2021) *Electric Vehicle Outlook 2020* Long-term Passenger Vehicle Outlook. p. 3.1. https://about.bnef.com/electric-vehicle-outlook/
[17] S&P Global Platts. (2021). US EV Sales Tumble in 2020, but EV Load Increases with More Charging Stations. US EV sales tumble in 2020, but EV load increases with more charging stations | S&P Global Platts
[18] Oregon Department of Energy. (2021, April 15). Oregon Electric Vehicle Dashboard. Oregon.gov.https://www.oregon.gov/energy/Data-and-Reports/Pages/Oregon-Electric-Vehicle-Dashboard.aspx.
[19] US Department of Energy. (2021, March 18). Alternative Fuel Data Center. https://afdc.energy.gov/fuels/electricity_locations.html#/find/nearest?fuel=ELEC

- Decision-making barriers are those that complicate or hinder the ability to choose to invest in EV or EVSE technology. Even if consumers are aware of EV technology, other barriers may affect their decision to invest in EVs, such as a lack of confidence in the technology's range or availability of charging stations, or uncertainty about the consistent availability of incentives. Notably, within rural areas (like Pacific Power's service territory), range anxiety is especially problematic, because rural residents on average travel longer distances than their urban counterparts.[20]
- Economic barriers refer primarily to the: 1) high upfront costs for EV technologies, and 2) insufficient operating cost savings. Together, these challenges negatively impact the cost-effectiveness of EVs for consumers. Examples impacting upfront costs include high EV and EVSE capital costs, inadequate or unavailable financial incentives to help with the upfront cost, and lack of affordability for low-income populations.

1.2.3 Implementation Barriers

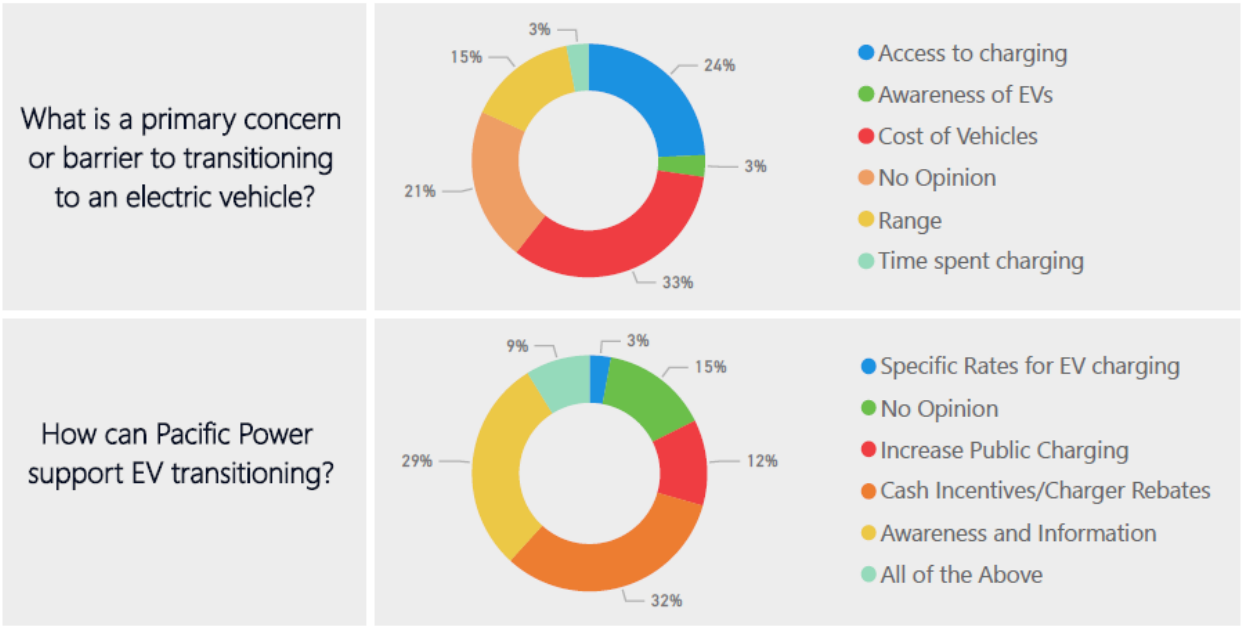
As noted above, Pacific Power's TE Plan provides a general summary of EV and EVSE market barriers – and one of those market barriers ties closely to a program implementation barrier for this new pilot – notably the barrier of "awareness." Awareness barriers include those that hinder the awareness of consumers regarding EVs and EV programs. Examples include a lack of knowledge of the capabilities or costs of EV technology, the available incentives for and operational savings of EVs and EVSE. Related to awareness will be the need to help customers understand the TOU program and application process and alleviate any concerns about the utility's access to data. The same factors that cause a lack of awareness about EV options in the car-buying market discussed above will make it difficult to implement the pilot.

To better understand potential barriers across diverse markets, the Company hired C2 Group to conduct additional surveys across multiple segments throughout the service area. In the 2020 survey, the majority of residential customer responses on how Pacific Power could support transportation electrification included offering cash incentives and rebates, followed by increased education and awareness on EV offerings and charging options.[21]

Figure 2 below illustrates feedback from residential customers. It's notable that after the cost of vehicles, the next two identified barriers to transitioning to an EV are "access to charging" and "range" concerns. This is consistent with information already described above taken from broader sources. The second pie chart below illustrates what residential customers felt the utility could do to support the transition. Again, consistent with the fundamentals of this pilot, the top response of survey participants was support for cash incentives and charger rebates.

[20] Baatar, B. et al. (2019). Preparing Rural America for the Electric Vehicle Revolution. A Report for the American Center for Progress. Washington DC.
https://epm.ucdavis.edu/sites/g/files/dgvnsk296/files/inlinefiles/Preparing%20Rural%20America%20for%20the%20Electric%20Vehicle%20Revolution.pdf

Figure 2. 2020 Residential Customer Outreach Feedback



In September 2020, Cadmus Group conducted interviews with four local EV dealerships, four EVSE manufacturers, and three electricians who install EVSE. Anecdotal information provided by the interviewees indicates that new EV owners are essentially on their own to determine an appropriate home charger (if any) and to find an electrician suitable to perform the installation. Electricians also said they do not provide an opinion on the type of charger a customer selects, suggesting that home charger selection is a secondary consideration for customers after choosing an EV. EV chargers can be readily found on online retail websites, such as Amazon, Home Depot, and Lowes. With such new technology, it is reasonable to expect that these buyers may conduct basic research to identify a home charger that is appropriate for them and their vehicle. Despite this, many EV owners may not fully understand the cost, time, and process for installing a L2 charger. Only after purchasing their EV do some owners learn about certain key barriers that often lead to an infeasible installation. Among these barriers are the need for panel and electrical system upgrades and homeowners' association approval, as well as the lack of dedicated off-street parking where EVSE can be installed. Some of these barriers include significant additional costs.

1.2.4 Pilot Strategies to Overcoming Barriers

Taking again from the Company's TE Plan, as the electricity service provider for its customers, Pacific Power has ongoing contact and communications with customers and is uniquely positioned to address awareness barriers through outreach and engagement to educate customers on the availability, applications, costs and benefits of EV technologies and programs. Pacific Power is in the communities it serves every day working with community partners and can be a trusted resource for technical considerations that the integration of EV will raise for

customers. Many years of experience with energy efficiency program assistance, customer service and communications are highly translatable to being effective in increasing awareness, including program awareness, a key market barrier in TE programming that also affects implementation.

Similarly, Pacific Power is well positioned to support comprehensive planning and integration of EVs for customers in the service territory. Through incentives and rate design programs, the Company can be influential in reducing the cost of EVSE capital and operating costs, thereby mitigating the economic market barrier.

To help build a more informed customer experience through this process, Pacific Power will establish a pre-qualified list of eligible equipment building on national and local resources (such as Energy Star's qualified product list). In addition to supporting the customer experience, this will help ensure that Pacific Power has more reliable access to charging data and will allow the Company to select equipment that meets certain standards such as having capabilities to enable future managed charging programs. A predetermined list of options is expected to be well-received by participants since it provides utility-vetted guidance on product selection. Pacific Power will also look to align with PGE's approved list of chargers, to help build consistency in programming.

1.3 Expected Utilization, Participation Eligibility, and Incentive Structures

The Company expects that approximately 3,500 residential customers will participate in the residential charging pilot over three years. All Pacific Power's Oregon customers on a residential rate schedule will be eligible for the incentive, limited to one incentive claim per customer account. As outlined in Table 2 above, Pacific Power proposes a standard incentive up to $500 (not to exceed 75 percent of total costs) with an additional EVSE incentive of up to $500 (for a total incentive amount of up to $1,000) for income qualified customers.

1.4 Impact on Distribution System

As discussed in Pacific Power's TE Plan, a 2018 EV distribution impact study found that the adoption of electric vehicles in Pacific Power's service area will have minimal impacts on the grid as new loads are incorporated into Pacific Power's planning processes. However, the Company anticipates that the expected costs per upgrade associated with suburban, rural, and urban areas may range from $2,000 to $100,000, but the typical or average accommodation falls within the range of $4,000 to $10,000.[22] This pilot program will ensure Pacific Power is aware of the location of EVSE on the distribution system; knowing the exact location of EVSE on different circuits will allow for better informed decisions and more targeted proactive upgrades.

Another essential component of this pilot is that most participants will enroll in Pacific Power's residential TOU rate. Customers will receive messaging on the importance of charging vehicles during off-peak hours and this messaging will be reinforced by pricing. The Company intends to

[22]PacifiCorp's Response to OPUC Data Request 10 in Docket No. UM 2056 submitted on June 1, 2020.

emphasize this message by highlighting TOU pricing that varies by time of day. This clear and consistent messaging should further reduce the likelihood of increased distribution system costs from this pilot. As uptake increases, the information from the pilot is also expected to help in the broader planning environment unfolding in the Oregon Distribution System Planning efforts.

Additional discussion related to system impacts is considered in Section 4.

1.5 Proposed Ownership Structure

Customers will own the installed chargers. In order to receive the incentive, customers will be required to sign a data agreement, allowing the Company to collect charging data for the life of the equipment and analyze data and charging habits.

1.6 National Standards and Interoperability of Invested Equipment

The interoperability between the vehicles and the chargers made by multiple manufacturers is crucial for the pilot data collection with EVSE technology. Participants will be required to share usage data which will need network capable chargers. Any data collected from the project will be used to better understand the participant's charging habits and determine efficiency for future load management. The pilot will provide a predetermined list of trusted charging models for residential installation. Pacific Power plans to hire a third-party coordinator/vendor to assess the use the technology standards that are emerging as best practices in EVSE incentive programs or utilize standard national resources (such as Energy Start Qualified Products List). The coordinator will review, and score L2 chargers based on the requirements outlined in the program and participant considerations including affordability, network capability and ease of use. The final EVSE recommendations will inform future infrastructure projects and used as part of best practices.

Best-practice technology standards will be determined by coordination with other electric utilities (particularly PGE, to preserve consistency across the State) and consultation with experts include but may not be limited to:

- Collection of station-level and vehicle transactional data
- Automatic data transmission without operator involvement
- Data reported on a web-based portal or network
- Multiple levels of log-in credentials
- Customer support for station activation, vehicle-level data assignment, and other services

- Hardware on open charge point protocol (OCPP) platform prevents stations from becoming obsolete if the cellular network or software provider changes

1.7 Stakeholder Involvement in Pilot Development

Pacific Power engaged in a robust stakeholder and customer outreach process to design these pilots. The Company met with numerous parties individually and in organized stakeholder meetings for guidance on the portfolio of customer programs contemplated in the Company's TE Plan and feedback on design. Invited stakeholders included:

- Climate Solutions
- Environmental Center
- Rogue Climate
- Oregon Citizens' Utility Board
- City of Portland Bureau of Planning and Sustainability
- Department of Environmental Quality
- Northwest Energy Coalition
- Oregon Public Utility Commission Staff
- Oregon Department of Energy
- ChargePoint

As noted above, the Company also reached out to residential customers through a survey. The majority of residential customer responses on how Pacific Power could support transportation electrification included offering cash incentives and rebates, followed by increased education and awareness on EV offerings and charging options. Customers also indicated that external barriers included EV cost of ownership and limited weather-friendly all-wheel drive options.

1.8 Coordination with Related State Programs

The Company will continue to coordinate with several ongoing initiatives and goals supported by various State agencies, including the Oregon Department of Energy, Oregon Department of Transportation, the Climate Office, and the Oregon Department of Environmental Quality. This program will require particularly close coordination with the State's Charge Ahead Rebate Program that is administered by the Oregon Department of Environmental Quality[23]. This program will also be timed as the results of the State's Transportation Electrification Infrastructure Needs Analysis (TEINA) are being finalized. "The TEINA study will highlight gaps in electrical vehicle charging infrastructure and propose solutions to help accelerate widespread transportation electrification in Oregon."[24]

[23] Oregon Department of Environmental Quality. (2021, June 15). Requirements of Charge Ahead Applicants. Oregon.gov. https://www.oregon.gov/deq/aq/programs/Pages/Charge-Ahead-Rebate.aspx

[24] Oregon Department of Transportation. (2021, June 15). Transportation Electrification Infrastructure Needs Assessment. Oregon.gov. https://www.oregon.gov/odot/Programs/Pages/TEINA.aspx

1.9 Coordination of Delivery with Other Market Actors and Activities

This proposed pilot will work in conjunction with other funding sources to provide residential customers with additional savings against the cost of EV purchase and ownership. Residential customers will be able to layer the proposed residential EVSE incentive on top of the federal EV tax incentive and state vehicle rebates, including the Oregon Standard EV Rebate[25] and the Oregon Charge Ahead Rebate.[26] Additional outreach and coordination will be conducted with dealerships, vehicle and EVSE manufacturers, electrical contractors, and CBOs.
Oregon Standard EV Rebate[27] and the Oregon Charge Ahead Rebate.[28]

2 Long-Term Strategy and PacifiCorp's TE Plan

2.1 Current Condition of TE Market and Outlook

Pacific Power's long-term strategy is identified and discussed in the Company's TE Plan, completed in February of 2020, and scheduled for update in February of 2022. Shortly after the Plan was completed, the COVID crisis hit and early projections suggested that the auto industry would suffer massive impacts. For example, in March of 2020, one source wrote, "after the virus appeared in China, auto sales there fell 80 percent [in February]. Globally, the industry has canceled large events—the Geneva Motor Show this month, New York's equivalent next month—for fear of spreading the virus. European carmakers began temporary factory closures last week amid health concerns for their employees, falling demand, and severe disruptions to manufacturing supply chains…"[29] At nearly the same time, the US auto industry announced a shutdown of all three Detroit carmaker manufacturing operations.[30]

Fast forward through 2020 and the dire initial impacts started to fade. "Global market trends were markedly different in the second half of 2020, when lockdowns were lifted or relaxed for some time, and the automotive market started to recover. For electric cars, monthly sales surpassed those between July and December in 2019 in every month in all large markets

[25] Oregon Department of Environmental Quality. (2021, June 15). Requirements of Charge Ahead Applicants. Oregon.gov. https://www.oregon.gov/deq/aq/programs/Pages/Charge-Ahead-Rebate.aspx
[26] The Oregon Charge Ahead Rebate provides an additional rebate beyond the Oregon Standard EV Rebate amount to low- or moderate-income households for the purchase of a qualifying new or used EV.
[27] Oregon Department of Environmental Quality. (2021, June 15). Standard EV Rebate. Oregon.gov. https://www.oregon.gov/deq/aq/programs/Pages/Standard-EV-Rebate.aspx
[28] The Oregon Charge Ahead Rebate provides an additional rebate beyond the Oregon Standard EV Rebate amount to low- or moderate-income households for the purchase of a qualifying new or used EV.
[29] Adams, E. (2020). Covid-19 Is Bad for the Auto Industry. *WIRED*. https://www.wired.com/story/covid-19-bad-for-auto-industry-worse-for-evs/
[30] Le Reau, J. and Howard, P.H. (2020). Detroit Automakers Ford, General Motors, FCA Agree to Close All US Plants. *Detroit Free Press*. https://www.freep.com/story/news/2020/03/18/ford-gm-fca-plant-closures-coronavirus/2865289001/

including China, the European Union, India, Korea, the United Kingdom and the United States, despite second waves of the pandemic."[31]

On a local level, Pacific Power continued to see strong interest from our customers and communities we serve—and travelers throughout our service territory generally—in building out the necessary infrastructure to support the transformation that's underway. Grant programs have attracted applicants from across the state. We also see the forecast from the EV Plan for the year 2020 aligning very closely with actuals.

Looking forward, it's reasonable to expect interest in EVs to continue to grow. Currently there are eight different EV pickup trucks poised to enter the market, with Rivian starting deliveries in 2021 and the electric Ford F-150 scheduled for production in 2022.[32] Additionally, since the first of the year, Volkswagen "unveiled a massive push to drive down the cost of producing batteries for its electric vehicles in the hopes of speeding the transition away from gas-powered cars" and to deliver on its promise of making electric vehicles 50 percent of its sales in the US by 2030.[33] GM is on its way to an all-electric future, with a commitment to 30 new global electric vehicles by 2025, and has set a target of 2035 for ending production of gas and diesel vehicles.[34] These announcements highlight that the EV market is continuing to evolve quickly and efforts to support customers through this change are timely.

Finally, while the macro trends are positive, specific adoption patterns are also starting to emerge that help recommend specific actions to accomplish broader adoption. A Portland State University survey of demographic information of Oregon EV owners found that 88.4 percent of EV owners self-identified as being White or Caucasian and 67.3% self-identified as being male.[35] Demographic information coupled with location registration information from the Oregon EV Dashboard reveals that seven of the top 10 counties with the highest number of EV registrations per 1,000 people are also among the top 10 counties with highest annual median income. This reveals the importance of pilot and efforts to broaden information, access, and affordability to customers well beyond the demographics comprising the early adopters that own EVs today.

[31] Gorner, M. & Paoli, L. (2021). How Global Electric Car Sales Defied Covid-19 in 2020. *IEA*. https://www.iea.org/commentaries/how-global-electric-car-sales-defied-covid-19-in-2020

[32] Beresford, C. (2021). Every Electric Pickup Truck Currently on the Horizon. *Car and Driver*. https://www.caranddriver.com/news/a29890843/full-electric-pickup-trucks/

[33] Hawkins, A. (2021). Here are the Biggest Announcements from Volkswagen's Battery Event. *The Verge.* https://www.theverge.com/2021/3/15/22325813/vw-volkswagen-power-day-battery-electric-car-announcement

[34] Eisenstein, P. (2021). GM to go all-electric by 2035, phase out gas and diesel engines. *NBC News.* https://www.nbcnews.com/business/autos/gm-go-all-electric-2035-phase-out-gas-diesel-engines-n1256055

[35] MacArthur, John, Michael Harpool and Daniel Scheppke. Survey of Oregon Electric Vehicle & Hybrid Owners. TREC-RR-1259. Portland, OR: Transportation Research and Education Center (TREC), 2018. https://www.doi.org/10.15760/trec.205

2.2 Opportunities to Improve the Operation and Reliability of the Electric Company's Power System

The Company will consider additional load management elements related to this pilot as it develops and more is understood about the impacts and dynamics of charging under the TOU. A high-level road map of considerations for a potential demand response program related to this pilot include:

1. First, learn how effective the TOU rate may be – it is a low-cost approach with mutual benefits for the participant and utility system.
2. After two years or at approximately 2,000 incentives, assess the impact and evaluate the efficacy of the TOU rate. For example, one key consideration will be to determine whether the TOU rate structure encourages vehicle owners to start charging at a specific time, e.g., 9:01 pm, in a manner that causes a big sudden usage uptick in energy use on the system.
3. As charging load increases on the system, if the data reveals a significant impact due to the increased load, the Company may look to deploy Demand Response (DR) for cost-effective, coordinated, diversified managed charging control.

3 Pilot Assumptions: Impacts, Benefits, and Costs

3.1 Estimated Pilot Impacts

Pacific Power is proposing a cap of 3500 participants in the pilot over three years of implementation. As Pacific Power gathers data from participating customers through this proposed pilot, that data can be used to evaluate the impact that those EVs and associated EVSE are having on the utility system, which may serve as a useful starting point from which to extrapolate the impacts of EV adoption more broadly.

3.1.1 Participation Assumptions

Projected incremental light duty vehicle (LDV) adoption in Pacific Power's Oregon service territory from the 2020 TE Plan serves as the starting point for estimating pilot participation. As of July 2020, 6,709 EVs are registered in Pacific Power service territory,[36] 65 more than forecasted for mid-year 2020 in the 2020 TE Plan.

[36] Oregon Department of Energy. (2021, April 15). Oregon Electric Vehicle Dashboard. Oregon.gov.https://www.oregon.gov/energy/Data-and-Reports/Pages/Oregon-Electric-Vehicle-Dashboard.aspx.

- 85 percent of new LDV registrations are estimated to be residential consumers with the remaining 15 percent assumed to be commercially owned as business vehicles.[37]
- 10 percent of new LDV owners install a L2 networked charger, while the large majority simply use L1.[38]

With robust outreach and marketing, and based on similar programming in California, 50 percent of remaining new EV purchases can reasonably be assumed to participate in the pilot and acquire a L2 networked charger.[39] Over three years, as shown in Table 3, the culmination of these assumptions equates to 3,459 participants. For pilot design purposes the Company proposes a cap of 3,500 participants over three years of implementation.

A goal of the pilot is to reach a broad mix of customers across geographies as well as income and ethnicity and age. According to 2019 US Census data, across the counties that Pacific Power serves in Oregon, about 14% percent of the population has household income below the federal poverty level. EV owners tend to fall in higher income brackets as well: a PSU survey found that only 9% of Oregon EV owners report income as below $50,000/year.[40] The pilot outreach will strive to achieve at least 15 percent of incentives to income qualified customers, but the larger barrier of new EV ownership is first, the cost to ownership. A rough assumption is applied to this pilot design that 5 percent of pilot participants will be income qualified. Regular reporting and evaluation of pilot participation will track progress towards these assumptions and may inform necessary adjustments to budget or pilot design.

[37] National Research Council. (2015). *Overcoming Barriers to Deployment of Plug-In Vehicles*. The National Academies of the Press. DOI 2015939639. Front Matter | Overcoming Barriers to Deployment of Plug-in Electric Vehicles | The National Academies Press (nap.edu)

[38] Guidehouse Inc. (2020). Pacific Power Transportation Electrification Programs-Evaluation Report.

[39] Center for Sustainable Energy. (2015). Clean Vehicle Rebate Project Participation Rates: The First Five Years (March 2010 – March 2015). https://cleanvehiclerebate.org/sites/default/files/attachments/2015-10%20CVRP%20Participation.pdf

[40] MacArthur, John, Michael Harpool and Daniel Scheppke. Survey of Oregon Electric Vehicle & Hybrid Owners. TREC-RR-1259. Portland, OR: Transportation Research and Education Center (TREC), 2018. https://www.doi.org/10.15760/trec.205

Table 3. Development of Pilot Participation Estimate

Incremental Participation	*Year 1*	*Year 2*	*Year 3*	*TOTAL*
				3 yr.
New LDVs, incremental 2020 TE Plan	2,656	3,043	3,344	9,043
New residential LDVs (85%)	2,258	2,586	2,842	7,686
Qualifying chargers (10%)	226	259	284	769
Remaining and participating (50%)	1,016	1,164	1,279	**3,459**
Subset of participating as Income Qualified (5%	51	58	64	**173**

3.1.2 Utility System Impacts

The system impacts (incremental energy, capacity, and local infrastructure upgrades) related to the increased charging load for these pilot participants are calculated based on a series of assumptions. These assumptions will be informed and adjusted based on reporting and evaluation of the pilot. Estimated total annual energy use per charger and the timing of when the charging is expected to occur are based on the following sources.

Annual energy use

- The underlying pilot program logic assumes the existence of the L2 networked charger incentive will remove cost and charging convenience barriers to EV ownership. Therefore, all charging load is considered incremental.
- Average annual charging energy is estimated as 3,411 kilowatt-hours (kWh) per residential consumer.[41]
- PGE estimates 3,724 kWh (10 percent more) in their Residential EV Pilot; Pacific Power's 2020 TE Plan estimated annual charging load at 3,100 kWh (10 percent less) based on assumption of 8.5 kWh/day used in the Oregon Clean Fuels calculations. For cost effectiveness scenarios, a +-10 percent range was applied.

Timing of charging

- All participants will be automatically be placed on the new residential TOU rate unless an exception is granted.

[41] U.S. Department of Transportation Federal Highway Administration. (2018, March 29). State & Urbanized Area Statistics. FHWA.dot.gov. https://www.fhwa.dot.gov/ohim/onh00/onh2p11.htm

- Pacific Power's new TOU rate has a 4:1 on-peak to off-peak ratio.
    - A similar California TOU rate design from SDG&E has led to 94 percent of energy use off peak and 6 percent on peak[42]
    - For the analysis of pilot impacts, an energy impact of 94 percent off peak and 6 percent on peak is assumed and will be the subject of the pilot evaluation to inform future analysis of benefits.
- Building on the prior assumption, 6 percent of charging energy is on peak and is spread over 17 percent of hours in the year (four hours per day on peak x 365 days per year / 8760 hours per year = 0.17) is assumed to define coincident peak capacity impacts.

System upgrade needs

- Distribution system upgrades due to increased charging load are estimated to be needed for 3 percent of new urban area chargers and for 1 percent of new EVSE in rural areas of the system at an estimated cost of $4,000-$10,000 per upgrade.[43]

Table 4. Impacts to the Utility System

Cumulative System Impacts	*Year 1*	*Year 2*	*Year 3*
New EVSE charging load (MWh)	3,466	7,435	11,798
On -peak energy (MWh)	208	446	708
Estimated Coincident Peak Capacity (MW)	0.15	0.33	0.52

3.2 Benefits

The benefits of pilot are estimated across three categories according to where the benefits are accrued. Benefits to the utility system are realized by all customers, benefits to participants are direct and indirect, and benefits to society are broadly shared.

[42] Cook, J.; Churchwell, C. & George, S. (2014). *Final Evaluation for San Diego Gas & Electric's Plug-in Electric Vehicle TOU Pricing and Technology Study.* https://www.sdge.com/sites/default/files/SDGE%20EV%20%20Pricing%20%26%20Tech%20Study.pdf

[43] Pacific Power.(2020). Oregon Transportation Electrification Plan. Public Utility Commission of Oregon. https://edocs.puc.state.or.us/efdocs/HAA/haa17127.pdf

Utility system

Utility electric system benefits represent grid or ratepayer benefits that are attributable to the Company's Oregon service area. These benefits can take the form of an avoided cost or a realized gain, which demonstrably leads to greater efficiencies, reliability, lower costs, or lower rates for the utility's electric system.

- **Revenue gains** from increased energy sales are quantified assuming 94 percent of the incremental charging load is added at the off-peak TOU rate ($0.0661/kWh) and 6 percent is added at the on-peak rate ($0.2648/kWh) of the new residential TOU rate. These gains in sales are offset by increased supply and capacity costs to serve increased charging load as described under Costs. Electric rates will be lower if the change in revenues from the program is greater than the change in utility costs.
- **Market revenues from Clean Fuels credits** from increased residential EV charging are allocated to Pacific Power and monetized. However, since those funds are directly applied towards additional Clean Fuels specific TE programs, they do not reduce the costs of this pilot as a benefit for ratepayers or the utility system and are not included in the quantification of associated benefits.

It is anticipated that data collected from this pilot will help support further quantification of utility benefits resulting from behavioral changes in response to TOU rate schedules and the potential for EV chargers to act as dispatchable resource for demand response. Additional information is needed before these benefits can be accurately quantified in a cost-benefit analysis.

Participant

- **Incentives** of $500-$1,000 directly lower the cost of the participant's investment in installing networked L2 charging on their premises. This participant benefit is also a direct utility system cost.
- **Tax Credits** may apply to lower the investment cost of EVs and EVSE.
- **Fuel cost and vehicle maintenance saving**s for EV owners incremental to ownership of an internal combustion engine vehicle.[44]

Society

- **Greenhouse Gas (GHG) emissions reductions** calculated as the net impact of replacing emissions from equivalent miles traveled with an ICE compared to an EV, charged with electricity from the PacifiCorp Oregon-allocated emissions profile from the 2019 Integrated Resource Plan (IRP) preferred portfolio as was applied to the 2020 TE Plan.

[44]AAA. (2019). Your driving costs, How much are you really paying. 19-0415_AUTO_YDC Brochure.indd (aaa.com)

The value of equivalent tons of carbon can be quantified by applying the Social Cost of Carbon to the net emissions reduction.[45]

3.3 Costs

The costs of the pilot span not just administration, management, evaluation, and incentives but also estimated cost to be incurred by the utility system to reliably meet the increased charging load when and where it's anticipated to be needed. The initial direct cost for program administration, management, evaluation, and incentives is outlined in Table 5 below. Infrastructure and supply costs are captured in Section 4.1.

