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April 12, 2017

***VIA ELECTRONIC FILING
AND OVERNIGHT DELIVERY***

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

Attn: Filing Center

**RE: UM 1810 – PacifiCorp’s Application for Transportation Electrification Programs–
Supplement**

PacifiCorp d/b/a Pacific Power (Company) encloses for filing in the above-referenced docket its supplemental application for transportation electrification programs. This application is supported by testimony and exhibits from the following witnesses:

- Eli M. Morris, Program Manager, Customer Solutions
- Robert M. Meredith, Manager, Pricing and Cost of Service

The Company makes this filing in compliance with section 29 of Senate Bill 1547¹ and OAR 860-087-0030.

Confidential information is provided in accordance with the protective order in this docket, Order No. 17-008.

It is respectfully requested that all formal data requests to the Company regarding this filing be