- **Program administrative and management costs** include participant enrollment and incentive processing and annual evaluation costs. Pacific Power assumes 0.5 full-time employees will be added as a result of pilot approval to oversee and manage this work. Estimated costs for these pilot expenses are based on similar TE programs delivered in Utah and the Company's experience with energy efficiency program delivery.
- **Incentive** payments of $500 or $1,000 (if income qualified) are assumed for each participant. Pacific Power assumes 5 percent of total participants are income qualified. A payment of $500 is estimated to cover nearly 100 percent of the cost of the Level 2 charger, but participants will also incur costs for installation which may vary from $1,200 to $3,500+ depending on the need for panel upgrades and overcoming locational challenges. Incentives are the majority of the pilot program budget.
- **Marketing and Outreach** costs refer to activities described in Section 1.1.2 including communications to installers, dealerships, and customers. Costs are estimated based on similar utility programs.
- **Pilot evaluation** costs refer to activities described in Section 5 and are assumed to comprise 5% of the total costs.

The table below summarizes the estimated direct costs over the three-year life of the pilot.

Table 5. Total estimated administration, management, evaluation, and incentives costs

	Year 1	Year 2	Year 3	3-year Term
Incentives	$ 533,335	$ 611,026	$ 671,537	$ 1,815,899
Program administration	$ 75,000	$ 75,000	$ 75,000	$ 225,000
Outreach/Marketing	$ 150,000	$ 150,000	$ 150,000	$ 450,000
Evaluation	$ 37,917	$ 41,801	$ 44,827	$ 124,545
Total	**$ 796,252**	**$ 877,828**	**$ 941,364**	**$ 2,615,444**

[45] The 2019 PacifCorp IRP estimated the social cost of carbon as $50/ton in 2021.

4 Cost Effectiveness

4.1 Cost Effectiveness Tests

The California Standard Practice Manual[46] is the standard by which most distributed energy resource (DER) programs sort through the various perspectives of utility programs to analyze cost effectiveness. Beneficial electrification is counter to how these tests are typically applied for energy efficiency programs, by adding electricity system load instead of reducing usage. However, three of the six standard tests; Ratepayer Impact, Total Resource Cost, and the Societal Cost test, can provide potential insights into cost effectiveness of how the energy usage is added to the system. In addition to the budget elements described in Section 3.3, additional costs are incorporated in the tests, including:

- **Increased supply costs** quantify the cost for increased system energy purchases and system capacity to meet added customer usage. Avoided costs values approved by the Commission in 2020 for Energy Trust's use in 2021 efficiency program design (docket UM 1893) are used in the base case analysis to quantify incremental energy and capacity costs based upon the assumed pattern of charging load influenced by enrollment in the residential TOU rate.
- **Infrastructure cost** is an estimate of the distribution system upgrade costs necessary for added load.
- **Participant cost** includes all costs the participant incurred for the EV plus EVSE less the incentive, which are incremental to costs otherwise incurred to own an ICE.
- **Total installed cost** encompasses the participant cost plus the incentive paid to the participant.

Table 6 lists the estimated benefit and cost categories for each of the three tests with relevance to increasing load.

Table 6. Cost Effectiveness Test Components for Beneficial Transportation Electrification

BENEFITS	**RIM**	**TRC**	**SCT**
Revenue gain, increased sales	New Residential TOU Rate	N/A	N/A
Market Revenue	N/A	N/A	N/A
Tax Credits	N/A	EV (up to $7500) EVSE (up to $1500)	N/A
Non-Energy Benefits	N/A	Fuel cost savings O&M savings (EV vs ICE)	Cost of Carbon Fuel cost savings

[46] California Standard Practice Manual.(2001).Economic Analysis of Demand-side Management Projects. https://www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=7741

			O&M savings (EV vs ICE)
COSTS	**RIM**	**TRC**	**SCT**
Administrative Costs	Yes	Yes	Yes
Infrastructure Costs	Yes	Yes	Yes
Incentives	$500/$1,000 per unit	N/A	N/A
Participant Cost	N/A	Price increment of EV over ICE, including EVSE	Price increment of EV over ICE, including EVSE
Total Installed Cost	N/A	Participant cost of incremental EV+EVSE, plus incentives	Participant cost of incremental EV+EVSE, plus incentives
Increased Supply Cost	Energy, Capacity adjusted for line losses	Energy, Capacity adjusted for line losses	Energy, Capacity adjusted for line losses

For each of the three tests, base case results are provided below with benefit / cost detail by year considered over the assumed life of the charger (10 years). The base case result tables are followed by scenarios which stress key assumptions for that test to show how these values may impact the overall cost effectiveness estimates of the pilot and highlight the need for evaluation of these base assumptions to inform future designs.

4.2 Ratepayer Impact Test Results

Table 7 shows the results of the RIM test assuming 100 percent of the incremental charging load due to installation of the pilot participant EVSE as being just marginally cost effective with a benefit/cost ratio (BCR) of 1.03. Scenarios around key assumptions help to show which aspects drive value in the pilot and where the evaluation plan will focus.

The table presents annual costs and benefits for the three years of the pilots' duration as well the net present value (NPV) of costs and benefits calculated considering the 10-year life of the participating EVSE, with total pilot impacts lasting through 2032 (12 years).

With the Base Case assumptions, more than half the costs are from increased supply costs. Incentives account for 25 percent costs and 11 percent of costs are pilot administration, evaluation, and outreach/marketing. Revenue gains reflect the impact of participant response to the TOU rate with 94 percent of charging resulting during low off-peak rate hours.

Summary results of two scenarios are included. The first shows the impact to cost-effectiveness by varying the annual energy usage assumption +/- 10 percent from the base case 3,441 kWh/yr. Finally, if all participants were to remain on the standard retail rate and charge half of the time during on peak hours, the BCR is just below 1.0.

Table 7. RIM Test - Benefit Cost Analysis

2021 ($)	*Total*	*Year 1*	*Year 2*	*Year 3*
	12 yr. NPV	2021	2022	2023
Benefits				
Revenue Gain, increased sales	**6,875,285**	270,441	580,277	920,724
Costs				
Incentives	1,652,317	533,500	611,000	671,500
Program Admin & Eval	318,862	112,917	116,801	119,827
Outreach/marketing	410,872	150,000	150,000	150,000
Infrastructure Cost	469,131	151,454	173,495	190,677
Increased Supply Cost	3,807,084	98,046	239,698	426,293
Total Costs	**6,658,266**	1,045,898	1,290,994	1,558,296
Benefit / Cost Ratio	1.03			
Scenarios:				
+-10% charging energy	0.99-1.07			
NO TOU rate			0.97	

4.3 Total Resource Cost Test Results

Table 8 shows the results of the total resource cost (TRC) test. Even assuming 100 percent of the incremental charging load and federal tax credits for EV and EVSE are extended, the pilot program does not pass this cost effectiveness test with a BCR of 0.94. Without tax credits, the TRC drops to 0.23.

The table presents annual costs and benefits for the three years of the pilots' duration yet the NPV of costs and benefits is calculated over the life of the participating EVSE, through 2032. The TRC does not reflect the value of the policy driver behind beneficial electrification which is to lower GHG emissions but does illustrate that only adding charging load to the system at the incremental cost of an EV and EVSE compared to and ICE is not cost effective from a combined utility and participant perspective alone.

Also included in the table below are two scenarios which show a modified TRC which adds the benefits of GHG reductions as quantified through the Social Cost of Carbon and a weighted average of DEQ's Clean Fuel Carbon Credits from the past 5 years taking into account

PacifiCorp's Oregon emissions intensity projection per the 2019 IRP. The NPV of GHG reduction is estimated to be $5.8 million for social cost of carbon and $9.7 million for clean fuel credits.

The second scenario removes the benefits of federal tax credits yet retains the benefit of GHG Reductions yielding a Societal Cost Test result of 0.38.

Table 8. TRC Test – Benefit Cost Analysis

2021 ($)	*Total*	*Year 1*	*Year 2*	*Year 3*
	12 yr. NPV	2021	2022	2023
Benefits				
Participant O&M	8,480,978	333,602	715,800	1,135,758
Federal Tax Credits	26,751,375	8,636,000	9,894,000	10,871,500
Total Benefits	**35,232,353**	8,969,602	10,609,800	12,007,258
Costs				
Participant incremental cost	30,776,644	9,935,364	11,382,856	12,507,316
Incentives	1,652,317	533,500	611,000	671,500
Program Admin & Eval	318,862	112,917	116,801	119,827
Outreach/marketing	410,872	150,000	150,000	150,000
Infrastructure Cost	469,152	151,454	173,516	190,659
Increased Supply Cost	3,662,290	99,067	229,777	409,745
Total Costs	**37,290,137**	10,982,301	12,663,951	14,049,047
Benefit / Cost Ratio	**0.94**			
Scenarios:				
Plus GHG Reduction (SCC)	1.10			
Plus GHG Reduction (DEQ CFC)	1.20			
Without federal tax credits (SCT)	0.382			

4.4 Cost Effectiveness Considerations

4.4.1 National Standard Practice Manual

In 2020 the National Energy Screening Project expanded upon the 2017 release of a National Standard Practice Manual for Assessing the Cost-Effectiveness of Energy Efficiency Resources to incorporate all DERs. The premise of both manuals is to "help inform which resources to acquire to meet the jurisdictions specific policy goals and objectives." The approach is not unlike the California standard practice manual in that costs and benefits of DER programs are quantified and compared but the approach stresses the importance of starting with policy goals and objectives and building a primary cost-effectiveness test that tests those objectives.

4.4.2 Executive Order 20-04 and UM 2165

The Oregon Utility Commission and Staff have created a workplan to address the Governor's Executive Order 20-04 which currently includes steps to look further into the cost effectiveness methodology for utility TE programs in the near future. In May 2021, the OPUC opened docket UM 2165 "Investigation of TE Investment Framework", where investment frameworks including cost-effectiveness guidelines are anticipated to be examined. Both the California Standard Practice Manual and the National Standard Practice Manual provide foundations for that discussion, as does consideration of modifications to other approaches to funding new business activities such as line extension policies. Given Oregon's policy objectives for the utility to play a role in support of consumer/customer adoption of EVs the data collected on all the benefits and costs of this pilot should be helpful for those discussions of cost effectiveness test design. Subsequent cost-effectiveness analysis for TE pilots will incorporate advice and guidance developed through these proceedings and may cause changes to results shown above.

4.4.3 Cost effectiveness of TE Portfolio

In designing the 2021 residential, nonresidential and outreach pilot proposals, Pacific Power recognized that an effective intervention strategy to accelerate the adoption of EVs across the service territory will take a portfolio of actions. Residential EV adoption assumed to be influenced through this pilot effort may also be influenced through increased access to public charging that was made possible through the nonresidential pilot as well as an enhanced "ride and drive" from the Outreach pilot. Each pilot addresses known barriers to adoption which together offer a strong approach to influencing consumers decisions. Since each pilot leverages the efforts of other pilots, future consideration of a portfolio approach TE program cost effectiveness and funding authorization may be beneficial.

4.5 Proposed Cost Recovery

The Company expects that the residential home charging pilot will provide a significant benefit to customers across Pacific Power's Oregon service area. Upon Commission review and approval of the proposed budget, PacifiCorp will implement a cost tracker to record pilot

expenditures.[47] Expenditures recorded in the balancing account will be deferred for future Commission review and potential rate recovery through a general rate case or a rate rider specific to transportation electrification programs.

Assuming approval of PacifiCorp's proposed budget for this pilot, the company estimates a rate impact of 0.1% each year of the pilot.

5 Pilot Evaluation

5.1 Evaluation Plan

Pacific Power has designed this proposed pilot program and evaluation plan to enable the company to identify key learnings and indicators of success throughout the life of the pilot such that lessons learned may be incorporated along the way. At the conclusion of the pilot, if deemed successful and meaningful to continue, the Company may propose to scale the pilot into a longer-term program offering.

The pilot design is built upon a number of key assumptions. Each of these assumptions will be evaluated with data gathered through the pilot, which will be included in regular reporting as well as other sources of market indicators.

Upon receiving approval to implement the pilot, Pacific Power will conduct a competitive solicitation and contract with a third-party contractor to design and execute a robust evaluation plan.

5.1.1 Process and Methods

Evaluation of the pilot will include process and impact elements occurring at annual intervals with ongoing quarterly reporting of pilot performance such that interim findings may inform continuous improvement of the pilot design. During pilot "startup" a third-party evaluator will be identified to set in place the data gathering requirements needed for efficient design of annual evaluations.

Process evaluation

The process evaluation aspects will inform how well the overall pilot is working from a procedural standpoint and will identify not only inefficiencies or bottlenecks to process but also helpful changes to marketing language or relationship gaps with the market. These aspects will be evaluated through interviews and review of pilot documentation.

[47] PacifiCorp submitted an application for approval of deferred accounting for a balancing account related to its TE Plan in Docket No. UM 1964 on July 27, 2018, and filed for reauthorization on March 24, 2020, amended on April 22, 2020, and on March 23, 2021. The Commission has not yet acted on these filings.

Three main categories of interviews are needed: 1) participants and non-participants, 2) Pacific Power pilot management staff and implementation contractors, and 3) key market actors such as dealerships and installers.

Examples of questions answered through the process evaluation include:

- How satisfied are participants and market actors with the pilot design?
- Were participants motivated by the incentive to purchase an EV plus a Level 2 networked charger?
- What are the demographics of participating customers? Are we seeing equitable distribution of participants?
- How satisfied are participants with participation on the TOU rate?
- Are there recommended changes to the pilot design to improve participation?

Impact evaluation

The impact evaluation begins with data collection to develop a baseline against which impacts can be measured. This pilot is testing not just the influence of the incentive the EV + EVSE purchase decision but also the effectiveness of the TOU rate in encouraging off-peak charging and the corresponding impacts on the utility distribution system. In addition, the impact evaluation will complete a field sample site evaluation of the equipment to ensure successful installation and network connectivity. The third-party evaluator will set up a clear approach to measurement of each impact during pilot start up.

Examples of analysis provided in impact evaluation include:

- Average annual charging load (kWh) vs. whole home load
- Hourly charging patterns of participants vs non-participants
- Variation in charging patterns by demographics
- Distribution system upgrades associated with local increases to load

Table 10 provides a few examples of how each of the key assumptions in the pilot will be evaluated by the third party. Once the pilot is approved, a third-party consultant will be identified who can then firm up the evaluation plan prior to pilot implementation.

Table 10. Key Assumptions to be Evaluated

Key Assumption	Base Value	Evaluation Approach
Annual charging load (kWh)	3,411 kWh	Charger data review
Charging load shape (% on vs off-peak)	6% on peak, 94% off peak,	Charger data review
Pilot penetration	50% new EV owners	Participation vs registration data
Income qualified participation	5% of participants	Pilot documentation review

5.2 Proposed Reporting and Evaluation Timeline

Reporting of pilot progress and findings will be established on a quarterly basis with more comprehensive reports annually. The frequency and focus of the reporting is designed to give the company ongoing insights into customer and market response and where adjustments to the approach may be needed to meet objectives and address any implementation barriers identified in the evaluation process.

Quarterly reporting includes:

- Number of participants and cumulative participation to date
- Outreach / marketing activities
- Charging data capture and evaluation
- Incentive processing
- Locational tracking of incentives/city/service territory location

Annual reporting includes:

- All portions of quarterly reporting
- Analysis of charging data patterns
- Locational summarization of incentives and charging patterns

Overall Pilot Evaluation includes:

- Third-party evaluation of pilot findings and recommendations
- Process and impact components
- Assessment of key assumptions
- Summary of PacifiCorp's program experiences in other states

5.3 Estimated Costs of Evaluation

Consistent with guidance from the California Evaluation Framework prepared for the California Public Utilities Commission, and experience with similar programming, it is assumed that approximately 5 percent of total costs are attributed to pilot evaluation.[48]

6 Discussion of SB 1547 Considerations

Oregon SB 1547 outlined a series of six standards for the Commission to consider as they review TE programs filed by investor-owned utilities. PacifiCorp has designed the proposed programs with these standards in mind, and anticipates the program accelerating TE adoption in Oregon in accordance with the intent of SB 1547.

- PacifiCorp's proposed residential charging pilot is designed for customers of Pacific Power, and thus, is **within the service territory of the electric company.** The company has taken steps to limit the risk of the pilot being extended outside of the service territory by mandating that any customers receiving funding must be current Pacific Power customers.
- PacifiCorp submits this proposal for Commission review to provide a detailed description of the residential charging pilot, information on the potential costs and benefits, pilot evaluation plans, a description of how the pilot fits into the Company's overall TE strategy, and how this will help accelerate the EV market in Oregon. This is to aid in the Commission's determination of **whether the pilot is prudent**. Further, PacifiCorp intends to seek Commission authorization to defer the costs of this pilot program for later cost recovery, which will allow a second opportunity for Commission review of actual costs to ensure that expenditures fit within the framework of the approved pilot.
- The goal of the residential charging pilot program is to make affordable residential charging more widely available to customers within Pacific Power's service area. To effectuate this, the Company is offering grant funding to customers who install charging, the costs of which will be recorded for future Commission review. This ability to audit installations after the fact—but before costs ultimately go into customer rates—will provide certainty that **the equipment is reasonably expected to be used and useful, as determined by the Commission**.
- Through this pilot, the Company will attempt to gain deeper insight into customer transportation decisions, where vehicle charging occurs and charging behaviors. These

activities will **ensure the pilots are reasonably expected to enable the electric company to support the electric company's electrical system.**

- A key component of the pilot will be the requirement that recipients enroll in the TOU rate, improving operational flexibility, and the requirement that EVSE support the Company's ability to integrate variable generating resources. This requirement supports the requirement that the Company is **reasonably expected to improve the electric company's electrical system efficiency and operational flexibility, including the ability of the electric company to integrate variable generating resources**.

- Aside from EVSE equipment requirements, the Company will remain technology and brand neutral to encourage competition and customer choice. Remaining brand-neutral supports the Company's ability to **stimulate innovation, competition, and customer choice in electric vehicle charging.**

Exhibit 2

Purpose

The purpose of the Transportation Electrification Residential Charging Pilot (Pilot) is to improve the access and economic viability of home charging for Residential Customers by providing an incentive to help offset the costs associated with the purchase and installation of qualifying electric vehicle supply equipment (EVSE).

Available

In all territory served by the Company in the State of Oregon

Applicable

To Residential Customers otherwise receiving Delivery Service under Schedule 4, in conjunction with Supply Service Schedule 201.

Customer Participation

Customer participation is voluntary and is initiated by following the participation procedures on the Company website. The Company shall have the right to qualify participants, at its discretion, based on criteria the Company considers necessary to ensure the effective operation of the measures, utility system, and program budget.

Program Description

This Pilot provides a Standard EVSE Installation Rebate (Standard Rebate) for Residential Customers who purchase and install a Level 2 (L2) networked charger at their residence. For Residential Customers who meet the income qualifications outlined in Income Eligibility, an Income-Eligible EVSE Installation Rebate (Income Eligible Rebate) is available.

Qualifying EVSE and Costs

Qualifying EVSE will be determined from either a Company Qualified Products List or reference national qualifying product lists such as the Energy Star Qualified EVSE products list.. The costs covered under this Pilot include licensed electrician labor, materials, and permits. Participants will be required to provide copies of contractor invoices, required permits, and proof of purchase and installation of a qualifying L2 charger to participate in the Pilot.

Incentive Amounts

The Pilot will provide a one-time rebate for the purchase and installation of a qualified L2 EVSE:

Standard Rebate	Up to $500, capped at 75 percent of qualified costs
Income Eligible Rebate	Standard Rebate + up to $500, capped at 100 percent of qualified costs

Income Eligibility

Low-income qualified customers demonstrate eligibility through participation in low-income programming, including the Oregon Energy Fund, Low Income Home Energy Assistance Program, or the Oregon Energy Assistance program. Information on these programs is available at: https://www.pacificpower.net/my-account/payments/bill-payment-assistance.html

(continued)

Special Conditions

1. Residential Customers receiving the Standard Rebate will automatically be enrolled in the Residential Time-of-Use Pilot Schedule 6 for a minimum of one year.
2. Residential Customers receiving the Income-Eligible Rebate will have the option to enroll in Schedule 6.
3. To be eligible for an incentive, Customers must submit a Program Administrator approved post-purchase application and meet all Program requirements.
4. Incentives will be available on a first come first served basis with an overall port and three-year program cap.
5. The Company and its agents reserve the right to inspect installations.
6. Applications may be subject to charger and per project caps.

Exhibit 3

PACIFIC POWER
TRANSPORTATION ELECTRIFICATION PROGRAM

NONRESIDENTIAL CHARGING PILOT PROGRAM

JUNE 30, 2021

Executive Summary

To further accelerate transportation electrification (TE) Pacific Power is proposing a nonresidential pilot program to provide an Electric Vehicle Supply Equipment (EVSE) incentive for Level 2 (L2) chargers. Growing adoption of Electric Vehicles (EV) in Oregon requires additional charging infrastructure across the Pacific Power service area. Pacific Power proposes to offer a cash or on-bill incentive for nonresidential customers installing qualifying charging infrastructure. This program will also offer targeted incentives for installing charging at multi-unit family dwellings (MUDs) to increase charging access for renters. Nonresidential customers earn a per-port incentive for installing qualifying L2 electric vehicle charging equipment at their location. Incentives will be available for MUDs and nonresidential applications.

Program	Nonresidential Incentive
Incentive Amount	Level 2: Up to $1,000 not to exceed 75% per port; Level 2 at MUD: Up to $3,000 not to exceed 75% per port
Customer Participation	975 ports over three years depending on incentive type
Eligibility	Nonresidential Pacific Power customers; MUD on a nonresidential rate
Timeline	Ramp up plus three years
Technical Aspects	Qualifying Level 2 networked chargers, enroll in Pacific Power's TOU or Schedule 29 pilot rate if a small nonresidential customer
Charging Plan	Collect charging data and information-evaluate managed charging and demand response
Equity Concerns	Additional MUD incentive, agricultural applications

Table of Contents

1 Introduction and Description of Programs

The state of Oregon has broad goals to increase the number of electric vehicles on the road and reduce emissions from the transportation sector. Utilities play a critical role in supporting their customers as they transition to electric vehicles. As a component of its broader TE initiatives, Pacific Power (Pacific Power or the Company) proposes to offer a cash or on-bill incentive for nonresidential customers installing qualifying charging infrastructure. This program will also offer targeted incentives for installing charging at MUDs[1] to increase charging access for renters.

This application is structured to demonstrate how this pilot program complies with the Transportation Electrification Program Application Requirements under OAR 860-087-0030. Additional strategic insights to the pilot program proposed by the Company are included in in its February 3, 2020 Transportation Electrification Plan (TE Plan).[2] The Nonresidential Charging Incentive Pilot program is identified in that plan as a key short-term intervention strategy.

Installing adequate infrastructure statewide is critical to assist with charging and refueling EVs. Nonresidential buildings and MUDs that facilitate installation of EV charging infrastructure provide an important opportunity to reduce the barriers to clean transportation access in workplace and public locations. Data suggests that most EV charging takes place at home, especially in the rural markets that comprise much of Pacific Power's service territory. These markets are also where Pacific Power sees lower penetration rate of EVs within the service territory.[3] Public charger access per customer is also much lower in these rural areas.[4] In these markets, private EVSE developers have not made significant inroads to support nonresidential charging due to lower EV market penetration. By encouraging more charging infrastructure in workplace and public locations, more customers with EVs will be able to charge more easily, particularly those customers who may not have access to parking or charging at home. An incentive will lower the cost of L2 EVSE, supporting purchase and installation costs including licensed electrician labor, materials, and permits. Adoption of the incentive would be supported through marketing and outreach to dealers and EVSE installers.

[1] Pacific Power defines a "Multi-Family Home" as "a residential building that contains three or more dwelling units"

[2] Pacific Power.(2020). Oregon Transportation Electrification Plan. Public Utility Commission of Oregon. https://edocs.puc.state.or.us/efdocs/HAA/haa17127.pdf

[3] Oregon Department of Energy. (2021, April 15). Oregon Electric Vehicle Dashboard. Oregon.gov.https://www.oregon.gov/energy/Data-and-Reports/Pages/Oregon-Electric-Vehicle-Dashboard.aspx.

[4] US Department of Energy. (2021, March 18). Alternative Fuel Data Center. https://afdc.energy.gov/fuels/electricity_locations.html#/find/nearest?fuel=ELEC

To be eligible for the incentive, a small nonresidential[5] customer would be required to enroll in a time-varying rate option.[6] This requirement is a critical component of the program because it will ensure incentive recipients are sent price signals that encourage charging load that minimizes the impact on Pacific Power's system. Larger non-residential customers are subject to demand charges and already have price signals that encourage efficient usage of the system. Nonresidential customers earn a per-port incentive for installing qualifying L2 electric vehicle charging equipment at their location. Incentives will be available for MUDs, workplace charging programs, and other nonresidential applications.

1.1 Objectives, Program Elements, Timeline and Expected Outcomes

1.1.1 Objectives

The objective of the pilot aims to improve customer access and economic viability of charging. As articulated in the Company's TE plan customer access and economic viability of charging is a key barrier to TE and an area where the utility has greater ability to influence. Policies that facilitate the adoption of EVSE, such as programs that provide direct incentives for EVSE installation, can improve the economic viability of charging. With the rural nature of Pacific Power's territory—and the related higher levels of range anxiety (compared to urban areas)—incentives and initiatives to improve the economic viability of charging or otherwise increase the availability of EVSE infrastructure will be important to support long-term market development.

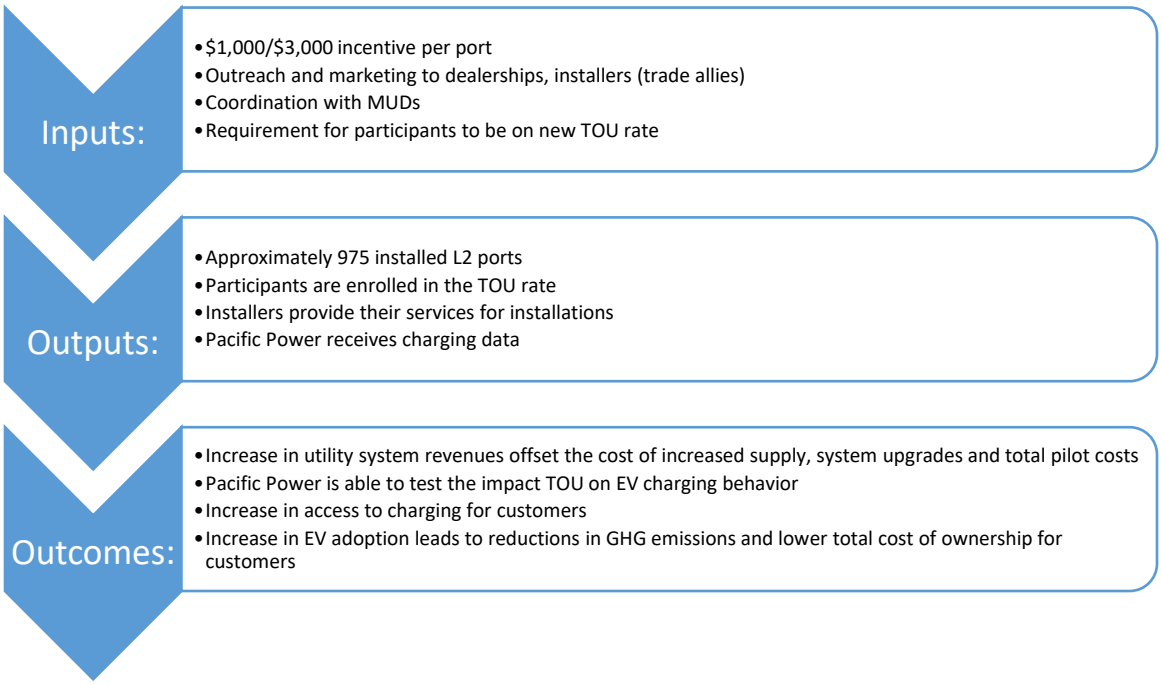
The overall intent of this program is to:

Continue to offer an EVSE support which has seen significant customer interest and has stimulated the development of new electric vehicle charging infrastructure in Pacific Power's Oregon service territory (through grants and technical assistance), increase certainty of funding for customers who need time to scope projects and secure additional funding sources and integrate with technical assistance services to provide holistic customer support.

[5] Per Tariff Rule 1, a small non-residential consumer is defined as a consumer whose demand has not exceeded 30 kW more than once within the preceding 13 months or with seven months or less of service whose demand has not exceeded 30 kW.

[6] Current time varying rate options available for small non-residential customers include Schedule 29 and Schedule 210.

Figure 1. Anticipated Pilot Input, Outputs, and Outcomes



1.1.2 Program Elements

The proposed program is composed of a customer incentive, marketing and outreach activities, administration, and a qualifying products list. These elements are discussed below.

Customer Incentive: Eligible customers can receive an incentive of up to $1,000/port, capped at 75 percent of total costs for the purchase and installation of a L2 networked charger. Qualified costs include licensed electrician labor, materials, and permits. Participants will be required to provide copies of contractor invoices, required permits, and proof of purchase and installation of a qualifying L2 charger. Qualifying chargers will be determined from the Qualified Products List, described below. Small non-residential participants will be required to enroll in a time varying rate option for at least one year.

Eligible MUD customers can receive an incentive of up to $3,000, capped at 75 percent of total costs. Project caps and financial caps will be set to be consistent with best practices throughout the industry.

Table 1. Summary of Proposed Incentives

Incentive	Description
Standard EVSE Installation Rebate Up to $1,000 per port; capped at 75 percent of EVSE eligible costs paid	A one-time rebate for the purchase and installation of a Qualified L2 EVSE. Eligible Customers will receive the rebate by check or bill credit from the Company upon approval of rebate qualification. Relevant customers must enroll in a time varying rate option for a minimum of one year.
MUD eligible EVSE Installation Rebate Up to $3,000 per port; capped at 75 percent of EVSE eligible costs paid	A one-time rebate for the purchase and installation of a Qualified L2 EVSE. Eligible Customers will receive the rebate by check or bill credit from the Company upon approval of rebate qualification. Relevant customers will be must enroll in a time varying rate option for a minimum of one year.

Market and Customer Outreach:

Pacific Power will expand current communications with nonresidential customers to incorporate information on this new pilot offering through traditional channels including social media, website, email, and bill inserts. To successfully meet participation goals for this pilot, Pacific Power recognizes the need to work closely with regional business managers who have established relationships with nonresidential customers so that they can market this pilot program as they work with customers. Pacific Power will also contact local governments, chambers of commerce and trade associations to help extend outreach to small and medium business owners in rural and frontier communities.

Important to the success of this pilot is the extent to which MUD owners and tenants can achieve equitable access to L2 chargers. Pacific Power plans to work closely with multifamily customer groups and home owner associations (HOAs) to gather feedback and address concerns related to participation in the pilot. To stimulate EVSE adoption in high utilization MUDs, Pacific Power is offering of up to $3,000 per installed port, which can supplement other existing sources of funding support such as the Oregon Charge Ahead rebate.

Administration: The Company anticipates issuing a competitive solicitation to identify a program management vendor to process the customer incentives. Outside of Oregon, the Company manages residential customer incentive programs for energy efficiency. Pacific Power will leverage lessons learned from these programs and issue requests for proposals (RFPs) to select a qualified vendor.

Qualifying Products List: Pacific Power plans to account for several considerations in evaluating product eligibility. The Company recognizes that Portland General Electric Company (PGE) has

an existing, similar L2 EVSE program[7] and sees value in consistency in program specifications across the state and so will consider potential alignment as well as align with national resources such as Energy Star[8] which hosts an up-to-date list of qualified EVSE products and specifies if equipment has network capabilities. Moreover, the Company must ensure that charging equipment is valuable for potential load management programs and intends to conduct an RFP to identify qualifying equipment for nonresidential and residential L2 chargers.

1.1.3 Timeline

The Company proposes a startup period estimated to be six to nine months, followed by three years of in-market customer programming.

Figure 2 below represents the anticipated timeline and major elements of the program roll out.

Figure 2. Proposed Timeline

Major performance milestones	Start-up		Year 1				Year 2				Year 3				Year 4
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
Pilot Launch															
Develop team, undergo solicitation, select incentive delivery contractor															
Finalize contracting and agreements with contractors															
Build out comprehensive pilot program design (marketing & outreach plan, customer journeys, processes, file management, pipeline management, quality assurance)															
Establish key pipeline and pilot rebate management systems															
Undergo beta test of customer experience															
Launch Pilot															
Pilot Implementation															
Host kickoff events															
Conduct ongoing marketing and outreach															

[7]Portland General Electric. (2021, June 20). EV Charging Pilot Qualified Products List. PGN.Com. https://portlandgeneral.com/energy-choices/electric-vehicles-charging/charging-your-ev/ev-charging-pilot-program-home?utm_source=dmg&utm_medium=digitalad&utm_campaign=2021-4-11-res-ev-charging-pilot-spring-ads

[8] Energy Star. (2021, June 20). Energy Star's Qualified Products List. Energystar.gov. https://www.energystar.gov/productfinder/product/certified-evse/results

Manage outreach and pipeline engagement with customers															
Process incentives															
Conduct quarterly and annual reporting															
Deliver quality assurance checks annually on product installations															
File program revision or extension (if recommended)															
Pilot Evaluation (shared between three pilot programs)															
Issue a request for proposals (RFP) for pilot evaluator															
Pilot evaluator selection and contracting															
Gather data to inform evaluation															
Complete evaluation															
Reporting															
Annual progress update to Public Utility Commission of Oregon (all three pilots)															

1.1.4 Expected Outcomes

This pilot will:

- Reduce the upfront cost of installing nonresidential and MUD L2 chargers.
- Increase customer knowledge around off-peak charging benefits and encourage customers to charge during off-peak times.
- Provide data to Pacific Power that can inform future programs and planning, including:
    - Costs of purchasing and installing nonresidential and MUD L2 charging in Pacific Power's Oregon service territory,
    - Location of EVs and charging equipment on Pacific Power's grid,
    - Customer choices and preferences for L2 charging equipment and extent to which that equipment may be able to be used as a resource in potential future load management programs,
    - Customer utilization of nonresidential charging systems in different locations and building types.
    - Participant satisfaction with TOU rates and attrition rates after the mandatory one-year period , and

- Estimates of peak charging load that can be feasibly moved to different times.

1.2 Market Baseline Assumptions, Market Barriers, Program Implementation Barriers, and Program Strategies to Overcome Barriers

This section outlines the state of the market, major market barriers to widespread transportation electrification in Pacific Power's service area, and how this program aims to overcome those barriers.

1.2.1 Market Baseline Assumptions

As of July 2020, there were 6,709 light duty vehicles (LDVs) registered in Pacific Power's Oregon service territory.[9] Approximately 85 percent of those vehicles are owned by residential consumers with the remaining owned by nonresidential entities for business use.

Oregon has aggressive goals for EV adoption across the state. 2020 registrations are close to what was projected in Pacific Power's February 2020 TE Plan, though recently revised forecasts for long term EV adoption shows some dampening effect in the market due to the economic disruption of COVID-19. Bloomberg's New Energy Finance EVO20 makes several statements about the effects of COVID-19 on the auto industry, specifically stating, "the long-term trajectory has not changed, but the market will be bumpy for the next three years". Further, they note that they expect "global passenger vehicle sales to plunge an unprecedented 23 percent in 2020, and EV sales to drop for the first time in the modern era."[10] Indeed, end of year sales figures confirmed the predicted trend as "US sales of plug-in light duty electric vehicles in 2020 totaled 296,000 units, which was down significantly from the 331,000 in sales in 2019 due largely to the coronavirus pandemic, according to Platts Analytics Future Energy Outlooks' report released Jan. 26."[11] These trends suggest the need for market intervention to assist in consumer adoption of EVs has not lessened over the past year but has grown more important.

Pacific Power also sees lower penetration rate of EVs within the service territory which largely serves rural communities.[12] Public charger access is also much lower in these rural areas relative to urban portions of the state.[13] Most residential charging needs are met by charging at home, however, chargers in nonresidential setting are crucial to more wholly integrate electric vehicles customers daily life. To help reduce range anxiety and provide greater flexibility and certainty in accessing charging when not able to charge from home, more publicly available

[9] Oregon Department of Energy. (2021, April 15). Oregon Electric Vehicle Dashboard. Oregon.gov.https://www.oregon.gov/energy/Data-and-Reports/Pages/Oregon-Electric-Vehicle-Dashboard.aspx.

[10] Bloomberg NEF. (2021) *Electric Vehicle Outlook 2020* Long-term Passenger Vehicle Outlook. p. 3.1. https://about.bnef.com/electric-vehicle-outlook/

[11] S&P Global Platts. (2021). US EV Sales Tumble in 2020, but EV Load Increases with More Charging Stations. US EV sales tumble in 2020, but EV load increases with more charging stations | S&P Global Platts

[12] Oregon Department of Energy. (2021, April 15). Oregon Electric Vehicle Dashboard. Oregon.gov.https://www.oregon.gov/energy/Data-and-Reports/Pages/Oregon-Electric-Vehicle-Dashboard.aspx.

[13] US Department of Energy. (2021, March 18). Alternative Fuel Data Center. https://afdc.energy.gov/fuels/electricity_locations.html#/find/nearest?fuel=ELEC

options are needed. To support this need and the charging needs of nonresidential LDV owners, Pacific Power is seeking to better understand the barriers to investment in nonresidential EVSE and the most effective program intervention strategy.

The nonresidential EVSE market can be sorted across five categories of infrastructure owner types serving residential and nonresidential vehicle charging needs:

- workplace charging for employee vehicles,
- company fleet charging,
- retail charging for customer vehicles,
- multifamily dwelling charging for tenant vehicles, and
- affordable housing multifamily dwelling charging for income qualified tenant vehicles.

Although more than 85 percent of all EV charging occurs at residences[14] the availability of public charging infrastructure plays a key role in expanding EV adoption. The approximately 6,709 EVs in operation in Pacific Power's territory[15] are served by over 1,300 public and private charging ports.[16]. Based on information the Company has from a 2019 Residential survey, of the 85 percent owned by residents, the majority are owned by single family households (87 percent).

1.2.1.1 Current Locations, Types, and Quantities of Chargers

The majority of both Level 2L2 and DCFC are public, as shown Table 2. All the private chargers in Pacific Power territory, plus about 75 percent of public charger ports, are in areas classified as Urban[17] Private chargers are often associated with workplace charging, as employers prefer to restrict charging availability to staff as an added employee benefit.

[14] Wood, Eric W., Rames, Clement L., Muratori, Matteo, Srinivasa Raghaven, Seshadri, & Melaina, Marc W. *National Plug-In Electric Vehicle Infrastructure Analysis*. United States. Doi:10.2172/1393792.

[15] Oregon Department of Energy. (2021, April 15). Oregon Electric Vehicle Dashboard. Oregon.gov.https://www.oregon.gov/energy/Data-and-Reports/Pages/Oregon-Electric-Vehicle-Dashboard.aspx.

[16] US Department of Energy. (2021, March 18). Alternative Fuel Data Center. https://afdc.energy.gov/fuels/electricity_locations.html#/find/nearest?fuel=ELEC

[17] Oregon Office of Rural Health. (2021, June 20). About Rural and Frontier Data. OHSU.edu. Oregon Office of Rural Health | OHSU available at https://www.ohsu.edu/oregon-office-of-rural-health/about-rural-and-frontier-data

Table 2. Charger Port Breakdown by Access Type

Charger Type	Public	Private
L2 Ports	**966**	**103**
Tesla Ports	188	-
All Other Ports	778	103
DCFC Ports	**219**	**0**
Tesla Ports	71	-
All Other Ports	148	0
Total	**1,185**	**103**
Percent Networked	**88%**	**71%**

Data Source: Alternative Fuel Data Center. September 26 2020. "Electric Vehicle Charging Station Locations"

Approximately 71 percent of the private chargers that exist in Pacific Power's territory are networked, compared to 88 percent of public chargers (excluding Tesla stations).[18] The networked private chargers comprise three electric vehicle service providers (EVSPs): Blink Network, GE WattStation, and Greenlots. The private chargers that correspond to zip codes in Pacific Power territory are scattered solely across areas classified as Urban per the Oregon Office of Rural Health definition.

Public Charging

Pacific Power contracted with Cadmus to evaluate multiple data resources and analyze the current distribution of EVs and L2 and direct current fast charging (DCFC) EVSE across Pacific Power's territory. The data was summarized at the zip code level by:

- EV manufacturer
- EVSE type
- Number of registered EVs
- Population geographic category

With Pacific Power's dispersed service territory, public EV charging stations appear abundant in Urban areas but quite sparse in Rural areas. Table 5 shows a breakdown of the distribution of public L2 chargers across Pacific Power Oregon service territory (shaded in light blue).

Cadmus split the Pacific Power zip codes into the three geographic categories—Urban, Rural, and Frontier—based on the Oregon Office of Rural Health's geographic definitions for the three classifications, as shown in Table 4 most zip codes served by Pacific Power are classified as Rural**,** whereas slightly less than one-third are classified as Urban. The latter mainly consists of communities in the greater areas of Bend, Corvallis, Eugene, Portland, and Salem. The table also includes the number of residential households in each category, highlighting that the number of zip codes in each area do not align exactly to population.

[18] US Department of Energy. (2021, March 18). Alternative Fuel Data Center. https://afdc.energy.gov/fuels/electricity_locations.html#/find/nearest?fuel=ELEC

Table 3. Population Geographic Status Breakdown

Geographic Category	Count of Zip Codes	Percentage of Total Zip Codes	Percentage of Residential Customer Sites	Criteria
Urban	59	30%	45%	Zip codes that do not fall into either of the below two categories
Rural	125	62%	53.5%	Any geographic areas in Oregon that are 10 or more miles from the centroid of a population center of 40,000 people or more
Frontier	16	8%	1.5%	Any county with six or fewer people per square mile (10 of Oregon's 36 counties are frontier)
Total	**200**	**100%**	**100%**	

Source: Oregon Office of Rural Health's geographic definitions; Residential Customer Sites from Pacific Power dataset.[19]

Table 5 delineates the EVSE and EV registration data by geographic category. The majority of registered EVs and L2 and DCFC EVSE are located within zip codes classified as Urban. The split of public L2 EVSE is most pronounced, with 630 (81 percent) in Urban areas and just a single L2 port located in one of the 16 zip codes designated as Frontier. Notably, DCFCs are also more likely to be installed at end-point destinations and at specified (planned) distances along freeways. The final column of 4 presents the magnitude of EVSE relative to the number of registered EVs in each geographic category.

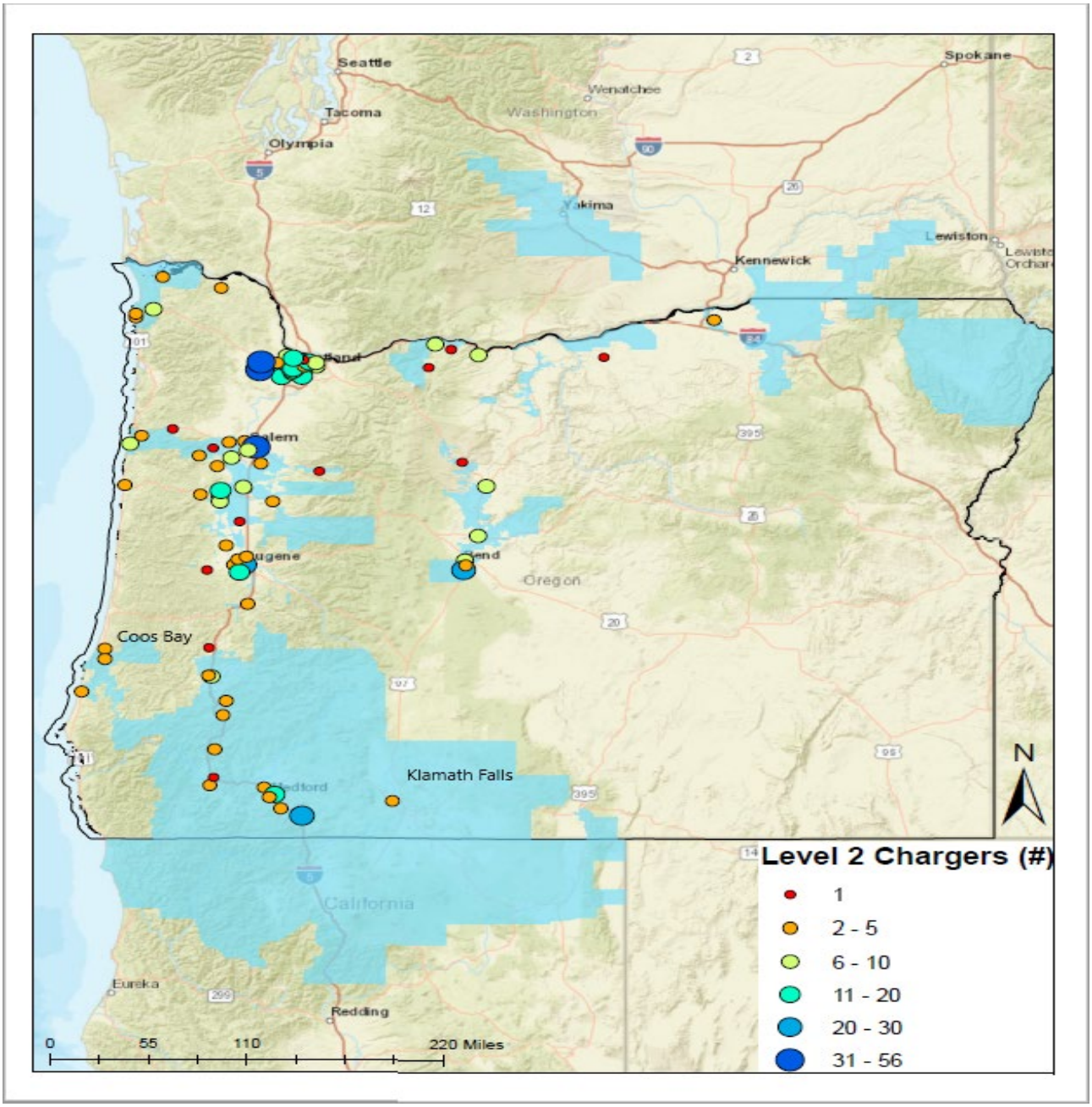
Table 4. EV and Public EVSE Breakdown by Geographic Category

Geographic Category	Number of Residential Customer Sites	Number of EVs Registered in Pacific Power Territory		Number of L2 Ports	EVs per L2 Port	Number of DCFC	EVs per DCFC	Total EVs Registered per Public EVSE
Urban	222,570	4,825	71.9%	630	8	82	59	6.8
Rural	263,235	1,864	27.8%	147	13	64	29	8.8
Frontier	6,801	20	0.3%	1	20	2	10	6.7
Totals	**492,606**	**6,709**	**100%**	**778**	**9**	**148**	**44**	**7.2**

While most EV owners primarily charge their vehicle at home, EV owners who are renters or who live in a multifamily home, condominium, or apartment may face challenges in installing chargers and are therefore more likely to rely on public EV chargers in their area. A higher ratio of EVs to EVSP can translate to longer wait times at the public chargers that do exist. Another notable consideration is how typical commute lengths differ by geographic category. Where commute lengths are longer, it is more likely that EV drivers would need to charge their vehicle at their workplace or destination.

[19] Oregon Office of Rural Health. (2020, September 20). About Rural and Frontier Data. OHSU.edu. Oregon Office of Rural Health | OHSU

Figure 3. Map of Public L2 Chargers in Pacific Power Territory

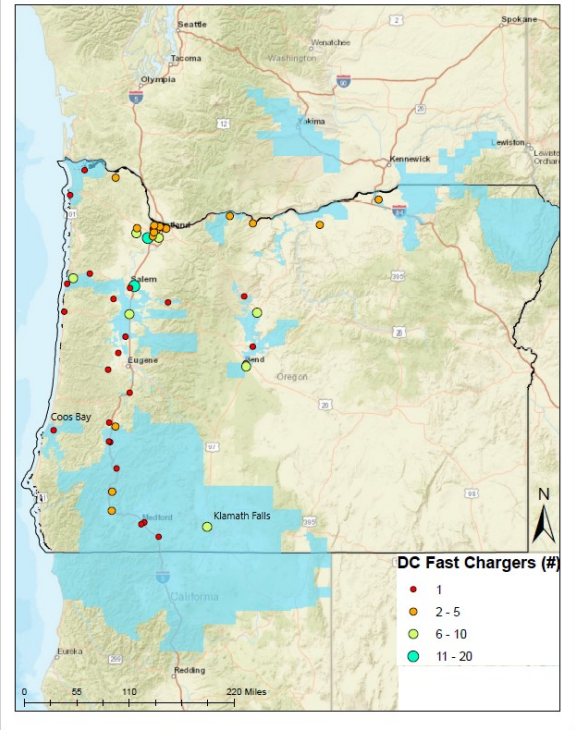


While the Greater Portland area is densely filled with chargers, the northeastern and south-central areas of Pacific Power's service territory (excluding areas surrounding I-5) exhibit minimal L2 charger availability. For example, there are approximately three chargers per mile in

Portland proper (including non-Pacific Power territory) and 0.002 chargers per mile in Klamath County.[20][21][22]

The list Pacific Power uses for marketing includes a few zip codes that have partial areas outside the blue Pacific Power territory. While this means that the estimate of total L2 chargers in Pacific Power territory is slightly inflated, the map is useful from a TE planning perspective, since EV owners will most likely use publicly available chargers along their commute, regardless of the charging station utility provider.

Figure 4. Map of Public DCFC in Pacific Power Territory



Similar to the L2 chargers, the distribution of DCFCs varies significantly across Pacific Power's service territory, as shown in Figure 4. Here, there is a higher concentration of infrastructure in the Greater Portland area, as well as along I-5. In particular, the orange dot in south central Oregon represents four DCFC ports in Klamath Falls that were recently added by Pacific Power.

[20] Adapted from the United States Census Bureau. (2020). Square Mileage by County. https://www.census.gov/quickfacts/portlandcityoregon.

[21] Adapted from the United States Census Bureau. (2020). Square Mileage by County. https://www.census.gov/quickfacts/klamathcountyoregon

[22] Adapted from the Alternative Fuels Data Center. (2020). https://afdc.energy.gov/fuels/electricity_locations.html#/find/nearest?fuel=ELEC

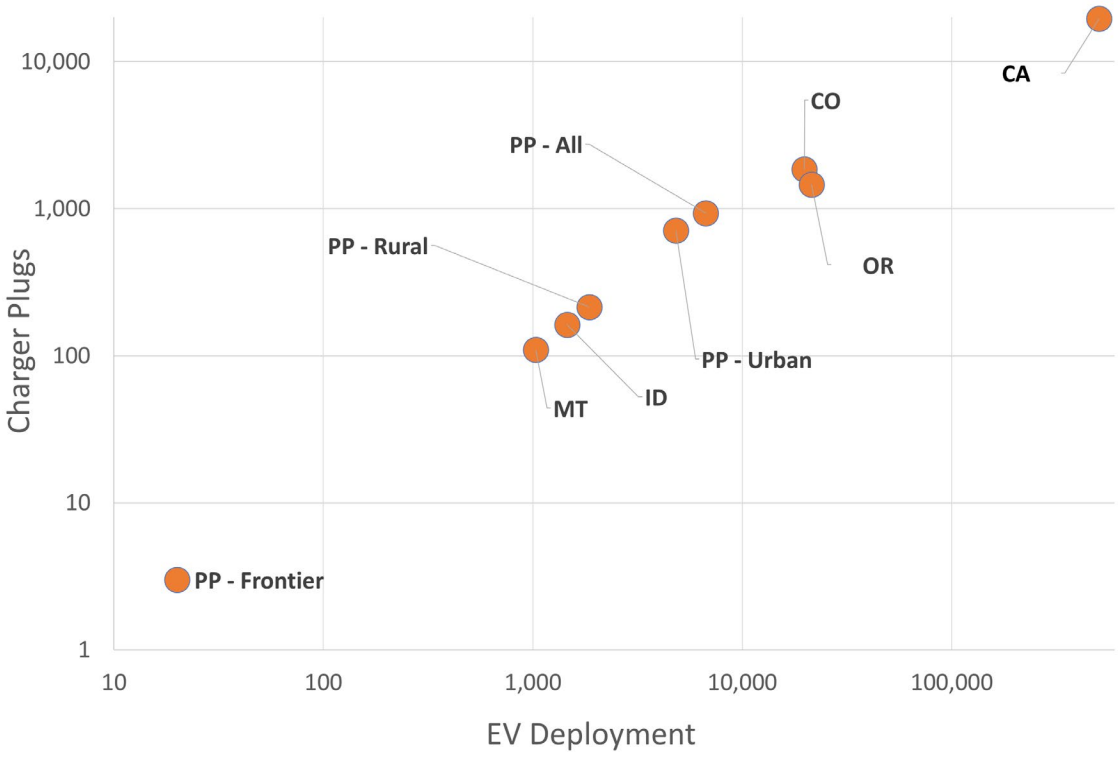
The southern coastline of Pacific Power's territory has a single CHADeMo DCFC, located in Coos Bay.

When looking beyond Pacific Power's territory along the coast, there appears to be a DCFC about every 50 to 60 miles (in Seaside, Port Orford, and Brookings, which are outside the Pacific Power territory), according to Plugshare.com.

1.2.1.2 EV Market Share and EVSE infrastructure

The relative ratios of EVSE to EVs are useful to assess access within Pacific Power's territory. Figure 5 further contextualizes the EV and EVSE markets in Pacific Power's territory by benchmarking against other Western states. This data suggests that the EV and EVSE markets in Pacific Power's territory are still in their infancy, where EV adoption and EVSE installations are mutually constrained. Note that a logarithmic scale was used for both the X and Y axes. The Pacific Power values are represented by the geographic category breakdowns described in Figure 5 following the format: PP – 'Geographic Category'.

Figure 5. Comparison of Charger Infrastructure and EV Deployment in the Western US



Source: Adapted from EV Adoption.com. April 5, 2019. Charging Stations by State, accessed 9/29/20.

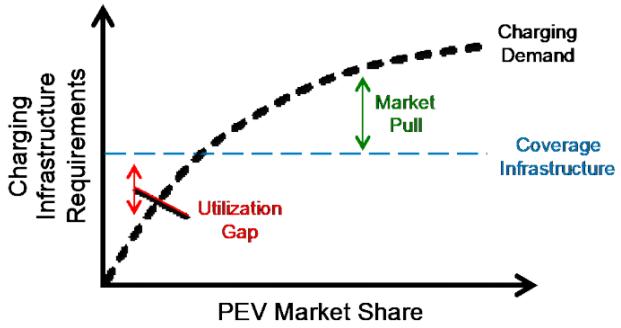
With over 250,000 registered, California has the most EVs of any state, as well as the most EVSE installed. At these higher levels of EV deployment, the market can support a higher EV to EVSE ratio (25.7) than can be supported in more nascent markets.[23] To stimulate EV adoption initially, significant investment in EVSE is required to establish a foundation of infrastructure. This initial stage requires a lower EV to EVSE ratio, as shown by the left-side of the curve under the "Coverage Infrastructure" line displayed Figure 6. Once the market has matured and a foundational level of EVSE coverage has been established, there is a tipping point after which a diminishing marginal amount of EVSE is required to continue the growth in EV market share. The number of EVs registered and forecasted in Pacific Power's territory suggest a need for continued investments in EVSE to maintain the relatively low ratios of EVs to EVSE that are necessary to provide adequate service at the market's current level of maturation.

Table 5. EVs to Outlets by State

State	EV deployment	EVs to Outlets
CA	506,000	25.73
OR	21,433	14.66
CO	19,738	10.63
MT	1,033	9.39
ID	1,459	8.95
PP - Rural	1,864	8.67
PP - All	6709	7.21
PP - Urban	4,825	6.78
PP – Frontier	20	6.67

[23] EV Adoption. (2019). Charging Stations by StateEVadoption.com. https://evadoption.com/ev-charging-stations-statistics/charging-stations-by-state/

Figure 6. Conceptual Relationship Between EV Market Share and EVSE



Source: National Renewable Energy Laboratory. January 24, 2018. "New EVSE Analytical Tools/Models: Electric Vehicle Infrastructure Projection Tool (EVI-Pro)." PowerPoint presentation. https://www.nrel.gov/docs/fy18osti/70831.pdf

1.2.2 Market Barriers

Pacific Power's TE Plan provides a general summary of EV and EVSE market barriers. In the Plan the EV and EVSE market barriers are broadly grouped across the following six categories: 1) awareness barriers, 2) decision-making barriers, 3) economic barriers, 4) policy and regulatory barriers, 5) technical barriers, and 6) supply chain barriers. This pilot will focus on technical, awareness and economic barriers more specifically:

- **Technical barriers** refer to EV technology or infrastructure limitations that decrease the likelihood that EVs can serve as a replacement for conventional technologies. Examples include range limitations, lack of available electric models for some vehicle classes, loss of range in cold weather due to heating loads, and the challenges of providing charging infrastructure for drivers without a garage or dedicated parking. In rural areas, low population density, remoteness of infrastructure, and low utilization rates all make it more difficult to find optimal areas for public charging infrastructure. Robust collaboration between utilities, government leaders, and other stakeholders (at the local, state, and regional level) will be necessary to address these challenges. Importantly, some of these barriers may diminish over time as EV technologies improve (e.g., as range increases, EVs become a viable option for an increasing share of drivers, especially in rural areas)

- **Economic barriers** refer primarily to the: 1) high upfront costs for EV technologies, and 2) insufficient operating cost savings. Together, these challenges negatively impact the cost-effectiveness of EVs for consumers. Examples impacting upfront costs include high EV and EVSE capital costs, inadequate or unavailable financial incentives to help with the upfront cost, and lack of affordability for low-income populations.

- **Awareness barriers** include those that hinder the awareness of consumers, fleet owners, dealers, policymakers, and other key stakeholders regarding EVs. Examples include a lack of knowledge of the capabilities or costs of EV technology, the available incentives for and operational savings of EVs, or their environmental and other benefits.

Each target market segment for this pilot (workplace, retail, multi-family, fleet) face similar barriers to their investing in EVSE with the most common barriers being cost, access and awareness. Each of these common barriers is discussed in detail below.

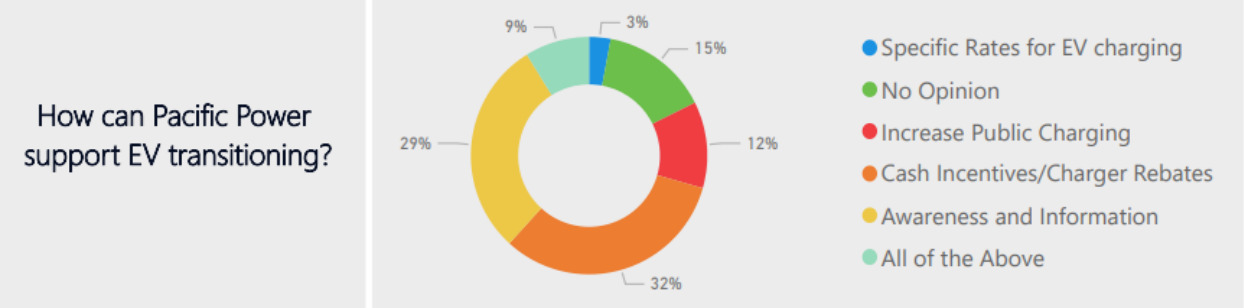
1.2.3 Program Implementation Barriers

As noted above, Pacific Power's TE Plan provides a general summary of EV and EVSE market barriers—and one of those market barriers ties closely to a program implementation barrier for this new pilot—notably the barrier of "awareness." Awareness barriers include those that hinder the awareness of consumers regarding EVs and EV programs. Examples include a lack of knowledge of the capabilities or costs of EV technology, the available incentives for and operational savings of EVs and EVSE. Related to awareness will be the need to help customers understand the TOU program and application process and alleviate any concerns about the utility's access to data.

1.2.3.1 Awareness

To better understand potential barriers across diverse markets, the Company hired C2 Group to conduct additional surveys across multiple segments throughout the service area. In the 2020 survey, the majority of residential customer responses on how Pacific Power could support transportation electrification included offering cash incentives and rebates, followed by increased education and awareness on EV offerings and charging options.

Figure 7. How can Pacific Power Support EV Transitioning? (residential customers only; n = 34)



C2 also conducted surveys with nonresidential customers who have participated in the Pacific Power Technical Assistance Program but had not applied for Pacific Power EV Charging Infrastructure grants. While cost was identified as the primary barrier for nonresidential customers, followed by awareness, these customers also believed that the most impactful step Pacific Power could take to support the transition to EVs was to support increased awareness and information related to EV and EVSE.

Figure 8. What is the Primary Barrier for Transitioning to EVs? (nonresidential customers only; n = 18)

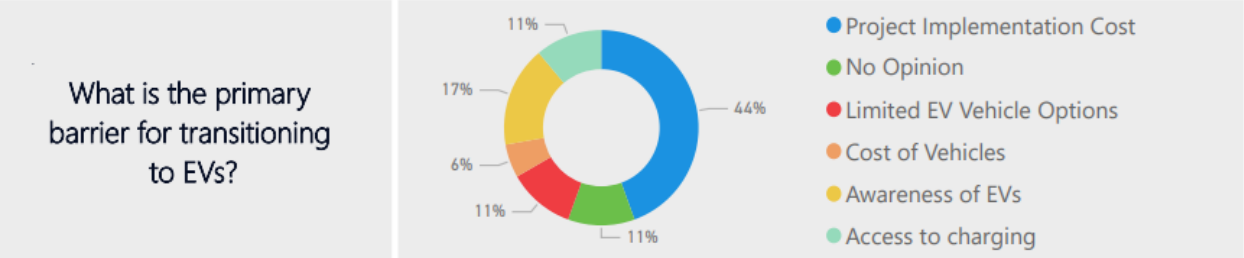
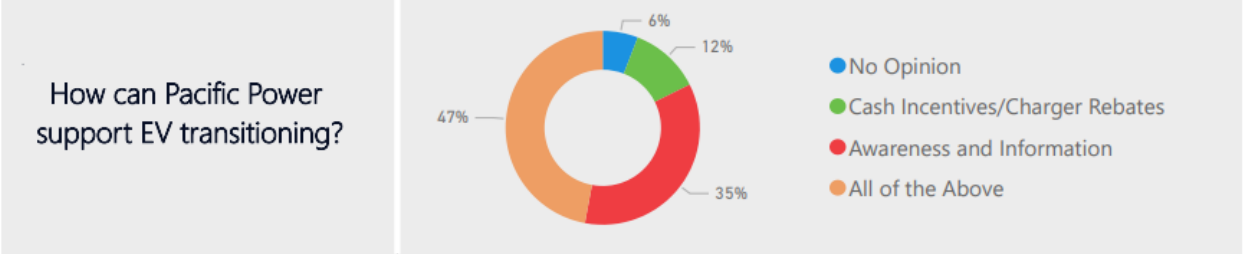


Figure 9. How can Pacific Power Support EV Transitioning? (nonresidential customers only; n = 18)



1.2.3.2 Access to Chargers and Range of Vehicles

An often-cited barrier to EV adoption is range anxiety, or a driver's fear they will not be able to conveniently reach their destination without running out of power. This point is supported by a recent Volvo-led study that surveyed a non-probability-based sample featuring both EV and non-EV drivers. Sixty-five percent of current EV owners said they had some degree of range anxiety when they purchased the vehicle, but they no longer have the same concerns. In a survey conducted for Pacific Power, Navigant also found evidence to support this, in that most respondents could not accurately predict range or charge times. Furthermore, feedback from users suggests that users consider public charging stations to be most convenient when placed along major interstates or highways and ensuring that charging ports are in good working order is a key driver of user experience and satisfaction.

Homeownership and parking access are related barriers. As mentioned, given the current level of deployment of public electric vehicle service equipment, most EV users rely on a home charger for an EV to be a reliable and consistent form of transportation. Those who do not own their own home, do not have off-street parking with charging capability, or live in a housing or condo complex are often unable to install chargers or, at the very least, they face additional barriers to installation. Though some MUD owners are able to employ the Right-to-Charge[24] to bypass some of these barriers, in the state of Oregon, renters are excluded from this right. As noted previously in Figure 6, there is a tipping point after which a diminishing marginal amount

[24] Northeast States for Coordinated Air Use Management. October 2019. *Right To Charge Laws.* https://www.nescaum.org/documents/ev-right-to-charge.pdf/

of EVSE is required in order to continue the growth in EV market share. Current charger deployment in relation to EVs in Pacific Power territory compared with other jurisdictions suggests that the company charger infrastructure is still needed to encourage EV adoption.

1.2.3.3 Upfront costs

Though the price to fuel an EV and the overall maintenance costs of an EV provide compelling long-term ownership savings, a consumer must first overcome the upfront cost barrier. As shown above in Figure 8, project implementation costs are the most commonly cited barrier for nonresidential customers. Total cost of L2 EVSE includes the cost of the equipment plus installation and behind the meter upgrades. The business case for investing in charging is challenged by the difficulty in quantification of the benefits that are largely associated with employee, customer or tenant appreciation. Table 10 in the cost section shows the average project cost per L2 port from Pacific Power's grant project database. As the number of sites installed per site increases, costs decline by an overall median cost of $9,050.

1.2.4 Program Strategies to Overcome Barriers

Given these market and program barriers, there are strategies which Pacific Power can employ within this pilot design to test whether these actions help to overcome barriers. Related to cost, the proposed incentive of $1,000 to $3,000 will cover a small yet noticeable portion of total cost of installation. The incentive is intended to be high enough to be of interest and spark action. The risk in providing less incentive is that it may not be enough to make a difference to most businesses and only those that do partake would have invested in the charging system anyway. Just how much of a difference the incentive made to the individual business decision will be tested in the pilot evaluation and may lead to mid-pilot changes to the incentive offer.

To address awareness, Pacific Power is well positioned to use the incentive offer as a means to get the word out about the benefits to increasing access to L2 EVSE for customers, employees and tenants more broadly. While advertising the incentive on the Company's and through customer communications, the marketing materials created to explain the offer will also provide concrete actions and ideas for next steps including equipment selection, site preparation and a list of trade allies and contacts to make the process as easy as possible for participants. Another component of outreach and marketing for the pilot offer is to work with dealerships who work with every facet of the market of EV owners. Buyers who live in MUDs can influence building owners and HOAs so providing those consumers with information to pass along to building owners will be a piece of the dealership strategy.

Furthermore, the prevalence of nonresidential chargers reduces consumer anxiety regarding range and accessibility as these chargers are often made identifiable to drivers through online platforms and are more visually prominent than a single-family residential chargers.

1.3 Expected Utilization, Participation Eligibility, and Incentive Structures

The Company expects that approximately 975 ports to be installed through charging pilot over three years. The incentive structure and general eligibility is outlined below. Expected utilization is outlined in section 3.1.1.

Table 6: Pilot Program Overview

Program	Nonresidential Incentive
Incentive Amount	Level 2: Up to $1,000 not to exceed 75% per port; Level 2 at MUD: Up to $3,000 not to exceed 75% per port
Customer Participation	975 ports over three years depending on incentive type
Eligibility	Nonresidential Pacific Power customers; MUD on a nonresidential rate
Timeline	Ramp up plus three years
Technical Aspects	Qualifying Level 2 networked chargers, enroll in Pacific Power's TOU or Schedule 29 pilot rate if a small nonresidential customer
Charging Plan	Collect charging data and information-evaluate managed charging and demand response
Equity Concerns	Additional MUD incentive, agricultural applications

1.4 Program Impact on Distribution System

Distribution system upgrades due to increased charging load are estimated to be needed for 3 percent of new urban area chargers and for 1 percent of new EVSE in rural areas of the system at an estimated cost of $4,000-$10,000 per upgrade.[25] This program will ensure Pacific Power is aware of the location of electric vehicles on the distribution system. As a 2018 EV distribution impact study found, the adoption of electric vehicles in aggregate will have minimal impacts on the grid as new loads are incorporated into Pacific Power's planning processes. Knowing the exact location of EVs on different circuits will allow for targeted proactive upgrades.

Overall new load from TE will benefit all customers, even those without EVs. This revenue growth is a benefit to all Pacific Power customers, particularly if charging is performed in a manner that supports grid efficiency, minimizes required distribution system upgrades and improves operational flexibility. The proposed pilot seeks to accelerate TE, increasing and pulling forward revenue benefits for customers.

1.5 Proposed Ownership Structure

Pacific Power will develop the application and funding process, manage the incentive distribution process and collect follow up data from projects. The Company will not own or manage any equipment under this program. In order to receive the incentive, customers will be required to sign a data agreement allowing the Company to collect charging data for the life of the equipment and analyze data and charging habits.

[25] PacifiCorp's Response to OPUC Data Request 10 in Docket No. UM 2056 submitted on June 1, 2020.

1.6 National Standards and Interoperability of Invested Equipment

The interoperability between the vehicles and the chargers made by multiple manufacturers is crucial for the program data collection with EVSE technology. Participants will be required to share usage data which will need network capable chargers. Any data collected from the project will be used to better understand the participants' charging habits and determine efficiency for future load management. The program will provide a predetermined list of trusted charging models for nonresidential installation referencing standards such as Energy Star's qualified product EVSE list. If needed, Pacific Power may plan to hire a third-party coordinator/vendor to assess the use the technology standards that are emerging as best practices in EVSE incentive programs. The coordinator will review, and score L2 chargers based on the requirements outlined in the program and participant considerations including affordability, network capability and ease of use. The final EVSE recommendations will inform future infrastructure projects and used as part of best practices.

1.7 Stakeholder Involvement in Program Development

Pacific Power engaged in a robust stakeholder and customer engagement to design these programs. Over six months the Company met individually with stakeholder organizations to discuss the portfolio of customer programs contemplated in the Company's TE Plan and receive feedback on program design. On October 16, 2020, the Company hosted a public workshop further articulating the envisioned programs.

Table 7. List of Stakeholders

- Climate Solutions
- Department of Environmental Quality
- Environmental Center
- Northwest Energy Coalition
- Rouge Climate
- Commission Staff
- Oregon Citizens' Utility Board
- Department of Energy
- City of Portland- Bureau of Planning and Sustainability
- ChargePoint

The Company engaged a consultant to conduct phone surveys of nonresidential customers in fall of 2020 to better understand how pilot programs can encourage EV and EVSE adoption in various market segments.

1.8 Description of Efforts to Coordinate with Related State Programs

The Company will continue to coordinate with several ongoing initiatives and goals supported by various state agencies, including the Oregon Department of Energy, Oregon Department of Transportation, the Climate Office, and the Oregon Department of Environmental Quality. This program will require particularly close coordination with the state's Charge Ahead Rebate

Program that is administered by the Oregon Department of Environmental Quality.[26] This program will also be timed as the results of the state's Transportation Electrification Infrastructure Needs Analysis (TEINA) are being finalized. "The TEINA study will highlight gaps in electrical vehicle charging infrastructure and propose solutions to help accelerate widespread transportation electrification in Oregon."[27]

1.9 Coordination of Delivery with Other Market Actors and Activities

This proposed program will work in conjunction with other funding sources to inform customers with additional opportunities towards savings against the cost of EV ownership and EVSE installation. Pacific Power will make customers aware of, and support customers in leveraging, the Oregon Clean Vehicle Rebate, the Diesel Emissions Reduction Grants Program, the Oregon Clean Fuels Program, and other relevant state programs, as appropriate. Furthermore, the Company will work to collaborate with non-profit market actors such as Forthon outreach activities and campaigns to maximize impact towards mutually shared goals. The Company will also coordinate with PGE to help maintain pilot programs that are generally aligned and provide customers with similar offerings that support the achievement of statewide policy objectives.

2 Long-Term Strategy and PacifiCorp's TE Plan

2.1 Current Condition of TE Market and Outlook

Pacific Power's long-term strategy is identified and discussed in the Company's TE Plan, completed in February of 2020 and scheduled for update in February of 2022. Shortly after the TE Plan was completed, the COVID crisis hit and early projections suggested that the auto industry would suffer massive impacts. For example, in March of 2020, one source wrote, "after the virus appeared in China, auto sales there fell 80 percent [in February]. Globally, the industry has canceled large events—the Geneva Motor Show this month, New York's equivalent next month—for fear of spreading the virus. European carmakers began temporary factory closures last week amid health concerns for their employees, falling demand, and severe disruptions to manufacturing supply chains…"[28] At nearly the same time, the US auto industry announced a shutdown of all three Detroit carmaker manufacturing operations.[29]

Fast forward through 2020 and the dire initial impacts started to fade. "Global market trends were markedly different in the second half of 2020, when lockdowns were lifted or relaxed for

[26] Oregon Department of Environmental Quality. (2021, June 15). Requirements of Charge Ahead Applicants. Oregon.gov. https://www.oregon.gov/deq/aq/programs/Pages/Charge-Ahead-Rebate.aspx

[27] Oregon Department of Transportation. (2021, June 15). Transportation Electrification Infrastructure Needs Assessment. Oregon.gov. https://www.oregon.gov/odot/Programs/Pages/TEINA.aspx

[28] Adams, E. (2020). Covid-19 Is Bad for the Auto Industry. *WIRED*. https://www.wired.com/story/covid-19-bad-for-auto-industry-worse-for-evs/

[29] Le Reau, J. and Howard, P.H. (2020). Detroit Automakers Ford, General Motors, FCA Agree to Close All US Plants. *Detroit Free Press*. https://www.freep.com/story/news/2020/03/18/ford-gm-fca-plant-closures-coronavirus/2865289001/

some time, and the automotive market started to recover. For electric cars, monthly sales surpassed those between July and December in 2019 in every month in all large markets including China, the European Union, India, Korea, the United Kingdom and the United States, despite second waves of the pandemic."[30]

On a local level, Pacific Power continued to see strong interest from our customers and communities we serve—and travelers throughout our service territory generally—in building out the necessary infrastructure to support the transformation that's underway. Grant programs have attracted applicants from across the state. We also see the forecast from the TE Plan for the year 2020 aligning very closely with actuals. Looking forward, it's reasonable to expect interest in EVs to continue to grow. Currently there are eight different EV pickup trucks poised to enter the market, with Rivian starting deliveries in 2021 and the electric Ford F-150 scheduled for production in 2022.[31] Additionally, since the first of the year, Volkswagen "unveiled a massive push to drive down the cost of producing batteries for its electric vehicles in the hopes of speeding the transition away from gas-powered cars" and to deliver on its promise of making electric vehicles 50 percent of its sales in the US by 2030.[32] GM is on its way to an all-electric future, with a commitment of 30 new global electric vehicles by 2025 and target of 2035 for ending production of gas and diesel vehicles.[33] These announcements highlight that the EV market is continuing to evolve quickly and efforts to support customers through this change are timely.

Finally, while the macro trends are positive, specific adoption patterns are also starting to emerge that help recommend specific actions to accomplish broader adoption. A Portland State University survey of demographic information of Oregon EV owners found that 88.4 percent of EV owners self-identified as being White or Caucasian and 67.3 percent self-identified as being male.[34] Demographic information coupled with location registration information from the Oregon EV Dashboard reveals that seven of the top 10 counties with the highest number of EV registrations per 1,000 people are also among the top 10 counties with highest annual median income. This reveals the importance of programs and efforts to broaden information, access, and affordability to customers well beyond the demographics comprising the early adopters that own EVs today.

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[30] Gorner, M. & Paoli, L. (2021). How Global Electric Car Sales Defied Covid-19 in 2020. *IEA*. https://www.iea.org/commentaries/how-global-electric-car-sales-defied-covid-19-in-2020

[31] Beresford, C. (2021). Every Electric Pickup Truck Currently on the Horizon. *Car and Driver*. https://www.caranddriver.com/news/a29890843/full-electric-pickup-trucks/

[32] Hawkins, A. (2021). Here are the Biggest Announcements from Volkswagen's Battery Event. *The Verge.* https://www.theverge.com/2021/3/15/22325813/vw-volkswagen-power-day-battery-electric-car-announcement

[33] Eisenstein, P. (2021). GM to go all-electric by 2035, phase out gas and diesel engines. *NBC News.* https://www.nbcnews.com/business/autos/gm-go-all-electric-2035-phase-out-gas-diesel-engines-n1256055

[34] MacArthur, John, Michael Harpool and Daniel Scheppke. Survey of Oregon Electric Vehicle & Hybrid Owners. TREC-RR-1259. Portland, OR: Transportation Research and Education Center (TREC), 2018. https://www.doi.org/10.15760/trec.205

2.2 Opportunities to Improve the Operation and Reliability of the Electric Company's Power System

The Company will consider additional load management elements related to this program as the program develops and more is understood about the impacts and dynamics of charging under the TOU pilot. A high-level road map of considerations for a potential demand response (DR) program related to this pilot include:

1. First, learn how effective a time of use (TOU) rate may be—it is a low-cost approach with mutual benefits for the participant and utility system.
2. After two years or at approximately 650 incentives, assess the impact of the current rate schedules and evaluate the potential of integrating a requirement of participating in a TOU rate. For example, one key consideration will be to determine whether the TOU rate structure encourages vehicle owners to start charging at a specific time, e.g., 9:01 p.m., in a manner that causes a big sudden usage uptick in energy use on the system.
3. As charging load increases on the system, if the data reveals a significant impact due to the increased load, the Company may look to deploy DR for cost-effective, coordinated, diversified managed charging control.

3 Pilot Program Assumptions: Impacts, Benefits, and Costs

3.1 Estimated Pilot Impacts

Pacific Power is proposing a cap of 975 port installations in the pilot over three years of implementation. As Pacific Power gathers data from participating customers through this proposed program, that data can be used to evaluate the impact that those EVs and associated EVSE are having on the utility system, which may serve as a useful starting point from which to extrapolate the impacts of EV adoption more broadly.

The uptake and subsequent impact of the new EVs associated with the new EVSE from this pilot program is complex to forecast and to evaluate as there are multiple market channels through which a nonresidential program will be offered.

Design of this pilot started with an estimation of program participation over three years.

3.1.1 Participation assumptions:

- Projected incremental LDV adoption in Pacific Power's Oregon service territory from the 2020 TE plan serves as the starting point for estimating supporting EVSE pilot participation. As of July, 2020, 6,709 EVs are registered in Pacific Power service territory,[35] 65 more than forecasted for mid-year 2020 in the TE 2020 plan.

[35] Oregon Department of Energy. (2020, July 15). Oregon Electric Vehicle Dashboard. Oregon.gov.https://www.oregon.gov/energy/Data-and-Reports/Pages/Oregon-Electric-Vehicle-Dashboard.aspx.

- Eighty-five percent of new LDV registrations are estimated to be residential consumers with the remaining 15 percent assumed to be commercially owned as business vehicles.[36]
- The target markets for nonresidential EVSE can be sorted across five categories; workplace charging for employee vehicles, company fleet charging, retail charging for customer vehicles, multifamily dwelling charging for tenant vehicles, and affordable housing multifamily dwelling charging for income qualified tenant vehicles. Only the Company fleet charging category is assumed to be commercially owned. All other categories apply to residential ownership.
- The program logic model for this pilot is premised upon the theory that increasing access and visibility/awareness of charging is an important and impactful role utilities can play in supporting acceleration of EV adoption among all consumers.
- Therefore, increasing uptake of L2 networked EVSE in each of these nonresidential applications will have far reaching effects on a broad range of consumers.
- Estimates for participation in an L2 networked charger incentive program for each of these market categories rely on a series of assumptions that can be tested through this pilot.
    - Company fleet charging mainly represents 15 percent of the new LDVs forecasted over the time period. Pacific Power estimates that 25 percent of new fleet charging needs will access this pilot incentive.
    - Multifamily interest is linked to forecasted EV owner for multifamily residences, a subset of residential customers in our service territory. Seventeen percent of residential customers live in multifamily dwellings. Pacific Power estimates that 25 percent of new multifamily EVs will lead to L2 EVSE investments made possible by this pilot incentive.
    - Multifamily affordable housing participation is estimated as 25 percent of standard multifamily uptake prior category.
    - Retail, including workplace charging interest, is estimated based upon EVSE need projections for Pacific Power's Oregon service areas from the EVI-Pro tool[37] through the U.S. Department of Energy's Alternative Fuels Data Center which ranges from 2-3 EVSE per 100 new LDVs.

Over three years, the culmination of these assumptions equates to approximately 974 additional L2 ports installed at nonresidential businesses and multifamily dwellings. The pilot will be capped at 975 installations spread across these three years to keep costs manageable and within expectations.

[36] National Research Council. (2015). *Overcoming Barriers to Deployment of Plug-In Vehicles*. The National Academies of the Press. DOI 2015939639. Front Matter | Overcoming Barriers to Deployment of Plug-in Electric Vehicles | The National Academies Press (nap.edu)

[37] Adapted from the Alternative Fuels Data Center. (2020). https://afdc.energy.gov/evi-pro-lite

Table 8. Development of pilot participation estimate

Incremental Participation	Year 1	Year 2	Year 3	TOTAL
	2021	2022	2023	3 yr.
New LDVs, incremental 2020 TE Plan	2,656	3,043	3,344	9,043
New residential LDVs (85%)	2,258	2,586	2,842	7,686
New nonresidential owned LDVs (15%)	398	456	502	1,356
Fleet participation (25% of nonresidential)	100	114	125	339
Retail/Employee charging participation (2.5 per 100)	66	76	84	226
Multifamily (25% of 17% residential)	96	110	121	327
Multifamily Affordable Housing (25% of Standard Multifamily)	24	28	30	82
Total Participation Estimate	**286**	**328**	**360**	**974**

3.2 Benefits

The benefits of the pilot are estimated across three categories according to by whom the benefits are received. Benefits to the utility system are realized by all customers, benefits to participants are direct and indirect and benefits to society are broadly shared.

Utility system

- **Revenue gains** from increased energy sales of participating EVSE are offset by increased supply and capacity costs to serve increased charging load as described under Costs.
- **Market revenues from Clean Fuels credits** from participating multifamily residential customers EV charging will be assigned to Pacific Power. However, since those funds are directly applied towards additional Clean Fuels specific TE programs, they do not reduce the costs of this program as a benefit for ratepayers or the utility system and are not included in the quantification of associated benefits.

Participant

- **Incentives** $1000-$3000 directly lower the cost of the participant's investment in installing networked L2 charging on their premises. This participant benefit is also a direct utility system cost.
- **Tax Credits** may apply to lower the investment cost of EVs and EVSE.
- **Market revenues from Clean Fuels credits** participating nonresidential customers may receive Clean Fuels credits which can be monetized and used to demonstrate emission reductions.
- **Fuel cost and vehicle maintenance savings** for EV owners incremental to ownership of an internal combustion engine vehicle.

Society

- **Greenhouse Gas (GHG) emissions reductions** can be estimated as the net impact of replacing emissions from equivalent miles traveled with an internal combustion engine (ICE) compared to an EV, charged with electricity from the PacifiCorp Oregon-allocated emissions profile from the 2019 Integrated Resource Plan preferred portfolio as was applied to the 2020 TE Plan. The value of equivalent tons of carbon can be quantified by applying the Social Cost of Carbon to the net emissions reduction[38].

3.3 Costs

The costs of the pilot span not just administration, management, evaluation and incentives but also estimated cost to be incurred by the utility system to reliably meet the increased charging load when and where it's anticipated to be needed.

- **Program administrative and management costs** include marketing and outreach, participant enrollment, incentive processing, and annual evaluation costs. Pacific Power assumes 0.5 full-time employee will be added as a result of pilot approval to provide oversight and management of this work. Estimated costs for these program expenses are based on similar TE programs delivered in Utah and the Company's experience with energy efficiency program delivery such as energy efficiency in states outside of Oregon.
- **Incentive** payments of $1,000 or $3,000 are assumed for each participant. The $1,000 incentive is estimated to cover approximately 10 to 30 percent of the total cost of the L2 charger plus installation. Incentives are the largest cost category of the pilot program budget.
- **Increased supply costs** include the cost for increased system energy purchases and system capacity to meet added customer usage.
- **Infrastructure costs** include distribution system upgrade costs necessary for added load which differs by rural, urban and frontier communities in the service territory.
- **Participant cost** includes all costs the participant incurred for the EV plus EVSE less the incentive. For fleet charging purposes, participant costs are assumed to be incremental to costs otherwise incurred to own and operate a comparable ICE fleet. For retail, workplace, and multifamily participants, participant costs are the total costs of the EVSE installed.
- **Total installed cost** encompasses the participant cost plus the program incentive paid to the participant

[38] The 2019 PacifCorp IRP estimated the social cost of carbon as $50/ton in 2021.

Table 9. Proposed Nonresidential Pilot Costs[39]

Program Element	Proposed Program Term			TOTAL
	YR 1 - 2021	Yr 2 - 2022	Yr 3 - 2023	3 yr
Incentives	$ 334,000	$ 384,000	$ 420,000	$ 1,138,000
Program Administration	$ 100,000	$ 100,000	$ 100,000	$ 300,000
Outreach / Marketing	$ 150,000	$ 150,000	$ 150,000	$ 450,000
Evaluation (5%)	$ 45,900	$ 50,900	$ 54,500	$ 151,300
Total	**$ 629,900**	**$ 684,900**	**$ 724,500**	**$ 2,039,300**

Project Cost

Table 10 summarizes the total project cost per L2 port from Pacific Power's grant project database. As the number of sites installed per site increases, costs decline with an overall median cost of $9,050.

Table 10. L2 Charger Project Cost per Port Breakdown

Tier	Tier Breakpoints		Count of Chargers	Count of Locations	Percentile		
	Min	Max			30%	50%	100%
Full Sample	all		111	31	$6,770	$9,050	$28,357
Small	0	3	30	16	$7,440	$9,744	$28,357
Medium	3	6	51	11	$3,413	$6,770	$14,836
Large	6	8	32	4	$6,976	$8,108	$10,630

Project cost data for DCFC is more limited as there are fewer examples from which to establish an average. Between the two customer DCFC projects for which Pacific Power has cost insights, the average per port installed cost is $56,000.

4 Cost Effectiveness

4.1.1 Considerations and Challenges in Assessing Cost Effectiveness

Although costs can be reasonably estimated for the pilot, there are many uncertainties related to the impacts and therefore the incremental benefits across all nonresidential applications that can be directly be applied to this pilot program. For example, there is limited data available regarding the utilization rate of retail chargers and how rates change or are anticipated to change over time by location. These uncertainties make quantification of cost effectiveness quite challenging and potentially not informative. In order to constrain the risk to customers that the cost of the pilot may exceed benefits, Pacific Power is proposing that the overall

[39] Pacific Power proposes an overall program cap for the pilot period of $2.03 million.

magnitude and term of the pilot be limited to 975 participants and/or $2 million over three years. During that time, the pilot will be focused on building upon what we have learned about what's useful to customers to encourage EV adoption so that we may answer questions related to the uncertainties of impacts to inform future analysis of cost effectiveness.

To further illustrate the uncertainties, Table 11 notes the pilot theory and anticipated impacts to participants, society and the utility system for each major use case this pilot will target. The pilot theory for each focuses the questions the pilot is intended to answer. For example, to what extent does the addition of L2 chargers in retail parking areas attract business and raise consumer awareness and interest in EVs enough to influence adoption? Can these benefits be measured/quantified? How much new charging activity can be associated with these theories and quantified as increased revenue? The intention is that this pilot will help the Company collect reliable data to understand how to appropriate characterize cost-effectiveness in the future for these types of program offerings.

Table 11. Pilot Theory and Associated Impacts

Use Case	Pilot Theory	Pilot Participant	Participant Benefits	Societal Benefits	Utility System Impacts	DR / control potential
Retail	1) L2 addition attracts customers - benefit for participant 2) Existence of L2 tips purchase decision for EV for consumer	Retail Business	Lowers cost to attracts customers, increased business $, positive community image	Encourages consumer EV ownership through increased accessibility to charging. Reduced emissions	Portion of home charging needs shifts to retail, utilization rate increases over 3 years	limited
Workplace	1) L2 addition attracts employees - benefit for participant 2) Existence of L2 tips purchase decision for EV for consumer	Company	Lowers cost to attract employees, increased business $, positive community image		Portion of home charging needs shifts to workplace	limited
Fleet	1) L2 addition lowers total cost of EV+EVSE - benefit for participant 2) Meets company env goals/image/employees like it	Company	Lowers total incremental cost of ICE vs EV Fleet benefits$, positive image and employee happiness		100% additional charging at nonresidential rate	Good potential for off peak shifting
MF	1) L2 addition attracts renters - benefit for participant 2) Existence of L2 tips purchase decision for EV for consumer who is the renter	Real Estate Owner	Lowers cost to attract renters, increased, or more stable revenue $		100% additional charging at nonresidential rate	Good potential for off peak shifting
MF - AH	1) L2 addition attracts renters - benefit for participant 2) Existence of L2 tips purchase decision for EV for consumer who is the renter 3) Customer Equity	Real Estate Owner	Supports ability to offer an amenity to renters where increasing rent/revenues is not an option		100% additional charging at nonresidential rate	Good potential for off peak shifting

4.1.2 National Standard Practice Manual

In 2020, the National Energy Screening Project expanded upon the 2017 release of a National Standard Practice Manual for Assessing the Cost-Effectiveness of Energy Efficiency Resources to

incorporate all distributed energy resources (DERs). The premise of both manuals is to "help inform which resources to acquire to meet the jurisdictions specific policy goals and objectives." The approach is not unlike the CA standard practice manual in that costs and benefits of DER programs are quantified and compared but the approach stresses the importance of starting with policy goals and objectives and building a primary cost-effectiveness test that tests those objectives.

4.1.3 Executive Order 20-04 and UM 2165

The Public Utility Commission of Oregon (Commission) and Commission Staff have created a workplan to address Governor Brown's Executive Order 20-04 which includes steps to look further into the cost effectiveness methodology for utility TE programs in the near future. In May 2021, the OPUC opened docket UM 2165 "Investigation of TE Investment Framework", where investment frameworks including cost-effectiveness guidelines are anticipated to be examined. Both the CA Standard Practice Manual and the National Standard Practice Manual provide foundations for those discussion as does consideration of modifications to other approaches to funding new business activities such as line extension policies. Given Oregon's policy objectives for the utility to play a role in support of consumer/customer adoption of EVs, the data collected on all the benefits and costs of this pilot should be helpful for those discussions of cost effectiveness test design. Subsequent cost-effectiveness analysis for TE pilots will incorporate advice and guidance developed through these proceedings.

4.1.4 Cost effectiveness of the TE Portfolio

In designing the 2021 residential, nonresidential and outreach pilot proposals, Pacific Power recognized that an effective intervention strategy to accelerate the adoption of EVs across the service territory would require of suite of programs to address market barriers. Each pilot addresses known barriers to adoption which together offer a strong approach to influencing consumers decisions. Since each pilot leverages the efforts of other pilots, future consideration of a portfolio approach TE program cost effectiveness and funding authorization may be beneficial.

4.2 Proposed Cost Recovery

Pacific Power expects that the nonresidential home charging pilot will provide a significant benefit to customers across Pacific Power's Oregon service area. Upon Commission review and approval of the proposed budget, PacifiCorp will implement a cost tracker to record pilot expenditures. Expenditures recorded in the balancing account will be deferred for future Commission review and potential rate recovery through a general rate case or a rate rider specific to TE programs.

Assuming approval of PacifiCorp's proposed budget for this pilot, the Company estimates a rate impact of 0.1% each year of the pilot.

5 Program Evaluation

5.1 Evaluation Plan

Pacific Power has designed this proposed pilot program and evaluation plan to enable the company to identify key learnings and indicators of success throughout the life of the pilot such that lessons learned may be incorporated along the way. At the conclusion of the pilot, if deemed successful and meaningful to continue, the Company may propose to scale the pilot into a longer-term program offering.

The pilot design is built upon several key assumptions. Each of these assumptions will be evaluated with data gathered through the pilot, which will be included in regular reporting as well as other sources of market indicators. Upon receiving approval to implement the pilot, Pacific Power will conduct a competitive solicitation and contract with a third-party contractor to design and execute a robust evaluation plan.

Pacific Power anticipates issuing a RFP for third-party program evaluation services once programs are approved. The selected vendor will evaluate all three new Pacific Power Programs. Pacific Power will work with the selected evaluation contractor to scope required evaluation efforts and develop an evaluation plan. Evaluation efforts will begin in earnest the first year of program implementation, leading up to the development of a program evaluation report to be filed as part of the Company's reports to the Commission. The program evaluation report will address all reporting requirements specified in OAR 860-087-0040 (1).

Gathering data to inform evaluation and future planning efforts is a key component of this program.

5.1.1 Process and Methods

Evaluation of the pilot will include process and impact elements occurring at annual intervals with ongoing quarterly reporting of pilot performance such that interim findings may inform continuous improvement of the pilot design. During pilot "startup" a third-party evaluator will be identified to set in place the data gathering requirements needed for efficient design of annual evaluations.

Process evaluation

The process evaluation aspects will inform how well the overall pilot is working from a procedural standpoint and will identify not only inefficiencies or bottlenecks to process but also helpful changes to marketing language or relationship gaps with the market. These aspects will be evaluated through interviews and review of pilot documentation.

Three main categories of interviews are needed: 1) participants and non-participants, 2) Pacific Power pilot management staff and implementation contractors, and 3) key market actors such as dealerships and installers.

Examples of questions answered through the process evaluation include:

- How satisfied are participants and market actors with the pilot design?

- Were participants motivated by the incentive to purchase an EV plus a L2 networked charger?
- What are the demographics of participating customers? Are we seeing equitable distribution of participants?
- How satisfied are participants with participation on the TOU rate schedule?
- Are there recommended changes to the pilot design to improve participation?

Impact evaluation

The impact evaluation begins with data collection to develop a baseline against which impacts can be measured. This pilot is testing not just the influence of the incentive the EV + EVSE purchase decision but also the effectiveness of in encouraging off-peak charging and the corresponding impacts on the utility distribution system. In addition, the impact evaluation will complete a field sample site evaluation of the equipment to ensure successful installation and network connectivity. The third-party evaluator will set up a clear approach to measurement of each impact during pilot start up.

Examples of analysis provided in impact evaluation include:

- Average annual charging load (kilowatt-hours (kWh)) vs. building load
- Charging utilization rates by demographic, location, and building type
- Hourly charging patterns of participants vs non-participants
- Variation in charging patterns by demographic, location, and building type
- Distribution system upgrades associated with local increases to load

Table 13 provides a few examples of how each of the key assumptions in the pilot will be evaluated by the third party. Once the pilot is approved, a third-party consultant will be identified who can then firm up the evaluation plan prior to pilot implementation.

Table 12. Key Assumptions to be Evaluated

Key Assumption	Base Value	Evaluation Approach
Annual charging load (kWh)	Unknown	Charger data review
Charging load shape (% on vs off-peak)	Unknown	Charger data review
Charger utilization rates	Unknown	Charger data review
Program penetration	25% new nonresidential and multifamily EV owners	Participation vs registration data
Multifamily affordable housing participation	25% of multifamily participants	Program documentation review

5.2 Proposed Reporting and Evaluation Timeline

Reporting of pilot progress and findings will be established on a quarterly basis with more comprehensive reports annually. The frequency and focus of the reporting is designed to give the Company ongoing insights into customer and market response and where adjustments to the approach may be needed to meet objectives and address any program implementation barriers identified in the evaluation process.

Quarterly reporting includes:

- Number of participants and cumulative participation to date
- Outreach / marketing activities
- Charging data capture and evaluation
- Incentive processing
- Locational tracking of incentives/city/service territory location

Annual reporting includes:

- All portions of quarterly reporting
- Analysis of charging data patterns
- Locational summarization of incentives and charging patterns

Overall Pilot Evaluation includes:

- Third-party evaluation of pilot findings and recommendations
- Process and impact components
- Assessment of key assumptions
- Summary of PacifiCorp's program experiences in other states

5.3 Estimated Costs of Evaluation

Consistent with guidance from the California Evaluation Framework prepared for the California Public Utilities Commission, and experience with similar programming, it is assumed that approximately five percent of total program costs are attributed to program evaluation.[40]

6 Discussion of Senate Bill (SB) 1547 Considerations

Oregon SB 1547 outlined a series of six standards for the Commission to consider as they review TE programs filed by investor-owned utilities. PacifiCorp has designed the proposed programs with these standards in mind, and anticipates the program accelerating TE adoption in Oregon in accordance with the intent of SB 1547.

- PacifiCorp's proposed nonresidential charging program is designed for customers of Pacific Power, and thus, is **within the service territory of the Company**. The Company has taken

California Public Utilities Commission. (2021, June 15). Energy Efficiency Evaluation, Measurement, and Verification. Cpuc.Ca.Gov. Energy Efficiency Evaluation, Measurement, and Verification - Main Page

steps to limit the risk of the program being extended outside of the service territory by mandating that any customers receiving grant funding must be current Pacific Power customers.

- PacifiCorp submits this proposal for Commission review to provide a detailed description of the nonresidential charging program, information on the potential costs and benefits, program evaluation plans, a description of how the program fits into the Company's overall TE strategy, and how this will help accelerate the EV market in Oregon. This is to aid in the Commission's determination of **whether the program is prudent**. Further, PacifiCorp h intends to seek Commission authorization to defer the costs of this pilot program for later cost recovery, which will allow a second opportunity for Commission review of actual costs to ensure that expenditures fit within the framework of the approved program.

- Pacific Power will track equipment utilization and report this information to the Commission during the pilot period. This ability to audit installations after the fact—but before costs ultimately go into customer rates—will provide certainty that **the equipment is reasonably expected to be used and useful, as determined by the Commission**.

- Through this pilot, the Company will attempt to gain deeper insight into customer transportation decisions, where vehicle charging occurs and charging behaviors. These activities will **ensure the pilots are reasonably expected to enable the electric company to support the electric company's electrical system**.

- A key component of the pilot will be to investigate when grant recipients charge their vehicles, improving operational flexibility, and the requirement that EVSE support the Company's ability to integrate variable generating resources. This requirement supports the requirement that the Company is **reasonably expected to improve the electric company's electrical system efficiency and operational flexibility, including the ability of the electric company to integrate variable generating resources**.

- Aside from EVSE equipment requirements, the Company will remain technology and brand neutral to encourage competition and customer choice. Remaining brand-neutral supports the Company's ability to **stimulate innovation, competition and customer choice in electric vehicle charging.**

Exhibit 4

Purpose

The purpose of the Transportation Electrification Nonresidential Charging Pilot (Pilot) is to improve the access and economic viability of charging for Nonresidential Customers by providing an incentive to help offset the costs associated with the purchase and installation of qualifying electric vehicle supply equipment (EVSE).

Available

In all territory served by the Company in the State of Oregon

Applicable

To Nonresidential Customers otherwise receiving Delivery Service under Schedules 23, 28, 47, and 48, in conjunction with Supply Service Schedule 201.

Customer Participation

Customer participation is voluntary and is initiated by following the participation procedures on the Company website. The Company shall have the right to qualify participants, at its discretion, based on criteria the Company considers necessary to ensure the effective operation of the measures, utility system, and program budget.

Program Description

Pacific Power proposes to offer a cash or on-bill incentive for nonresidential customers installing qualifying charging infrastructure. This program will also offer targeted incentives for installing charging at multi-unit family dwellings (MUDs) to increase charging access for renters. Non-residential customers earn a per-port incentive for installing qualifying Level 2 (L2) electric vehicle charging equipment at their location. Incentives will be available for MUDs and other nonresidential applications.

This Pilot provides a Standard EVSE Installation Rebate (Standard Rebate) for Nonresidential Customers who purchase and install a Level 2 (L2) networked charger. For Nonresidential Customers who are meet the requirements as an MUD will receive a MUD eligible installation rebate (MUD Rebate) to purchase and install a L2 networked charger.

Qualifying EVSE and Costs

Qualifying EVSE will be determined from either a Company Qualified Products List or reference national qualifying product lists such as the Energy Star Qualified EVSE products list. The costs covered under this Pilot include licensed electrician labor, materials, and permits. Participants will be required to provide copies of contractor invoices, required permits, and proof of purchase and installation of a qualifying L2 charger to participate in the Pilot.

Incentive Amounts

The Pilot will provide a one-time rebate for the purchase and installation of a qualified L2 EVSE:

Standard EVSE Installation Rebate	Up to $1,000 per port; capped at 75 percent of EVSE eligible costs paid
MUD Eligible EVSE Installation Rebate	Up to $3,000 per port; capped at 75 percent of EVSE eligible costs paid

(continued)

Special Conditions

1. Small Nonresidential Customers will automatically be enrolled in the Time-of-Use Pilot Schedule 29 for a minimum of one year.
2. To be eligible for an incentive, Customers must submit a Program Administrator approved application(s), provide all required documentation, and receive pre-approval.
3. Equipment purchased or installed prior to receipt of the Company's pre-approval may not be eligible for incentives.
4. Incentives will be available on a first come first served basis with an overall port and three-year program cap.
5. Customers must consent to provide charger usage data.
6. The Company and its agents reserve the right to inspect installations.
7. Applications may be subject to charger and per project caps.

Exhibit 5

PACIFIC POWER

TRANSPORTATION ELECTRIFICATION PROGRAM

OUTREACH AND EDUCATION PILOT PROGRAM

JUNE 30, 2021

Executive Summary

To promote transportation electrification (TE) in Oregon, Pacific Power is proposing an outreach and education pilot program. Although there's been generally steady growth in electric vehicle (EV) sales in Oregon, myths and misinformation continue to pose a barrier to EV adoption. As more EV models reach the market and charging infrastructure becomes widely available there's an opportunity to educate customers on their options. Positive impressions via online tools and in-person events are important in gaining consumer confidence in EV technology. Helping customers get started with initial technical assistance has also provided valuable.

Pacific Power proposes a three-year pilot to design and implement an expanded outreach and education pilot program throughout its service territory. Efforts will focus on: decision making support, high quality EV experiences, and planning studies. The proposed pilot program will provide customers with education on EV technology and charging infrastructure and will aim to reduce market barriers to EV adoption. The pilot program will also provide benefits to the utility with anticipated higher uptake in programming and better planning data to improve future program efforts.

Table of Contents

1. Introduction and Description of Pilot Programs

The State of Oregon has broad goals to increase the number of EVs on the road and reduce emissions from the transportation sector. Pacific Power (Pacific Power or PacifiCorp or the Company) recognizes its unique role in the evolution of electric transportation as an opportunity to facilitate and accelerate this transition. As a component of its broader TE initiatives, Pacific Power proposes a new three-year outreach and education pilot program.

This application is structured to demonstrate how this pilot program complies with the Transportation Electrification Program Application Requirements under Oregon Administrative Rule 860-087-0030. Additional strategic insights to the pilot program proposed by the Company are also included in in its February 3, 2020 Transportation Electrification Plan (TE Plan).[1] This pilot is identified in that plan as a key short-term intervention strategy. The proposed pilot also builds off the Company's previous education and outreach pilot program which aimed to increase awareness of EVs and electric vehicle supply equipment (EVSE) through feasibility assessments, community events, and education and outreach initiatives. Past pilot experience also provided crucial information on strategy to inform this proposed pilot program.

Outreach and education is a critical component of Pacific Power's strategy to reduce customer barriers to TE. The Outreach and Education Pilot Program is organized into three categories with supporting actions in each category. The first category, Decision Making Support, aims to help customers better understand the benefits of EVs. The second, High Quality EV Experiences, will provide customers with direct experiences with EVs. The third category, Planning and Studies, will support smart, strategic investments to ensure new load from TE is planned for and managed proactively. This pilot has the goals of providing future EV drivers with greater awareness and understanding of EVs and helping them make the transition to EVs sooner. This pilot is aimed at moving the market towards increased EV adoption and promotes a market growth trajectory well beyond the pilot period.

1.1 Objectives, Pilot Elements, Timeline, and Expected Outcomes

1.1.1 Objectives

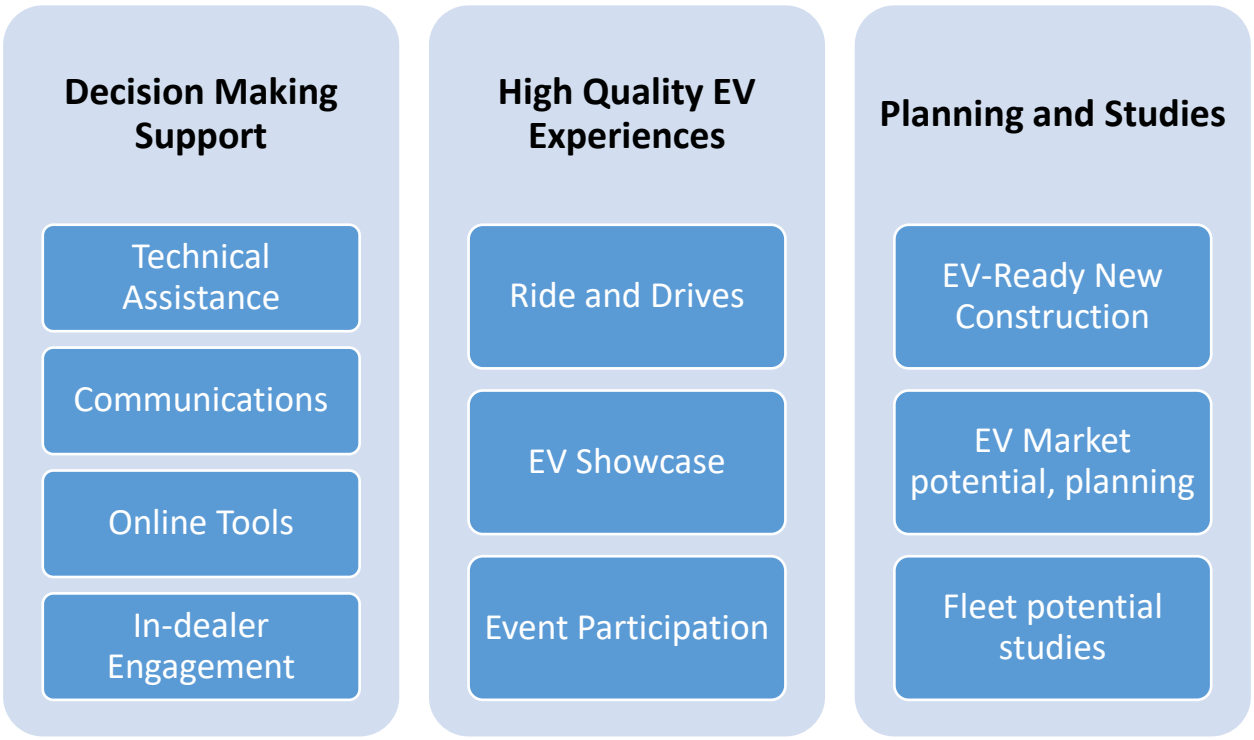
Over the course of the pilot program Pacific Power will participate in online campaigns and in-person events to provide positive impressions of EV technology to accelerate the adoption of EVs and EVSE charging infrastructure. Each component of the outreach and education pilot will provide customers with basic EV knowledge and empower motivated consumers with the tools to compare EV and EVSE models for their household, business, and fleet needs.

[1] Pacific Power, Oregon Transportation electrification Plan, February 3, 2020, https://edocs.puc.state.or.us/efdocs/HAA/haa17127.pdf

1.1.2 Pilot Elements

The proposed pilot program will test an updated portfolio of outreach and education tactics, which fall within three primary categories as illustrated in Figure 1 and discussed in more detail in the sections that follow.

Figure 1. Outreach and Education Pilot Program Portfolio



Decision Making Support

- Technical assistance: Expert, onsite technical assistance for nonresidential EVSE projects (*e.g.*, charging for fleet electrification, workplace charging, public or customer charging).
- Customer communications: Develop direct customer communications (*e.g.*, bill inserts, email campaigns, newsletter content, social media, brochures, etc.) and paid advertising, where appropriate. Messaging will help build awareness, promote off-peak charging and direct customers to additional Outreach and Education Pilot elements and other programs proposed by Pacific Power.
- Online Tools: Expand Pacific Power's electric transportation online resources and contract for additional online tools accessible to all customers. Educational resources will provide information about electric transportation technologies, costs, benefits, incentives (e.g., tax credits) and additional resources as available.
- In-dealer engagement: Chargeway beacon deployment and dealer representative training.

High Quality EV Experiences

- Ride and Drives: Partner with local organizations to host in person ride and drive events. Introduce people to basic EV information as they drive or ride in an EV. Attendees can engage with auto dealer representatives to learn about the latest EV models.
- EV Showcase: Coordinate group tours of the Forth EV showcase where customers can research EVs in a brand neutral environment. Customers can test drive EVs as well as rent EVs via the Turo platform.
- Event participation: Attend and/or sponsor events to increase exposure to TE and the Company's programming. Examples of events attended in the past include Touch a Truck Independence Oregon; Da Vinci Days, Corvallis, Oregon; the Portland International Auto Show; and a Science, Technology, Engineering, and Math (STEM) EV Model vehicle sponsored for schools.

Planning and Studies:

- EV Ready New Construction: Promote EV ready building codes and fund an initial incentive program to ensure new construction can support EVSE infrastructure.
- EV Market potential planning: Design and plan strategies for customer TE adoption and grid impact on future infrastructure, and load analysis. (e.g., consumer adoption, commercial EVSE infrastructure, smart metering, storage capacity).
- Fleet potential studies: Partner with a vendor to evaluate fleet implications and potential impact on light, medium and heavy-duty vehicles. Evaluation will consider rate of market penetration, reduction of greenhouse gas (GHG), EVSE infrastructure and vehicle to grid (V2G) technology.

1.1.3 Timeline and Performance Milestones

Table 1 shows anticipated timing and performance milestones. The Company is proposing a short ramp up period followed by a three-year pilot program.

Table 1. Estimated pilot program timeline

Major performance milestone estimates	Start-up		Program Year 1				Program Year 2				Program Year 3				Year 4
	Q1	Q2	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
Program Implementation															
Decision Making Support															
Communications															
Develop startup collateral															
Execute ongoing communications															
Online Tools															
Online tools and resource selection and contracting															
Implement resources															
Dealer Engagement															
Dealer Engagement selection and contracting															
Dealership engagement															
High-Quality EV Experiences															
Ride-and-drive Events vendor selection and contracting															
First ride-and-drive event															
Additional ride-and-drive events															
Technical assistance															
Technical assistance provider contract extension															
Develop technical assistance processes															
Implement technical assistance process															
Planning and Studies															
Vendor selection and contracting															
EV-Ready new construction															

Major performance milestone estimates	Start-up		Program Year 1				Program Year 2				Program Year 3				Year 4
	Q1	Q2	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
EV Market potential, planning study vendor selection															
Fleet potential study															
File program revision or extension (if recommended)															
Pilot Evaluation															
Issue a request for proposals for program evaluator															
Program evaluator selection and contracting															
Gather data to inform program evaluation															
Complete program evaluation															
Reporting															
Annual pilot progress update to Public Utility Commission of Oregon															
Final report to Public Utility Commission of Oregon															

1.1.4 Expected Outcomes

This pilot program in intended to:

1. Increase customer awareness of EVs on Pacific Power's system,
2. Increase customer knowledge TE benefits and encourage customers to participate in TE programs and incentives,
3. Develop a best practice toolkit for marketing campaigns for different customer demographics,
4. Study participant TE awareness before and after campaign/event engagement, and
5. Determine how outreach campaigns can improve and maximize TE efforts for future programs.

1.2 Market Baseline, Market Barriers, Program Implementation Barriers, and Program Strategies to Overcome Barriers

1.2.1 Market Baseline Assumptions

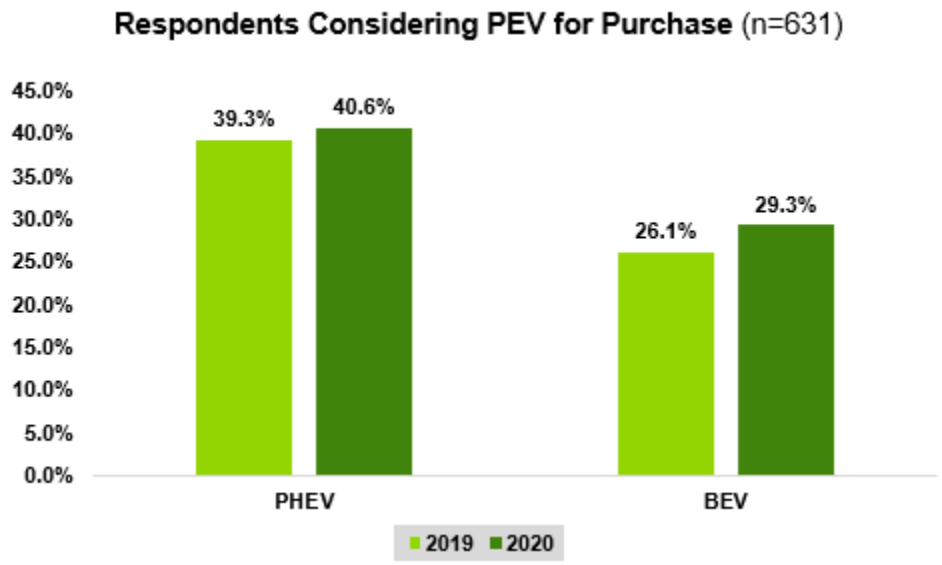
As of June 2020, there were 6,709 Light Duty Vehicles (LDVs) registered in Pacific Power's Oregon service territory.[2] Approximately 85 percent of those vehicles are owned by residential consumers with the remaining owned by nonresidential entities for business use.

Oregon has aggressive goals for EV adoption across the state. Although current registrations are close to what was projected in Pacific Power's 2020 TE Plan, a recently revised forecast for long-term EV adoption shows some dampening effect to the market due to the economic disruption of COVID-19. Bloomberg New Energy Finance's Electric Vehicle Outlook 2020 makes several statements about the effects of COVID-19 on the auto industry, specifically stating, "the long-term trajectory has not changed, but the market will be bumpy for the next three years". Further, they note that they expect "global passenger vehicle sales to plunge an unprecedented 23 percent in 2020, and EV sales to drop for the first time in the modern era."[3] Indeed, end of year sales figures confirmed the prediction as "US sales of plug-in light duty electric vehicles in 2020 totaled 296,000 units, which was down significantly from the 331,000 in sales in 2019 due largely to the coronavirus pandemic, according to Platts Analytics Future Energy Outlooks' report released Jan. 26."[4] These trends suggest the need for market intervention to assist in consumer adoption of EVs has not lessened over the past year but has grown more important.

More specifically, data from a 2020 survey of Pacific Power customers performed after the initial outreach and education pilot suggests modest growth in interest in EVs, but that there remains significant opportunity for growth, as shown in Figure 2.

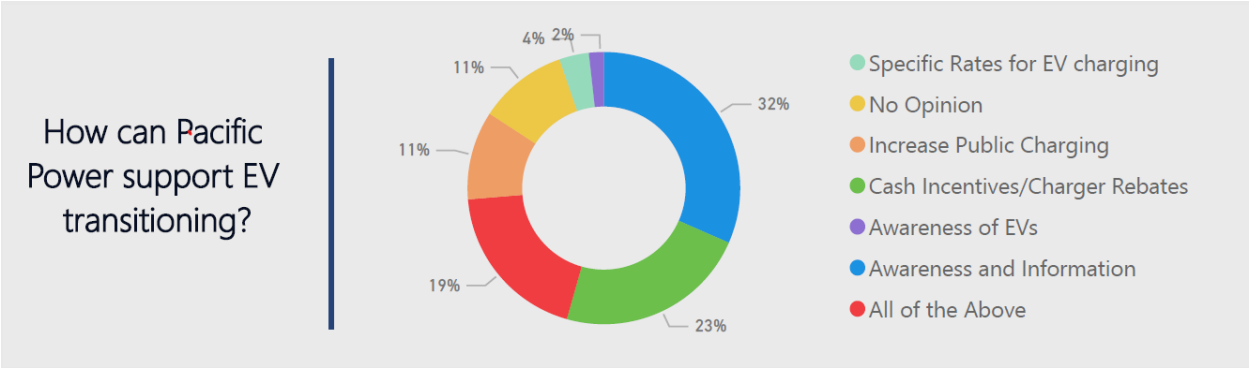
[2] US Department of Energy. (2021, March 18). Alternative Fuel Data Center. https://afdc.energy.gov/fuels/electricity_locations.html#/find/nearest?fuel=ELEC

Figure 2. Pacific Power Customers Considering EVs, 2019 - 2020



Additional market baselining suggests that outreach and education is an effective way to increase EV adoption. In a November 2020 customer survey of customers that had participated in technical assistance, customers were asked how Pacific Power could support their transition to an electric vehicle transportation. "Awareness and Information" was the most requested action,[3] as shown in Figure 3:

Figure 3. Customer Response to How Pacific Power Can Support the EV Transition



<u>Initial Outreach and Education Pilot</u>

During September of 2020 through November of 2020, Pacific Power conducted an initial outreach and education pilot. While final program evaluation will be published in June 2021 with the final pilot report, initial evaluation findings suggest a set of positive and significant

[3] C2 Group. (2020). Electrification Outreach Report.

associations between outreach and education activities and desired pilot outcomes such as favorable impressions, interest, consideration, and purchasing intentions for battery electric vehicle (BEVs).

Pacific Power engaged in a wide variety of outreach and education activities designed to provide customers with more information about Plug-in hybrid electric vehicles (PHEVs) and BEVs. These activities included providing information about EVs on the Pacific Power website, the Pacific Power newsletter, and the customer billing envelope; sharing information at community events; holding ride and drive events; and placing advertisements across a variety of media including television, paper mailings, online social media, internet search engines, radio, and on streaming services.

The initial outreach and education pilot evaluation found that exposure to outreach and education appears to be associated with better impressions of BEVs and greater intentions to purchase a full BEV or PHEV. Guidehouse (formally Navigant) was engaged to assess customer exposure to various sources of information and created a composite measure of exposure to outreach and education.[4] Respondents were asked whether they recalled being exposed to these various sources of information. Survey findings revealed that outreach and education activities were successful in reaching approximately 30 percent of respondents. The level of exposure was fairly shallow, with only 13 percent of respondents reporting being exposed to more than one outreach/education activity.

The evaluation also found an increased interest in BEVs when outreach and education is moderate and a significant influence on the likelihood (intention) to purchase a BEV among those who were NOT already considering a purchase. Critically, outreach and education makes the biggest difference in the likelihood of purchasing a BEV among those people who were not already interested and considering BEVs.

1.2.2 Market Barriers

Pacific Power's TE Plan provides a general summary of EV and EVSE market barriers. In the Plan the EV and EVSE market barriers are broadly grouped across the following six categories: 1) awareness barriers, 2) decision-making barriers, 3) economic barriers, 4) policy and regulatory barriers, 5) technical barriers, and 6) supply chain barriers. This pilot will primarily target awareness and reducing decision-making barriers, including:

- **Awareness barriers** include those that hinder the awareness of consumers, fleet owners, dealers, and other key stakeholders regarding EVs. Examples include a lack of knowledge of the capabilities or costs of EV technology, the available incentives for and operational savings of EVs, EVSE or their environmental and other benefits. For example, a survey provided as part of the EV Plan of 1,400 consumers in Pacific Power's territory reveals that well over half of respondents (64 percent) are not aware of any EV

[4] Navigant. (2019). Select Baseline Survey Responses Pacific Power Gen Pop Survey.

initiatives, 70 percent are unaware of the federal tax incentive for EVs, and 77 percent are unaware of the Oregon vehicle rebate. [5]

- **Decision-making barriers** are those that complicate or hinder the ability to choose to invest in EV or EVSE technology. Even if consumers are aware of EV technology, other barriers may affect their decision to invest in EVs, such as a lack of confidence in the technology's range or availability of charging stations, or uncertainty about the consistent availability of incentives.

Lack of awareness of electric transportation options and benefits remains a barrier to the adoption of EVs in Pacific Power's service area. Consumers' lack of comfort with, and acceptance of, electric transportation in Pacific Power's service area is due in part to low levels of exposure and limited access to reliable information, which affect understanding of the benefits and capabilities of EVs (e.g., vehicle cost, rebates, tax credits, available EV models, charging options and vehicle dependability) and EVSE.

The survey provided as part of the EV plan revealed that the customer purchase journey can be a complex, years-long journey. It starts with awareness, continues to the consideration stage, and closes with the purchase decision. Beyond awareness, customers often need trusted information and direct experience with riding, driving, and charging an EV to overcome perception issues at the consideration stage and make a good purchase decision. As a trusted entity with strong customer relationships, PacifiCorp is in a unique position to address awareness issues and provide experiential opportunities to help customers choose electric for their next vehicle choice.

1.2.3 Pilot Program Implementation Barriers

Pilot Program outreach implementation may be limited by the continued effects of COVID -19. Oregon has seen a spike in cases which limits in person events and gatherings. Many of the community events and annual festivals have been cancelled or postponed until late 2021 or 2022. Limited interaction with the public greatly dampens the impact of providing the high-quality experience of riding or driving an EV.

Additionally, outreach and education programs, especially in rural areas, face unique barriers to program implementation. These include:

- Access to WIFI network
- Lack of participation
- Lack of standardized data to measure long-term program outcomes

[5] Navigant. (2019). Select Baseline Survey Responses Pacific Power Gen Pop Survey.

1.2.4 Pilot Program Strategies to Overcome Barriers

Despite challenges with hosting ride and drives and interacting with customers in in person, Pacific Power will continue to monitor the situation and design different strategies to engage with customers and the public. The pilot will implement the following strategies, intended to maximize participation for a range of audiences:

- Leverage online tools and marketing campaigns
- Deploy a robust marketing campaigns via bill inserts and paid media
- Maximize support for existing events (e.g., Road Map Conference, National Drive Electric Week, Auto Show)
- Design limited gatherings that include safety protocols

1.3 Expected Utilization, Participation Eligibility, and Incentive Structures

The pilot will be deployed throughout the Pacific Power service territory via online and in person events, in addition to bill inserts and event attendance. Customers can access the EV website to learn more about EV charging, available EV models and apply for technical assistance. While events and marketing campaigns will be customized to capture different markets and maximize impact, the goal of education and awareness campaigns is to ensure that all customers are aware of, and can easily access, resources about electric transportation.

1.4 Pilot Impact on Distribution System

The Outreach and Education pilot program will have no immediate, direct impact on the distribution system. At this time, there is insufficient data to estimate the additional adoption that may be attributed to this pilot, and, more importantly, in the context of distribution upgrades, how concentrated this adoption will be and where charging will occur. As discussed in Pacific Power's TE Plan, a 2018 EV distribution impact study found that the adoption of EVs in Pacific Power's service area will have minimal impacts on the grid as new loads are incorporated into Pacific Power's planning processes.

One key message for customer communications to promote efficient usage of the grid, will be for customers to charge vehicles during off-peak hours. The Company intends to reinforce this message by highlighting time-of-use (TOU) pricing that varies by time of day. This clear and consistent messaging should further reduce the likelihood of increased distribution system costs because of this pilot.

1.5 PacifiCorp Support of Infrastructure, Services, and Customer Information

Pacific Power's role in this program is to provide credible, accessible, pertinent, and consistent information to customers to address barriers to the adoption of electric transportation and to encourage efficient use of the electrical system. To maximize value for customers, the Company will explore opportunities to leverage third-party expertise to support development of online

tools, dealership engagement, delivery of technical assistance, and organization of community events. In addition, the Company will explore opportunities to integrate education and awareness efforts with other organizations working to accelerate TE in its Oregon service area. For example, the Company may utilize messaging developed through the Oregoin' Electric education campaign funded by the Oregon Clean Fuels Program.

1.6 National Standards and Interoperability of Invested Equipment

As national standards for measurement and communication develop, this information will be incorporated into technical assistance and educational materials related to EVSE. Outreach and communication materials will refer to the Company's Residential Incentive Program, which will require the installation of equipment meeting certain technology standards that are emerging as best practices in EVSE incentive programs.

1.7 Stakeholder Involvement in Pilot Program Development

Pacific Power engaged in a robust stakeholder and customer outreach process to design its pilot programs. The Company met with numerous parties individually and with stakeholder organizations for guidance on the portfolio of customer programs contemplated in the Company's TE Plan and receive feedback on program design. Invited stakeholders included:

- Climate Solutions
- Environmental Center
- Rogue Climate
- Oregon Citizens' Utility Board
- City of Portland Bureau of Planning and Sustainability
- Department of Environmental Quality
- Northwest Energy Coalition
- Oregon Public Utility Commission Staff
- Oregon Department of Energy
- ChargePoint

1.8 Coordination with Related State Programs

The Company will continue to coordinate with several ongoing initiatives and goals supported by various State agencies including the Oregon Department of Energy, Oregon Department of Transportation, the Climate Office, and the Oregon Department of Environmental Quality.

1.9 Coordination of Delivery with Other Market Actors and Activities

Pacific Power will continue to collaborate with stakeholders and other partners and leverage key relationships with other utilities (particularly PGE), community partners, and the Oregon Auto Dealers Association to promote EV adoption.

2. Long-Term Strategy and PacifiCorp's TE Plan

2.1 Current Condition of TE Market and Outlook

Pacific Power's long-term strategy is identified and discussed in the Company's TE Plan completed in February of 2020 and scheduled for update in February of 2022. Shortly after the Plan was completed, the COVID crisis hit and early projections suggested that the auto industry

would suffer massive impacts. For example, in March of 2020, one source wrote, "after the virus appeared in China, auto sales there fell 80 percent [in February]. Globally, the industry has canceled large events—the Geneva Motor Show this month, New York's equivalent next month—for fear of spreading the virus. European carmakers began temporary factory closures last week amid health concerns for their employees, falling demand, and severe disruptions to manufacturing supply chains…"[6] At nearly the same time, the US auto industry announced a shutdown of all three Detroit carmaker manufacturing operations.[7]

Fast forward through 2020 and the dire initial impacts started to fade. "Global market trends were markedly different in the second half of 2020, when lockdowns were lifted or relaxed for some time, and the automotive market started to recover. For electric cars, monthly sales surpassed those between July and December in 2019 in every month in all large markets including China, the European Union, India, Korea, the United Kingdom and the United States, despite second waves of the pandemic."[8]

On a local level, Pacific Power continued to see strong interest from our customers and communities we serve—and travelers throughout our service territory generally—in building out the necessary infrastructure to support the transformation that's underway. Grant programs have attracted applicants from across the state. We also see the forecast from the EV Plan for the year 2020 aligning very closely with actuals.

Looking forward, it's reasonable to expect interest in EVs to continue to grow. Currently there are eight different EV pickup trucks poised to enter the market with Rivian starting deliveries in 2021 and the electric Ford F-150 scheduled for production in 2022.[9] Additionally, since the first of the year, Volkswagen "unveiled a massive push to drive down the cost of producing batteries for its electric vehicles in the hopes of speeding the transition away from gas-powered cars" and to deliver on its promise of making EVs 50 percent of its sales in the US by 2030.[10] GM is on its way to an all-electric future, with a commitment to 30 new global EVs by 2025, and has set a target of 2035 for ending production of gas and diesel vehicles.[11] These announcements highlight that the EV market is continuing to evolve quickly and efforts to support customers through this change are timely.

Finally, while the macro trends are positive, specific adoption patterns are also starting to emerge that help point to important actions to broader adoption. A Portland State University

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[6] Adams, E. (2020). Covid-19 Is Bad for the Auto Industry. *WIRED*. https://www.wired.com/story/covid-19-bad-for-auto-industry-worse-for-evs/

[7] Le Reau, J. and Howard, P.H. (2020). Detroit Automakers Ford, General Motors, FCA Agree to Close All US Plants. *Detroit Free Press*. https://www.freep.com/story/news/2020/03/18/ford-gm-fca-plant-closures-coronavirus/2865289001/

[8] Gorner, M. & Paoli, L. (2021). How Global Electric Car Sales Defied Covid-19 in 2020. *IEA*. https://www.iea.org/commentaries/how-global-electric-car-sales-defied-covid-19-in-2020

[9] Beresford, C. (2021). Every Electric Pickup Truck Currently on the Horizon. *Car and Driver*. https://www.caranddriver.com/news/a29890843/full-electric-pickup-trucks/

[10] Hawkins, A. (2021). Here are the Biggest Announcements from Volkswagen's Battery Event. *The Verge.* https://www.theverge.com/2021/3/15/22325813/vw-volkswagen-power-day-battery-electric-car-announcement

[11] Eisenstein, P. (2021). GM to go all-electric by 2035, phase out gas and diesel engines. *NBC News.* https://www.nbcnews.com/business/autos/gm-go-all-electric-2035-phase-out-gas-diesel-engines-n1256055

survey of demographic information of Oregon EV owners found that 88.4 percent of EV owners self-identified as being White or Caucasian and 67.3 percent self-identified as being male.[12] Demographic information coupled with location registration information from the Oregon EV Dashboard reveals that seven of the top 10 counties with the highest number of EV registrations per 1,000 people are also among the top 10 counties with highest annual median income. This reveals the importance of program and efforts to broaden information, access, and affordability to customers well beyond the early adopter group that owns EVs today.

2.2 Opportunities to Improve the Operation and Reliability of the Electric Company's Power System

As discussed in the Company's TE plan and in its other 2021 pilot program filings, additional load management elements are being considered as the programs develop. The outreach and communication pilot program will highlight the advantages of EV-owning customers enrolling in the Company's TOU rate. Depending on the efficacy of the TOU through the period of the charging pilots, a potential demand response (DR) pilot program could be considered. As detailed in the Company's Residential Incentive pilot filing, which requires participation in the TOU, the Company plans to assess the impact of the TOU rate and evaluate how enrollment affects charging behavior. If a significant impact is revealed as charging load increases, the Company may look to deploy DR for cost-effective, coordinated, diversified managed charging control.

3. Pilot Assumptions: Impacts, Benefits and Costs

3.1 Estimated Pilot Impacts

3.1.1 Participation Assumptions

Participant assumptions regarding outreach and education are derived primarily from Pacific Power's previous outreach and marketing pilot program and the subsequent evaluation completed by Guidehouse (formerly known as Navigant).[13] Pacific Power conducted several outreach or marketing campaigns to provide customers with information about EVs. Some activities included social media posts, informational pamphlets to commercial customers, notification on bill envelopes directing customers to Pacific Power's EV website, and informational newsletters.

Pacific Power sponsored a series of community events to engage with the public regarding EVs.

- Held five ride and drive events between May 2019 and January 2020. These events allowed customers to view, ride in, or test drive EVs and engage with Pacific Power

[12] MacArthur, John, Michael Harpool and Daniel Scheppke. Survey of Oregon Electric Vehicle & Hybrid Owners. TREC-RR-1259. Portland, OR: Transportation Research and Education Center (TREC), 2018. https://www.doi.org/10.15760/trec.205

[13] Guidehouse Inc. (2020). Pacific Power Transportation Electrification Programs-Evaluation Report. State of Oregon: Public Utility Commission of Oregon

representatives for information. Pacific Power reported that these events resulted in 106 ride/drives and 402 customer interactions.

- Hosted Electric Avenue Exhibit at the Portland International Auto Show in February 2020.
- Deployed three Chargeway beacons in Medford/Ashland, Bend, North Bend, and Coos Bay/North Bend in the fall of 2019. The beacons are interactive electronic screen displays located at vehicle dealerships that allow customers and dealers to explore EV and charging options.

Pacific Power expects that this level of outreach and participant interaction will continue and increase over time throughout the course the pilot program. The reasons for this are twofold: First, prior program and evaluation activities were hindered considerably as a result of to the coronavirus outbreak. Second, recent product launches by major automobile manufacturers include model and vehicle types that previously did not include an electric analogy.[14]

The purpose of the evaluation conducted by Guidehouse was to understand how Pacific Power's pilot programs were addressing certain market barriers to EV adoption, how EV charging infrastructure was being used by consumers, and whether key findings could be used to inform future program design. To achieve this, Guidehouse performed two online surveys of the general population to assess customer willingness to purchase an EV, determine customers' understanding of the pricing model, and investigate the exposure to and effectiveness of Pacific Power's outreach and communications campaigns. An initial survey was conducted in June 2019 to establish a baseline; a second survey was fielded in June 2020 to only those customers who completed the first survey in 2019 (i.e., panel approach). More specifically, evaluation activities were used to measure and evaluate changes in:

- Customer understanding of the technology, its features, and its readiness
- Customer understanding of the economics of ownership
- Customer concern about charging logistics, including access to EVSE
- Customer awareness of environmental and community benefits
- Market drivers, consumer interests, and barriers to adoption

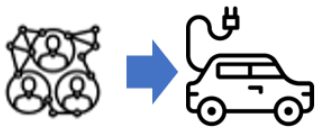
Pacific Power's outreach activities appeared effective at reaching the general population, with about 30 percent of the surveyed general population recalling exposure to one or more activities. The depth of exposure was limited, with most respondents recalling exposure to only one item. Pacific Power indicated that implementation of some activities was limited by the inability to conduct in-person events after March of 2020 due to the pandemic. The evaluation findings suggest a set of positive and significant associations between outreach and education

[14] Beresford, C. (2021). Every Electric Pickup Truck Currently on the Horizon. *Car and Driver*. https://www.caranddriver.com/news/a29890843/full-electric-pickup-trucks/

activities and desired pilot outcomes such as favorable impressions, interest, consideration, and purchasing intentions for BEVs.

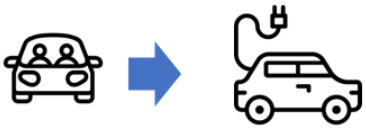
Figure 4 summarizes how outreach and education activities associate with customer interest, consideration, and intention to purchase EVs. Figure 5 elaborates on additional findings from the customer surveys.

Figure 4. The Influence of Outreach and Education



Exposure to outreach and education appears to be associated with…

- ***better impressions*** of BEVs (but not PHEVs) and ***greater intentions*** to purchase both types of vehicles
- Increased interest in BEVs when exposure is moderate (but no significant change in interest in PHEVs)
- No significant change in consideration of either a PHEV or a BEV.
- ***A significant influence on the likelihood (intention) to purchase a BEV*** among those who were NOT already considering a purchase.
  - O&E make the biggest difference in the likelihood of purchasing a BEV among those people who were not already interested and considering BEVs



Influence of In-Car Experience on Perceptions and Plans to Purchase*

For BEVs – Higher levels of interest, consideration and intentions are associated with both types of in-car experiences. Impressions seem to exist independently of in-car experiences.

For PHEVs – Higher levels of interest and consideration of PHEVs are associated with having ridden in a PEV. Respondents' intention to purchase a PHEV is positively associated with both riding and driving experience.

*The influence of outreach and education and experience is assessed using bivariate analysis only.

Figure 5. Summary of General Population Survey Findings

Outreach and Education reached about 30% of survey respondents however exposure was limited. (Only 13% of respondents were exposed to more than one O&E activity).

Motivators. The top three PEV features of most interest to (> 70%) respondents are: eco-friendliness, emissions reductions, and convenience (ability to charge from home).

Knowledge. There was little change in most measures of EV knowledge between 2019 and 2020. There were small increases in understanding of lower maintenance costs (4%) and environmental benefits (5%).

Awareness of Public Charging Locations increased by 4.5% between 2019 and 2020.

Vehicle Experience. Ownership remained steady while the percent of respondents who had driven a BEV nearly doubled from 6.4% to 12.1%.

Barriers to Adoptions. 74.5% of respondents are NOT planning to purchase a new vehicle in next 2 years.

One-third of respondents are NOT willing to pay more for an EV. Of those who are, 1/3 are willing to pay up to $2k more, 1/3 are willing to pay up to $5k more, and 1/3 are willing to pay a premium greater than $5k.

One-third does not have a dedicated parking spot with an outlet.

COVID has had a small dampening effect on plans to purchase a vehicle in the next 3 years.

3.1.2 Utility System Impacts

Impacts to the utility system do not directly tie to outreach and education activities, but as a result of overall increased charging related to transportation electrification, the utility system can expect to see effects associated with increased energy use, shifts in timing of charging, and utility system upgrades.

3.2 Pilot Program Benefits

The benefits of the pilot are estimated across three categories according to by whom the benefits are received. Benefits to the utility system are realized by all customers, benefits to participants are direct and indirect, and benefits to society are broadly shared.

Utility system

- **Revenue gains** from increased energy sales, including on regular residential rate schedules and on TOU rates.
- **Market revenues from Clean Fuels credits** from increased residential EV charging are allocated to Pacific Power and monetized. However, since those funds are directly applied towards additional Clean Fuels specific TE programs, they do not reduce the costs of this pilot as a benefit for ratepayers or the utility system and are not included in the quantification of associated benefits.

Participant

- **Awareness** of BEV and PHEV options, and availability of infrastructure.
- **Tax Credits** may apply to lower the investment cost of EVs and EVSE. Federal EVSE incentives have been extended until the end of 2021.
- **Fuel cost and vehicle maintenance savings** for EV owners incremental to ownership of an internal combustion engine (ICE) vehicle. [15]

Society

- **GHG emissions reductions** calculated as the net impact of replacing emissions from equivalent miles traveled with an ICE vehicle compared to an EV charged with electricity from the PacifiCorp Oregon-allocated emissions profile from the 2019 Integrated Resource Plan (IRP) preferred portfolio (as was applied to the 2020 TE Plan). The value of equivalent tons of carbon can be quantified by applying the social cost of carbon to the net emissions reduction.[16]

[15] AAA. (2019). Your driving costs, How much are you really paying. 19-0415_AUTO_YDC Brochure.indd (aaa.com)
[16] The 2019 IRP estimated the social cost of carbon as $50/ton in 2021.

3.3 Total Pilot Program Costs

Pacific Power estimates the costs during the pilot period, including program administration, evaluation and reporting, at roughly $2.1 million, as presented in Table . Estimated expenditures by program element are intended to be indicative of the Company's priorities for this pilot program. Actual expenditures by element will be dictated by customer and community demand for offered outreach and education services, and the Company will manage budgets at the program level. As shown in Table 1, Year 1 spending is expected to be lower than years 2 and 3, reflecting time required for regulatory approval and pilot start-up costs.

Table 1. Estimated Pilot Program Costs

Pilot Program Element	Program Year 1	Program Year 2	Program Year 3	Total
Decision Making Support, Technical Assistance and EV Experiences	$ 500,000	$ 500,000	$ 500,000	$ 1,500,000
Planning and Studies	$ 225,000	$ 75,000	$ 50,000	$ 350,000
Program Admin and Management	$ 75,000	$ 75,000	$ 75,000	$ 225,000
Evaluation	$ 40,000	$ 32,500	$ 31,250	$ 103,750
Total	**$ 840,000**	**$ 682,500**	**$ 656,250**	**$ 2,178,750**

3.4 Estimated Participant Costs

Pacific Power intends to offer these outreach and communication services through this pilot at no cost to customers. Customers may be eligible for financial assistance from the Company for these costs through other Company programs, such as the Residential Incentive Pilot and other funding sources in the State of Oregon.

Custom technical assistance will require a customer time commitment such that Pacific Power does not anticipate the need for safeguards to ensure pilot spending is limited to participants likely to implement projects. The Company will monitor participation to ensure that services are being deployed as intended and may implement a nominal participation fee, if needed.

4. Cost Effectiveness

Although costs can be reasonably estimated for the pilot, it's not possible to estimate incremental benefits resulting from outreach and education with certainty. Challenges regarding attribution and quantification of benefits for use in cost effectiveness determinations are therefore quite difficult and potentially not informative. In order to constrain the risk to customers that the cost of the pilot may exceed benefits, Pacific Power is proposing that the overall magnitude and term of the pilot be limited to $2.1 million over three years.

4.1 Cost-effectiveness considerations

4.1.1 National Standard Practice Manual

In 2020 the National Energy Screening Project expanded upon the 2017 release of a National Standard Practice Manual for Assessing the Cost-Effectiveness of Energy Efficiency Resources to incorporate all distributed energy resources (DERs). The premise of both manuals is to "help inform which resources to acquire to meet the jurisdictions specific policy goals and objectives." The approach is not unlike the California Standard Practice Manual in that costs and benefits of DER programs are quantified and compared but the approach stresses the importance of starting with policy goals and objectives and building a primary cost-effectiveness test that tests those objectives.

4.1.2 Executive Order 20-04 and UM 2165

The Commission and Staff have created a workplan to address Governor Brown's Executive Order 20-04 which currently includes steps to look further into the cost effectiveness methodology for utility TE programs in the near future. In May 2021, the OPUC opened docket UM 2165 "Investigation of TE Investment Framework", where investment frameworks including cost-effectiveness guidelines are anticipated to be examined. Both the California Standard Practice Manual and the National Standard Practice Manual provide foundations for that discussion, as does consideration of modifications to other approaches to funding new business activities such as line extension policies. Given Oregon's policy objectives for the utility to play a role in support of consumer/customer adoption of EVs the data collected on all the benefits and costs of this pilot should be helpful for those discussions of cost effectiveness test design. Subsequent cost-effectiveness analysis for TE pilots will incorporate advice and guidance developed through these proceedings.

4.1.3 Cost effectiveness of TE portfolio

In designing the 2021 residential, nonresidential and outreach pilot proposals, Pacific Power recognized that an effective intervention strategy to accelerate the adoption of EVs across the service territory will take a portfolio of actions. Residential EV adoption assumed to be influenced through this pilot effort may also be influenced through increased access to public charging that was made possible through the nonresidential pilot as well as an enhanced "ride and drive" from the Outreach and Education pilot. Each pilot addresses known barriers to adoption which together offer a strong approach to influencing consumers decisions. Since each pilot leverages the efforts of other pilots, future consideration of a portfolio approach TE program cost effectiveness and funding authorization may be beneficial.

4.2 Proposed Cost Recovery

Upon Commission review and approval of the proposed budget, PacifiCorp will implement a cost tracker to record pilot program expenditures.[17] Expenditures recorded in the balancing account will be deferred for future Commission review and potential rate recovery through a general rate case or a rate rider specific to transportation electrification programs.

5. Pilot Program Evaluation

5.1 Evaluation Plan

Pacific Power has designed this proposed pilot program and evaluation plan to enable the Company to identify key learnings and indicators of success throughout the life of the pilot such that lessons learned may be incorporated along the way. At the conclusion of the pilot, if deemed successful and meaningful to continue, the Company may propose to scale the pilot into a longer-term program offering.

The goal of the pilot is to test the Company's ability to cost effectively influence consumer adoption of EVs by providing EV education and support to customers considering the adoption of EVs. The pilot design is built upon a number of key assumptions. Each of these assumptions will be evaluated with data gathered through the pilot which will be included in regular reporting as well as other sources of market indicators. Upon receiving approval to implement the pilot, Pacific Power will contract with a third-party contractor to design and execute a robust evaluation plan.

5.1.1 Process and Methods

Pilot evaluation will be designed to test whether market and implementation barriers were mitigated as a result of the pilot, and to identify opportunities to enhance future programming. The methods of data collection that will be used to evaluate the effectiveness of the pilot include surveys and analysis of engagement metrics associated with the education resources and outreach campaigns:

- Surveys will be employed to assess the evolution of customer awareness of transportation electrification. Event participants and users of online resources will be asked to complete additional surveys specific to the effectiveness of these tactics. Also, recipients of technical assistance will be required participate in additional surveys to measure usefulness, process, and impact in overcoming barriers to TE.

[17] PacifiCorp submitted an application for approval of deferred accounting for a balancing account related to its TE Plan in Docket No. UM 1964 on July 27, 2018, and filed for reauthorization on March 24, 2020, amended on April 22, 2020, and on March 23, 2021. The Commission has not yet acted on these filings.

- Gross utilization and engagement metrics will be employed for online tools and email campaigns, including web page visits, open rates, and social media engagement.

5.2 Proposed Reporting and Evaluation Timeline

Reporting of pilot progress and findings will be established on an annual basis. The frequency and focus of the reporting is designed to give the Company ongoing insights into customer and market response and where adjustments to the approach may be needed to meet objectives.

Annual reporting includes:

- Analysis of impact on customer impression of PHEV and BEV
- Awareness of EV programs and incentives

Overall Pilot Evaluation includes:

- Third-party evaluation of pilot findings and recommendations
- Process and Impact components
- Assessment of Key Assumptions
- Summary of PacifiCorp's program experiences in other states

5.3 Estimated Costs of Evaluation

The Company can build analytics and surveys into its website, digital communications (i.e., email and social media) and, potentially, third-party self-service resources. In addition, the Company will continue to include general EV awareness and acceptance questions in its existing customer research and as part of its other pilot programs. For the time being, the Company estimates that pilot evaluation costs are 5 percent of total cost, which is a historic benchmark used for estimating expected evaluation costs. However, Pacific Power will explore leveraging online applications and existing customer surveys to collect evaluation data and reduce overall evaluation costs for the pilot.

6. Senate Bill (SB) 1547 Considerations

Oregon SB 1547 outlined a series of six standards for the Commission to consider as they review TE programs filed by investor-owned utilities. PacifiCorp has designed the proposed programs with these standards in mind, and anticipates the pilot accelerating TE adoption in Oregon in accordance with the intent of SB 1547.

- PacifiCorp's proposed outreach and education pilot program support will only be available for communities and events **within the service territory of the company** and education and awareness activities will be developed for, and targeted toward, Pacific

Power customers. However, online resources will be accessible to anyone who visits the Company's website, as requiring a customer login would likely create a barrier to efficient communication of information.

- PacifiCorp submits this advice letter for Commission review to provide a detailed description of the outreach and education pilot program, information on the potential costs and benefits, pilot evaluation plans, a description of how the program fits into the Company's overall TE strategy, and how this will help accelerate the EV market in Oregon. This is to aid in the Commission's determination of **whether the program is prudent**. Further, PacifiCorp intends to seek Commission authorization to defer the costs of this pilot program for later cost recovery, which will allow a second opportunity for Commission review of actual costs to ensure that expenditures fit within the framework of the approved program.

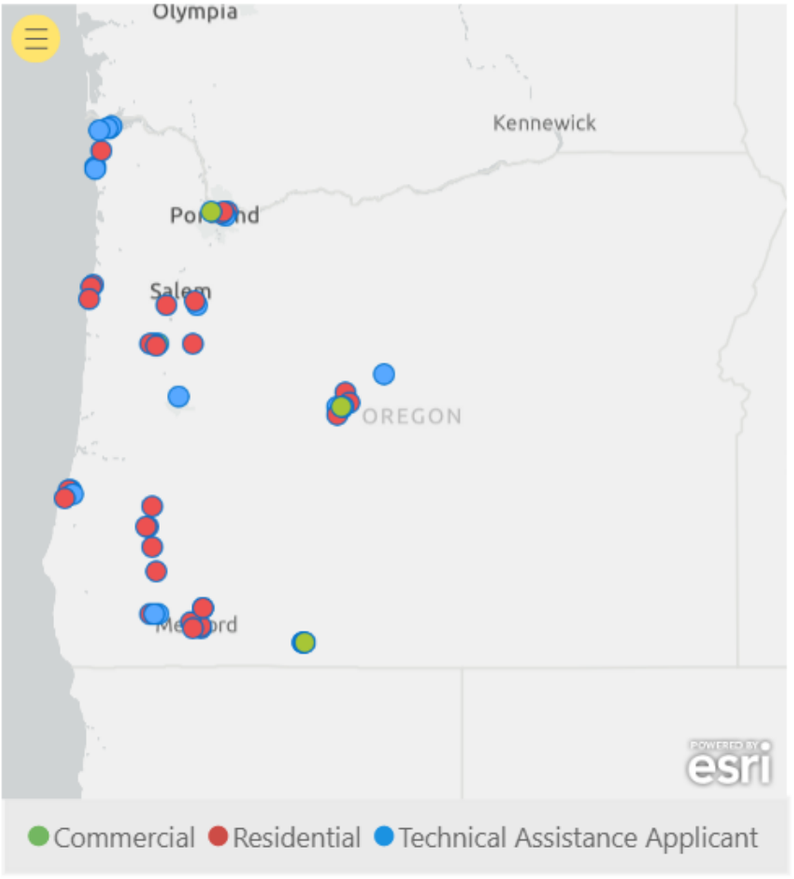
- This pilot program is designed to increase awareness and understanding across the broad spectrum of Pacific Power customers. Initial efforts are based on best practices from other utility outreach and education programs, such as energy efficiency, and learnings from the Company's initial outreach and education pilot. This pilot program is designed to test the usefulness of these efforts through evaluation measures described in this application, supporting the requirement that **equipment is reasonably expected to be used and useful, as determined by the Commission**.
- A key component of the outreach and education pilot will be customer education on efficient use of the electrical system, including the benefits of charging vehicles during off-peak periods and enrollment in the Company's TOU rate. Outreach and education on these components will **enable the electric company to support the electric company's electrical system**.
- Outreach and education about efficient use of the electrical system, such as charging during off-peak periods, and including information about qualified EVSE, will support the pilot in **improving the electric company's electrical system efficiency and operational flexibility, including the ability of the electric company to integrate variable generating resources.**
- All information, including technical assistance, will remain technology and brand neutral to encourage competition and customer choice. Technical assistance will include information about reliable emerging technologies and practices to ensure customers interested in more innovative solutions have relevant information to make informed decisions. Remaining brand neutral in information and technical assistance will spur **innovation, competition and customer choice in electric vehicle charging and related infrastructure and services**.

Exhibit 6

Electrification Outreach Report

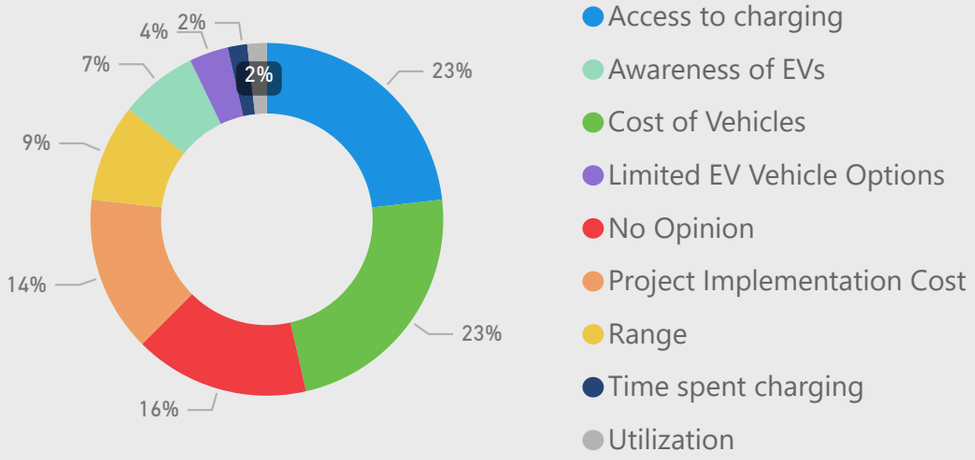
EXECUTIVE SUMMARY

To better understand potential barriers to electrification across our diverse markets, we conducted surveys across multiple segments throughout our service territory. Due to the unique environment and COVID safety concerns, our outreach team opted to conduct random samplings via telephone to 249 customers. Survey participants expressed overall positive responses for the opportunity to provide feedback on how Pacific Power can better support their EV charging needs and electrification barriers as they saw them. Commercial customers often cited costs of infrastructure upgrades and total cost of ownership as a barrier to both workplace charging and fleet electrification. The majority of residential customer responses on how Pacific Power could support transportation electrification included offering cash incentives and rebates, followed by increased education and awareness on EV offerings and charging options. Customers also indicated that external barriers included EV cost of ownership and limited weather-friendly all-wheel drive options.

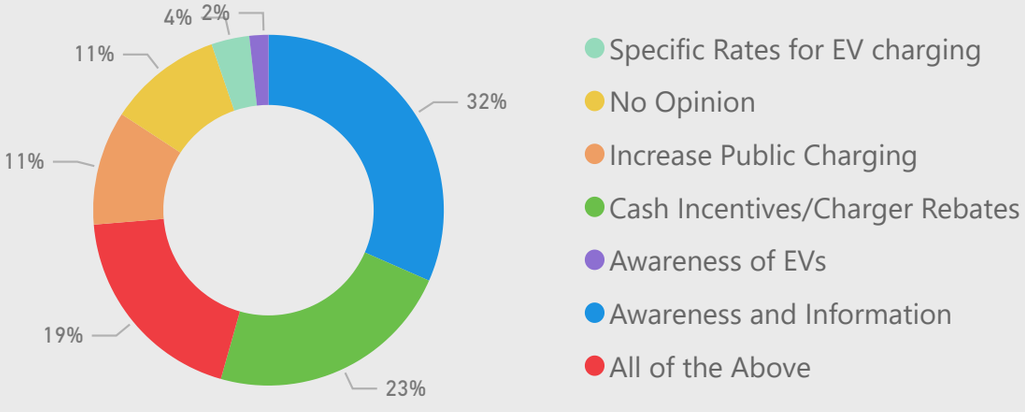


Combined Responses From All Three Customer Segments

What is the primary barrier for transitioning to EVs?



How can Pacific Power support EV transitioning?



PACIFIC POWER

Electrification Outreach Report

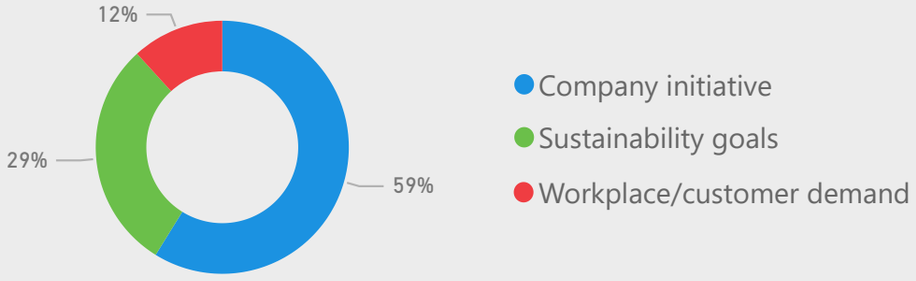
C2 GROUP

COMMERCIAL TECHNICAL ASSISTANCE CUSTOMERS

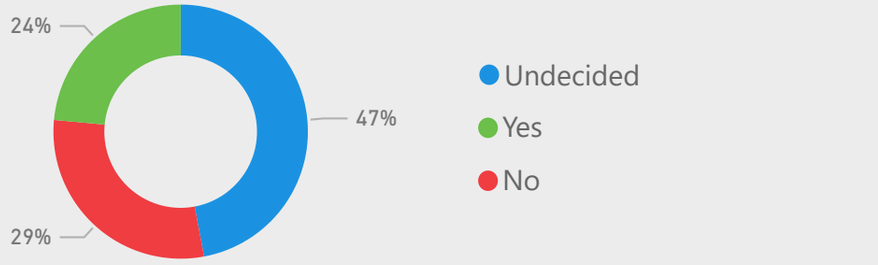
Commercial customers who have participated in the Pacific Power Technical Assistance Program were contacted for the survey. This subset of customers has not applied for Pacific Power EV Charging Infrastructure grants. All of the possible customers in this category were contacted.

35 Customers Contacted	18 (51%) Survey Participation

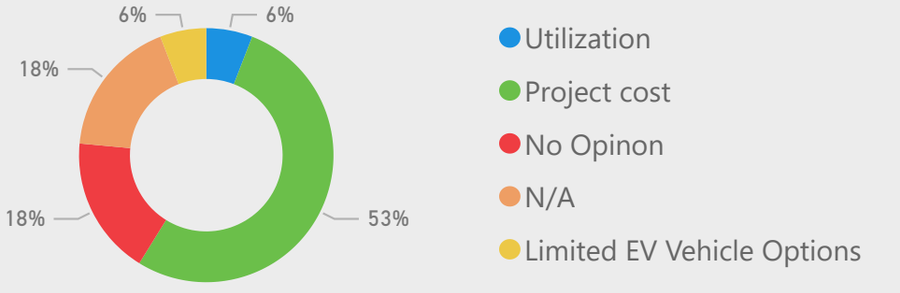
What led you to first wanting to receive Technical Assistance for EV's from Pacific Power?



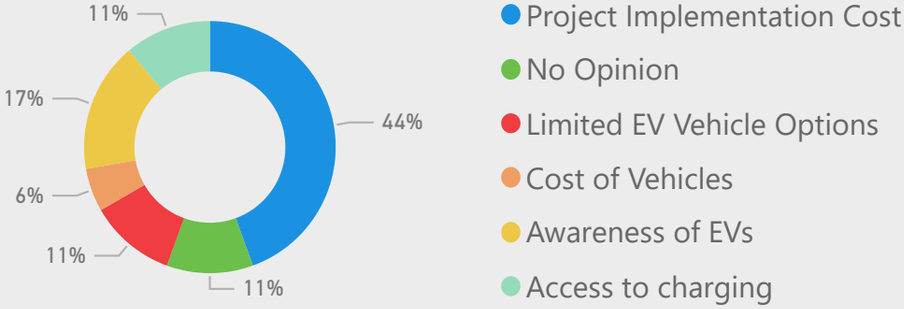
Are you planning to continue with building an EV charging project?



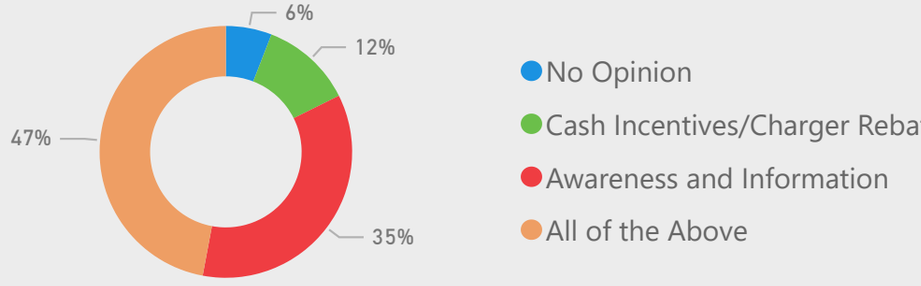
If no, or undecided, what is the primary barrier?



What is the primary barrier for transitioning to EVs?



How can Pacific Power support EV transitioning?



PACIFIC POWER

Electrification Outreach Report

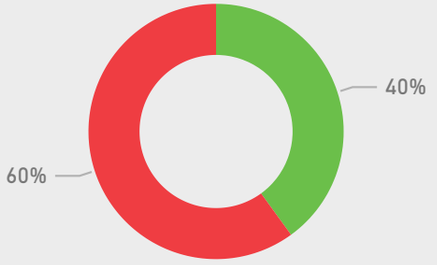
C2 GROUP

COMMERCIAL CUSTOMERS

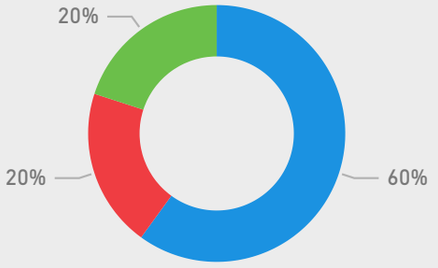
Commercial customers who have not participated in Pacific Power EV-related programs were contacted and selected by the Pacific Power team as customers who would be interested in participating in the survey.

13 Customers Contacted	5 (38%) Survey Participation

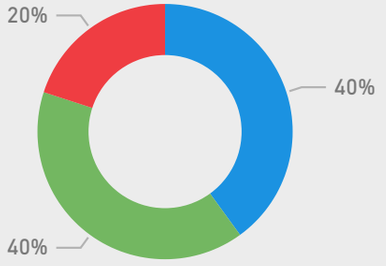
Do you currently have any fleet or company vehicles that are EVs?



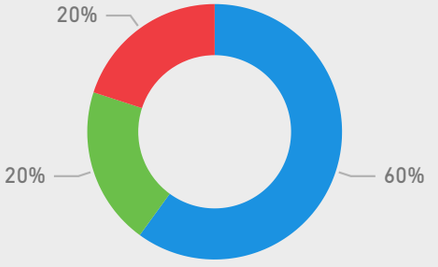
Do you have plans to transition fleet or company vehicles to EVs?



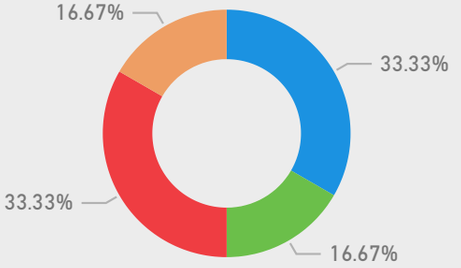
What is currently a barrier for your business in transitioning to EVs?



What is the primary barrier for transitioning to EVs?



How can Pacific Power support EV transitioning?



PACIFIC POWER

Electrification Outreach Report

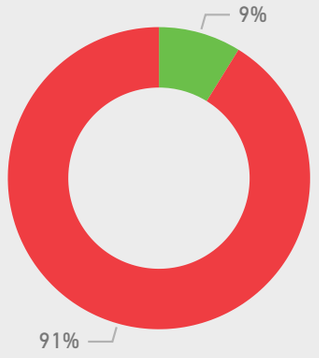
C2 GROUP

RESIDENTIAL CUSTOMERS

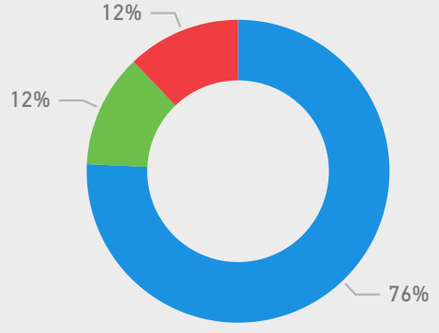
A random selection of Pacific Power residential customers was contacted for the survey. After leaving messages, some customers chose to call back and participate.

201 Customers Contacted	34 (17%) Survey Participation

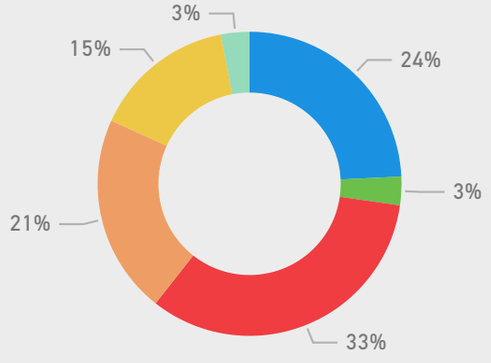
Do you currently own or lease an EV?



Are you planning on purchasing an EV in the next 1-3 years?



What is a primary concern or barrier to transitioning to an electric vehicle?



How can Pacific Power support EV transitioning?

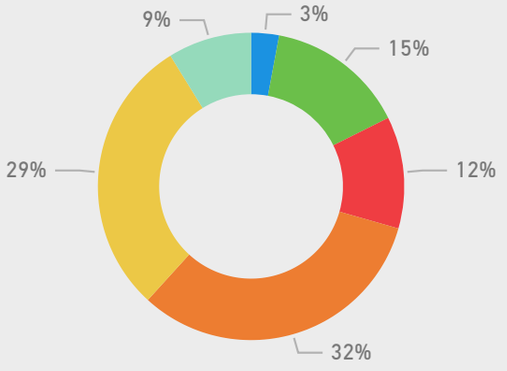


Exhibit 7

SELECT BASELINE SURVEY RESPONSES

PACIFIC POWER GEN POP SURVEY

JULY 26, 2019

NAVIGANT

SURVEY RESPONSES

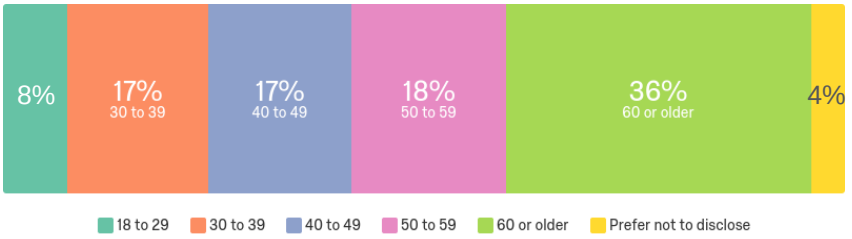
Number of Survey Responses*

Answer	%	Count	Response Rate
Completed Survey	97%	1482	14.8%
Screened Out	3%	47	
Total	100%	1529	15.3%

*A total of 10,000 customers were invited to take the survey.

DEMOGRAPHICS: AGE

Take Away: More than 50% of respondents are over the age of 50



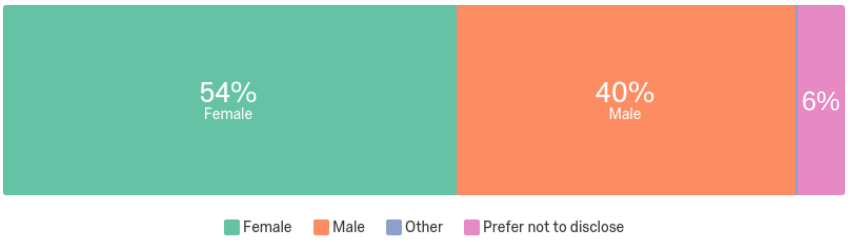
Survey Question: What is your age?

N=1422

NAVIGANT

DEMOGRAPHICS: GENDER

Take Away: Slightly more than 50% of respondents were female



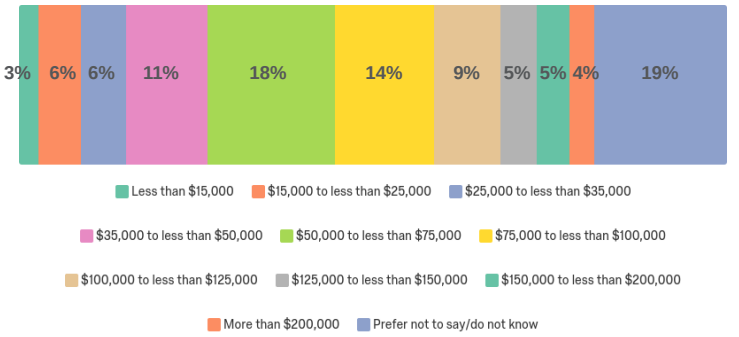
Survey Question: What is your gender?

N=1422

NAVIGANT

DEMOGRAPHICS: INCOME

Take Away: Of those respondents who specified their income, 68% had a household income of $50k or more, and 28% had a household income of $100k or more.



Survey Question: Which of the following categories best describes your household's pre-tax income in 2018?

N=1418

NAVIGANT

CUSTOMER FEEDBACK FOR FIRST ROUND OF SURVEY

Several customers sent follow-up comments with feedback to Pacific Power using the email address provided in the survey invitation. Navigant identified a couple of themes from this customer feedback:

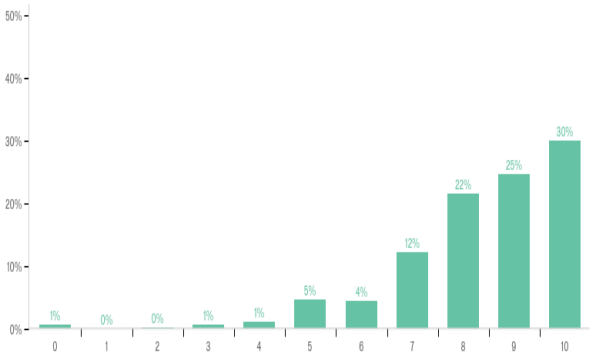
1. Three customers indicated they were not interested in electric vehicles and did not appreciate the survey on this topic
2. Three customers commented on the environmental impact or hazardous material concerns of EV batteries from manufacturing, end of vehicle life, and during crashes
3. Two customers commented that the survey should have included more questions about other forms of mobility options, including rideshare or car sharing
4. One customer commented that the survey did not explicitly point out the portion of Pacific Power's electricity generation that comes from fossil fuels, and how that impacts the cleanliness of EVs (the survey did ask a question about whether the GHG emissions from charging EVs is generally lower than the GHG emissions from conventional ICE vehicles)

Navigant will consider this feedback when making any modifications to the survey instrument for the second-round panel survey in 2020

NAVIGANT

SATISFACTION WITH PACIFIC POWER

Take Away: 89% of respondents indicated a satisfaction rating of 7 or above and 55% provided a satisfaction rating of 9 or 10.



Survey Question: Please rate your satisfaction with Pacific Power overall (0=not at all satisfied, 10=highly satisfied).

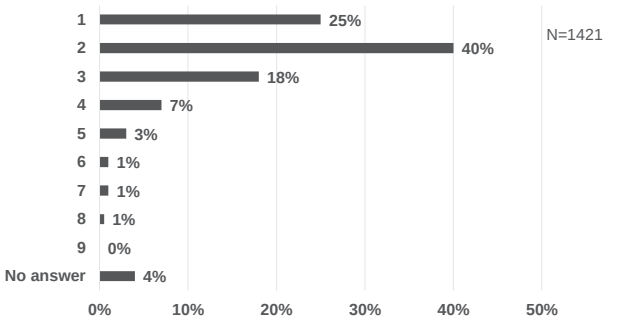
N=1479

NAVIGANT

NUMBER OF HOUSEHOLD VEHICLES

Take Away:

- 25% of households have 1 vehicle
- 40% of households have 2 vehicles
- 31% of households have 3 or more vehicles



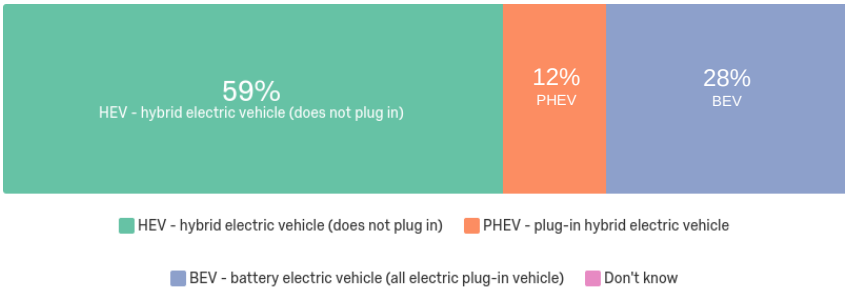
Survey Question: Approximately how many vehicles does your household currently own or lease?

NAVIGANT

CURRENT EV OWNERSHIP

Take Away:

- Nearly 8% (118) of *all* respondents own an electric vehicle
- *Of the 118 EV owners surveyed*, most (59%) have a hybrid-electric vehicle *without* a plug
- 47 respondents (40%) have an electric vehicle *with* a plug



Survey Question: Which type of electric vehicle do you currently own/lease?

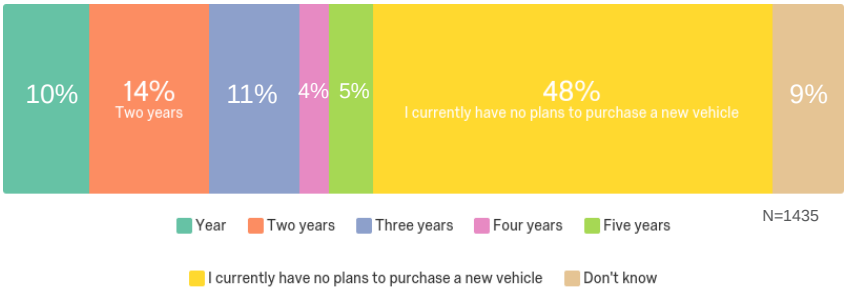
N=118

NAVIGANT

VEHICLE PURCHASE TIMEFRAME

Take Away:

- 35% of respondents plan to purchase/lease a new/used vehicle in the next 1-3 years
- Nearly half of respondents (48%) do not currently have plans to purchase/lease a new/used vehicle



N=1435

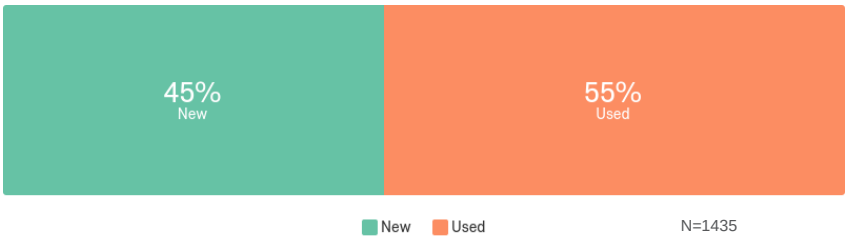
Survey Question: Please indicate whether you plan to purchase or lease a new or used vehicle in the next...

NAVIGANT

VEHICLE PURCHASE NEW/USED

Take Away:

- Respondents are more likely to be in the market for a used vehicle (55%) than a new vehicle (45%).



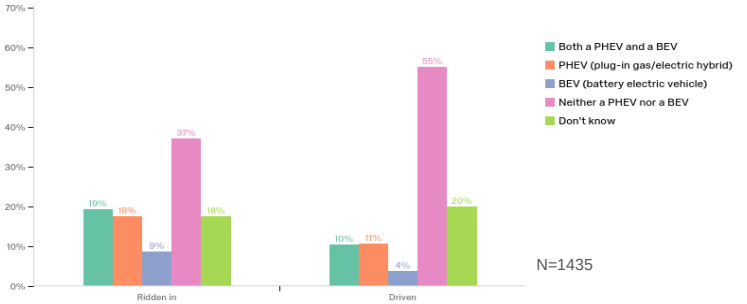
Survey Question: Are you more likely to be in the market for a new or used vehicle?

NAVIGANT

CUSTOMER EXPERIENCE: RIDDEN OR DRIVEN PEVS

Take Away:

- More people have ridden in a PHEV than a BEV (37% vs 28%)
- 25% of respondents have driven either a PHEV, BEV or both
- Roughly 20% of respondents aren't sure if they have ridden in or driven an electric vehicle.



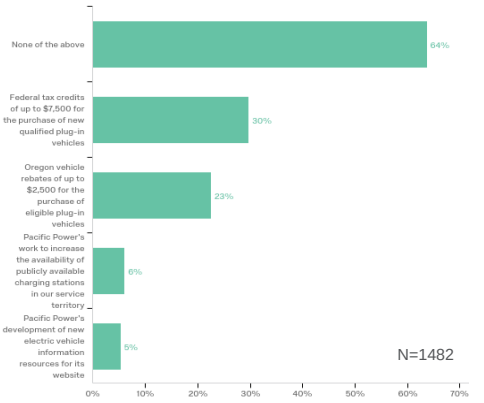
Survey Question: Which of the following vehicle types have you ridden in or driven? Select one response in each column.

NAVIGANT

AWARENESS OF EV INITIATIVES

Take Away:

- Well over half of respondents (64%) are not aware of any EV initiatives
- 30% are aware of the federal tax incentive for EVs
- 23% are aware of the Oregon vehicle rebate



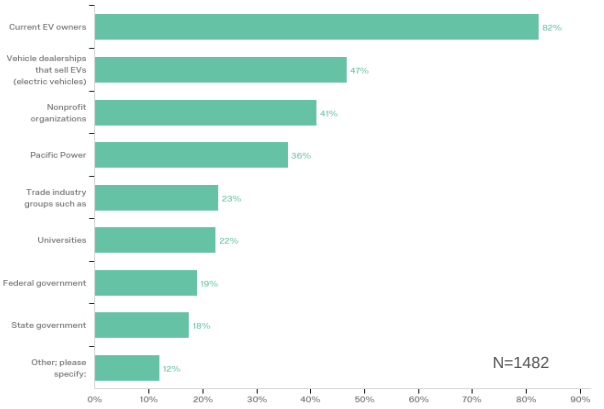
Survey Question: Which of the following electric vehicle initiatives were you aware of before taking this survey? Select all that apply.

NAVIGANT

TRUSTED INFORMATION SOURCES FOR ELECTRIC VEHICLES

Take Away:

- 82% of customers indicate current EV owners are the most trusted sources of EV information
- Dealerships, and non-profit organizations are also seen as trusted sources by many customers.
- Pacific Power is the 4th most trusted source of EV information

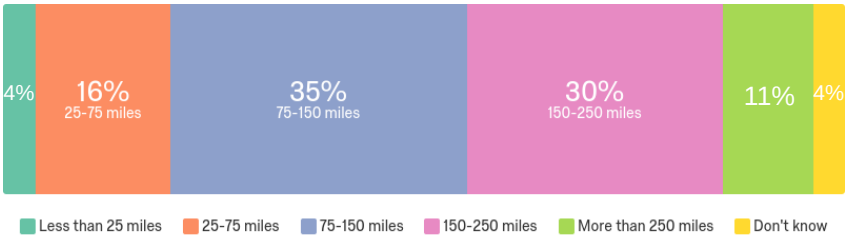


Survey Question: Which of the following do you consider to be the 3 most trusted sources of information about electric vehicles? Select three.

NAVIGANT

RANGE KNOWLEDGE (BEV)

Take Away: 30% of respondents correctly identify the typical range of a BEV, but more than half of respondents underestimate the drivable distance of a typical BEV.



Survey Question: Drawing on your current knowledge of BEVs (battery electric vehicles), what is the drivable distance per charge for a typical sedan-style BEV (battery electric vehicle)?

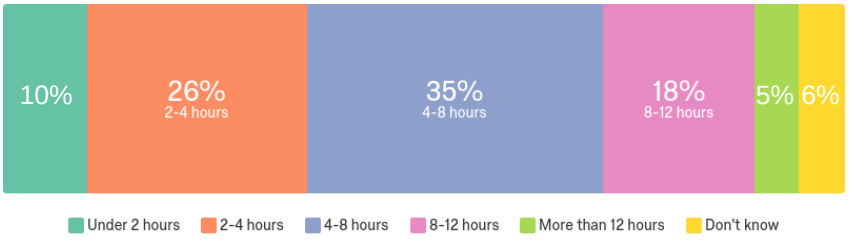
*Correct Answer: 150-250 miles

N=1379

NAVIGANT

CHARGING KNOWLEDGE-L2 (BEV)

Take Away: 35% of respondents correctly identify the charge time for a L2 charger, while 36% underestimate charge time, and 29% either overestimate or don't know.



Survey Question: How long would it typically take to fully charge a common BEV (battery electric vehicle) at your home using a 240-volt outlet similar to a clothes dryer outlet?

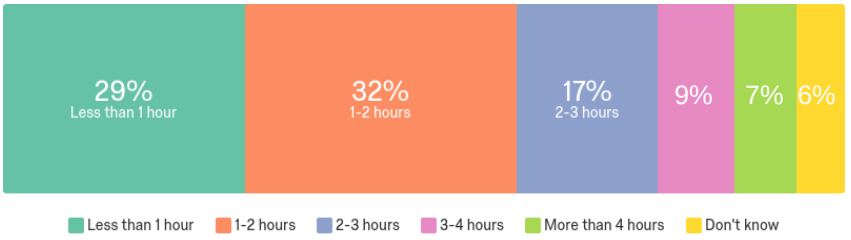
*Correct Answer: 4-8 hours

N=1353

NAVIGANT

CHARGING KNOWLEDGE-DCFC (BEV)

Take Away: 32% of respondents correctly identify the charge time for a DC fast charger, while nearly half (49%) of all respondents ***overestimate*** the charge time or don't know.



Survey Question: How long would it typically take to fully charge a BEV (battery electric vehicle) using a high-powered charging station that you might find at a location such as a library, grocery store, or curbside?

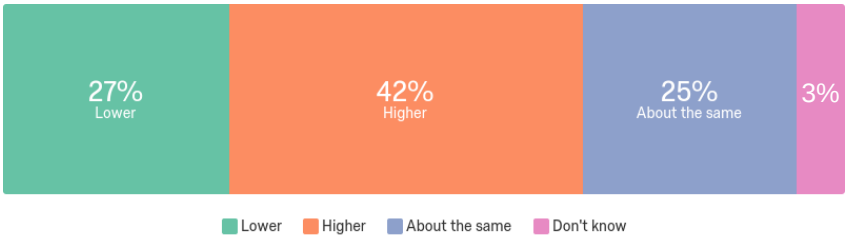
*Correct Answer: 1-2 hours

N=1350

NAVIGANT

MAINTENANCE COSTS KNOWLEDGE (BEV)

Take Away: Only 27% of respondents are aware that BEV maintenance costs are lower than those of an ICEV, while 42% believe BEV maintenance costs are higher.



Survey Question: When compared to a traditional gas or diesel-powered vehicle (of similar size and with similar features), are the maintenance costs of a BEV (battery electric vehicle) typically...

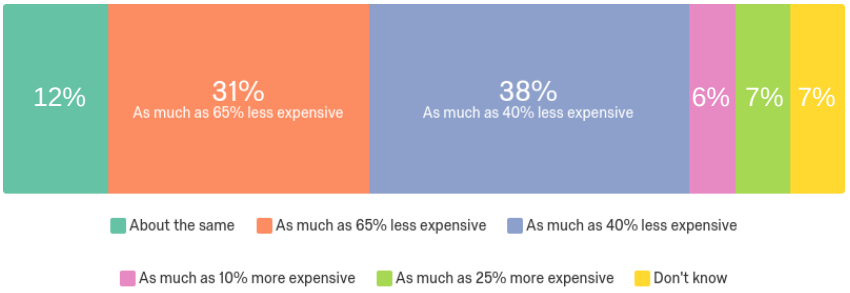
*Correct Answer: Lower

N=1349

NAVIGANT

FUEL COSTS KNOWLEDGE (BEV)

Take Away: Most respondents are aware that fuel prices for BEVs are less than ICEVs, although many respondents are not aware of the extent of the cost difference.



Survey Question: When compared to a traditional gas or diesel-power vehicle, are the fuel costs (i.e., charging costs) for a BEV (battery electric vehicle) typically...

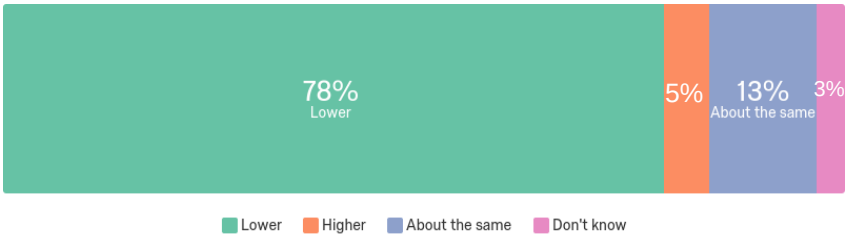
*Correct Answer: As much as 65% less expensive

N=1339

NAVIGANT

GREENHOUSE GAS EMISSION KNOWLEDGE (BEV)

Take Away: Nearly 80% of respondents are aware that BEVs emit fewer GHGs than ICEVs.



Survey Question: When compared to gasoline or diesel fuel, are the greenhouse gas emissions associated with the electricity used to fuel a BEV (battery electric vehicle) typically...

*Correct Answer: Lower

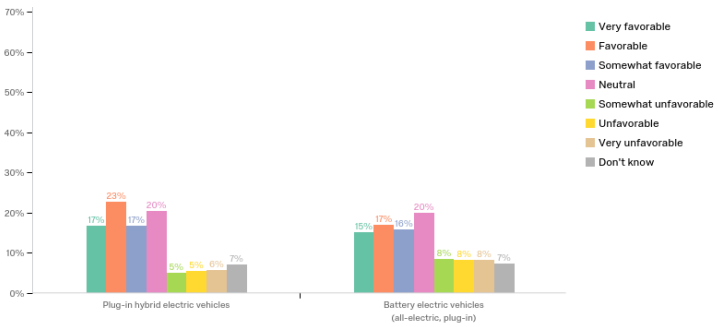
N=1386

NAVIGANT

GENERAL IMPRESSION OF PEVS

Take Away:

- 57% of respondents have favorable impressions of PHEVs
- 48% of respondents have favorable impressions of BEVs



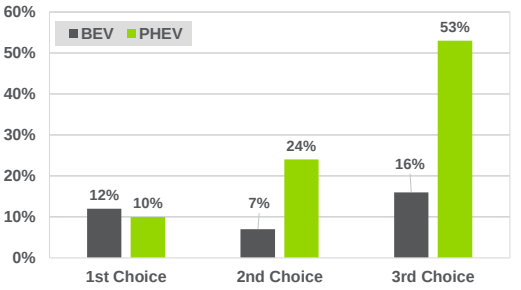
Survey Question: What is your general impression of these vehicle types? N=1435

NAVIGANT

FUEL TYPE PREFERENCES

Take Away:

- 34% of respondents indicate PHEVs are among their first or second vehicle choice by fuel type
- 19% of respondents indicate that BEVs are among their first or second vehicle choice by fuel type



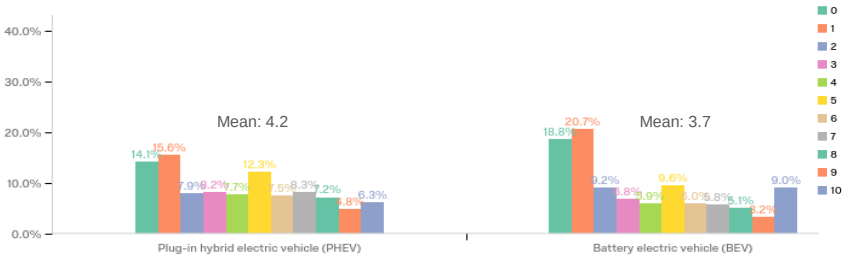
Survey Question: Please rank your preference for each of the following fuel types. N=1435

NAVIGANT

LIKELIHOOD OF PURCHASING A PHEV OR BEV

Take Away:

- 34% of respondents are more likely than not to select a PHEV for their next vehicle
- 29% of respondents are more likely than not to select a BEV



Survey Question: Please indicate how likely or unlikely you are to select each of the following vehicle types as your next vehicle (0=very unlikely, 10=very likely).

N=1435

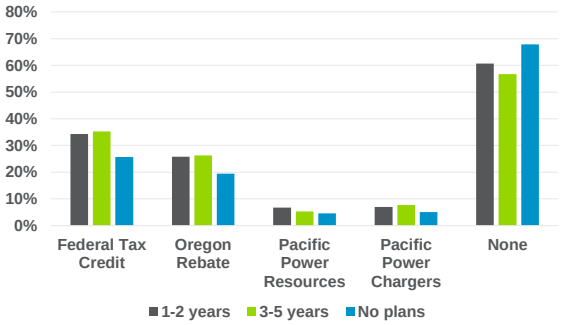
NAVIGANT

EV INITIATIVE AWARENESS BY VEHICLE PURCHASE TIMEFRAME

Take Away:

- Overall, respondents lack awareness of EV initiatives
- Respondents who are in the car market have slightly higher awareness of all initiatives than those who are not in the market.

**bar color indicates timeline for which respondent has plans to purchase next vehicle



Survey Question: Which of the following electric vehicle initiatives were you aware of before taking this survey? Select all that apply.

N=1435

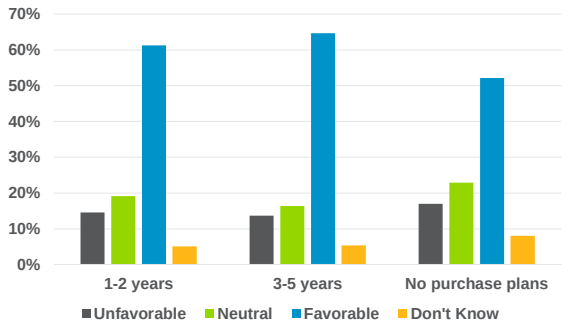
NAVIGANT

GENERAL IMPRESSIONS OF PHEVS BY VEHICLE PURCHASE TIMEFRAME

Take Away:

- Respondents views toward PHEVs are generally favorable.
- Respondents who are in the market for a new or used vehicle have more favorable impressions of PHEVs than those who are not in the market.

**Horizonal axis number range indicates timeline for which respondent has plans to purchase next vehicle



N=1435

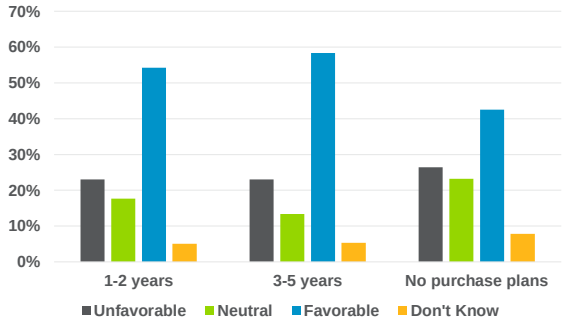
NAVIGANT

GENERAL IMPRESSIONS OF BEVS BY VEHICLE PURCHASE TIMEFRAME

Take Away:

- Respondents views toward BEVs are generally favorable
- Those who are in the market for a new/used vehicle have more favorable views of BEVs than those who are not in the market.

**Horizonal axis number range indicates timeline for which respondent has plans to purchase next vehicle



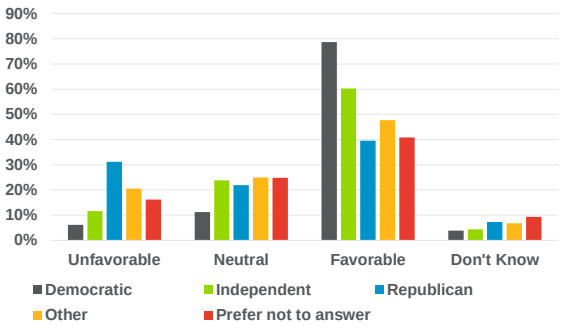
N=1435

NAVIGANT

GENERAL IMPRESSIONS OF PHEVS BY POLITICAL PREFERENCES

Take Away:

- Democrats and Independents are more favorable toward PHEVs than respondents who typically vote Republican or other parties



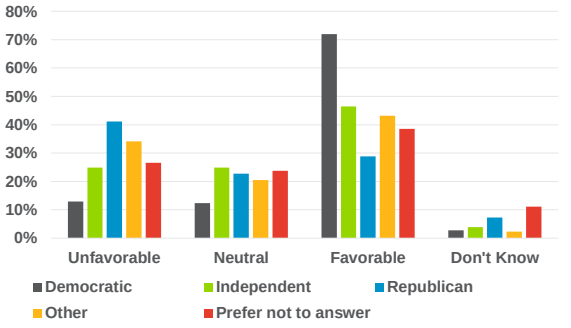
N=1422

NAVIGANT

GENERAL IMPRESSIONS OF BEVS BY POLITICAL PREFERENCES

Take Away:

- Democrats and Independents are more favorable toward BEVs than respondents who typically vote Republican or other parties



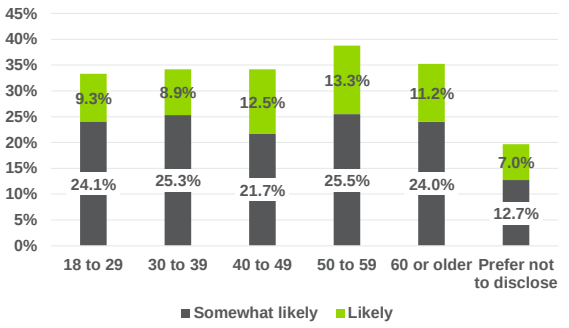
N=1422

NAVIGANT

LIKELIHOOD OF PURCHASING A PHEV BY AGE

Take Away:

- Roughly one-third of all customers indicate they are “somewhat likely” or “likely” to purchase a PHEV.
- Customers between the ages of 50 and 59 may be somewhat more likely to purchase a PHEV.



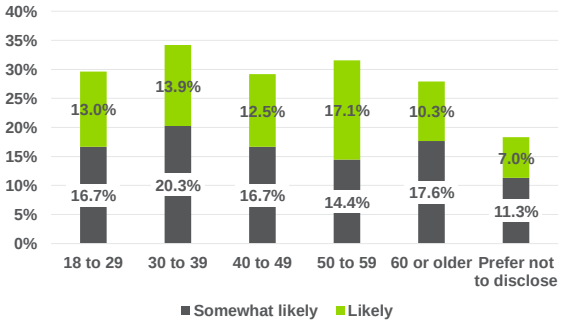
N=1435

NAVIGANT

LIKELIHOOD OF PURCHASING A BEV BY AGE

Take Away:

- Roughly one-third of all customers indicate they are “somewhat likely” or “likely” to purchase a BEV.
- Customers between the ages of 30 and 39 may be slightly more likely to purchase a BEV.



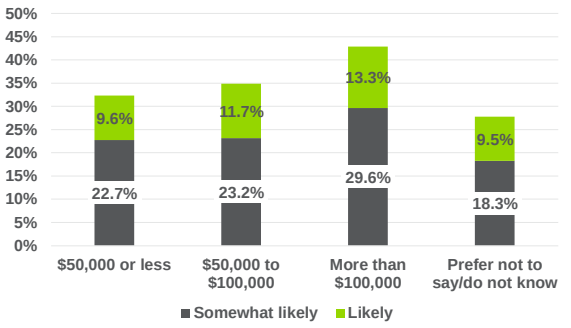
N=1435

NAVIGANT

LIKELIHOOD OF PURCHASING A PHEV BY INCOME

Take Away:

- Respondents from higher income brackets are slightly more likely to plan on purchasing a PHEV, although the differences between groups is subtle.



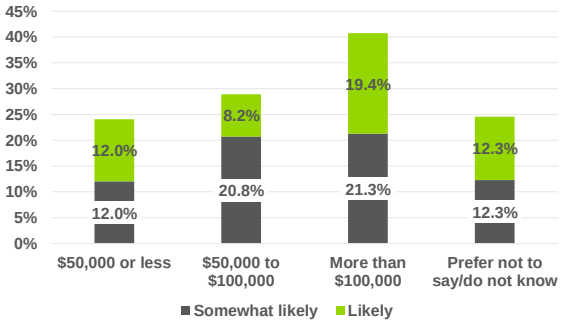
N=1435

NAVIGANT

LIKELIHOOD OF PURCHASING A BEV BY INCOME

Take Away:

- Respondents in higher income brackets are more likely to plan on purchasing a BEV than those in lower income brackets.



N=1435

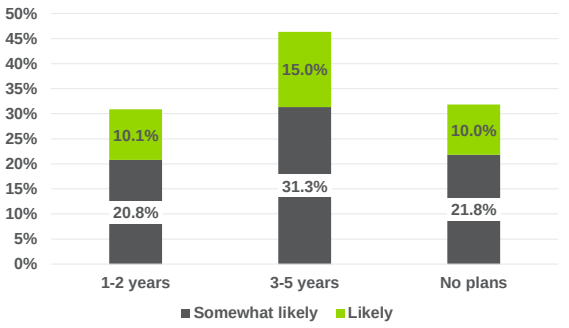
NAVIGANT

LIKELIHOOD OF PURCHASING A PHEV BY PURCHASE TIMEFRAME

Take Away:

- Respondents who plan to purchase a vehicle in 1-2 years are less likely to plan on purchasing a PHEV than customers who plan to purchase a vehicle in 3-5 years.

**Horizonal axis number range indicates timeline for which respondent has plans to purchase next vehicle



N=1435

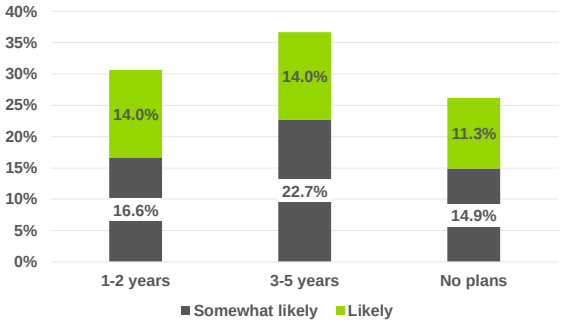
NAVIGANT

LIKELIHOOD OF PURCHASING A BEV BY PURCHASE TIMEFRAME

Take Away:

- Respondents who plan to purchase a vehicle in 1-2 years are less likely to plan on purchasing a BEV than those who plan to purchase a vehicle in 3-5 years.

**Horizonal axis number range indicates timeline for which respondent has plans to purchase next vehicle



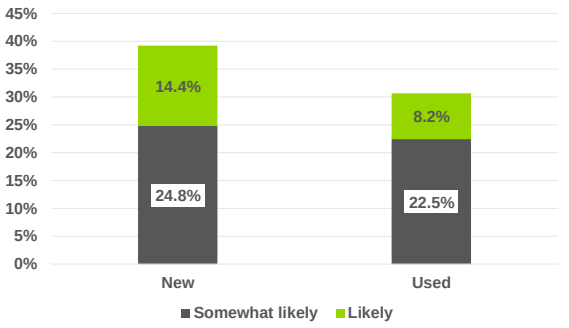
N=1435

NAVIGANT

LIKELIHOOD OF PURCHASING A PHEV BY INTENTION TO PURCHASE A NEW/USED VEHICLE

Take Away:

- Respondents who plan to purchase a ***new vehicle*** are more likely to plan on purchasing a PHEV than those in the used vehicle market.



N=1435

NAVIGANT

LIKELIHOOD OF PURCHASING A BEV BY INTENTION TO PURCHASE A NEW/USED VEHICLE

Take Away:

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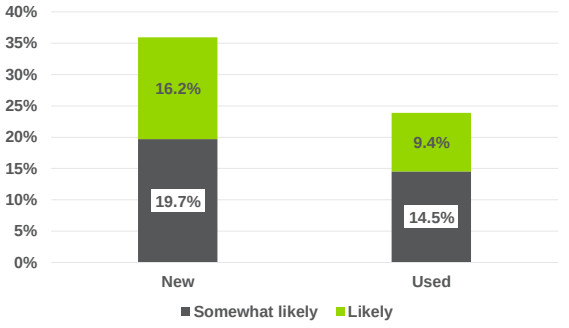


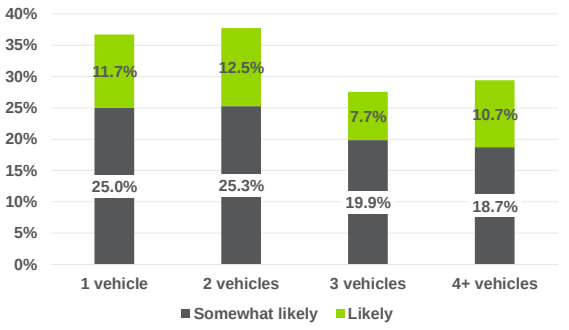
N=1435

NAVIGANT

LIKELIHOOD OF PURCHASING A PHEV BY NUMBER OF CURRENT HOUSEHOLD VEHICLES

Take Away:

- Respondents with a larger number of household vehicles are less likely to plan on purchasing a PHEV.



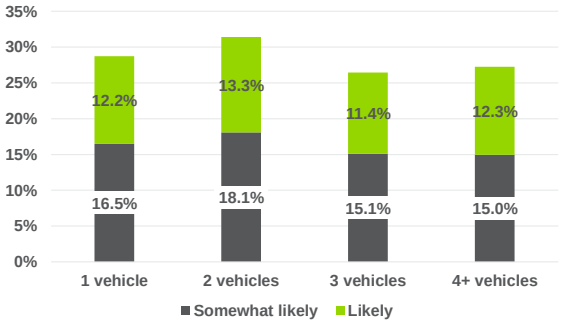
N=1421

NAVIGANT

LIKELIHOOD OF PURCHASING A BEV BY NUMBER OF CURRENT HOUSEHOLD VEHICLES

Take Away:

- Respondents with 2 household vehicles are slightly more likely to plan on purchasing a BEV than respondents with fewer or more vehicles.



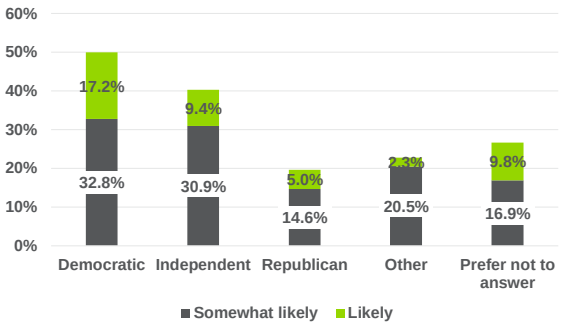
N=1421

NAVIGANT

LIKELIHOOD OF PURCHASING A PHEV BY POLITICAL PREFERENCES

Take Away:

- Democrats and Independents are more likely to plan on purchasing a PHEV than those who typically vote Republican and other parties.



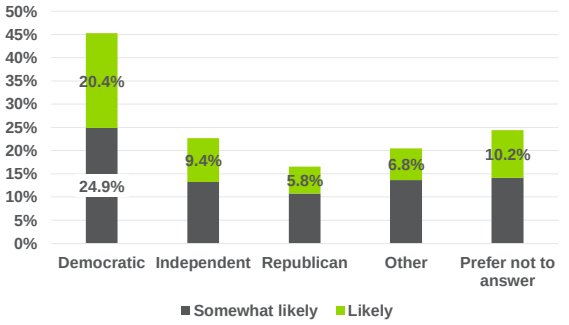
N=1435

NAVIGANT

LIKELIHOOD OF PURCHASING A BEV BY POLITICAL PREFERENCES

Take Away:

- Democrats are more likely to plan on purchasing a BEV than those who typically vote Independent, Republican, and other parties



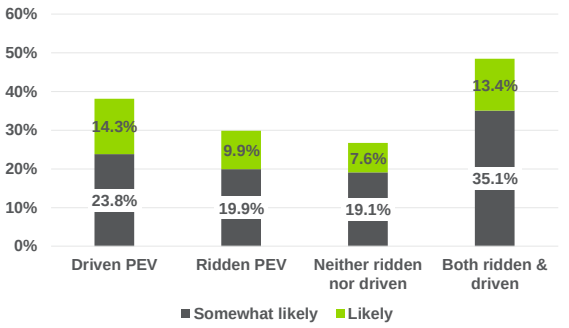
N=1435

NAVIGANT

LIKELIHOOD OF PURCHASING A PHEV BY PAST EXPERIENCE WITH PEVS

Take Away:

- Respondents who have both ridden in and driven a PEV are more likely to purchase a PHEV than those who have only ridden *or* driven.



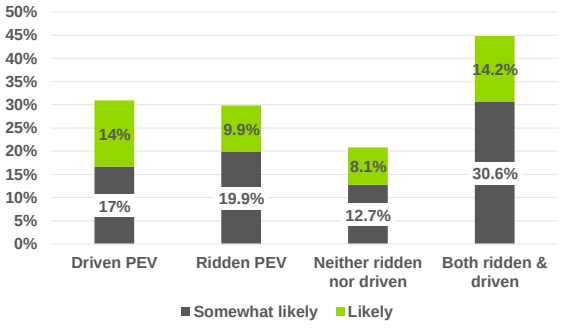
N=1435

NAVIGANT

LIKELIHOOD OF PURCHASING A BEV BY PAST EXPERIENCE WITH PEVS

Take Away:

- Respondents who have both ridden in and driven a PEV are more likely to purchase a BEV than those who have only ridden *or* driven.



N=1435

NAVIGANT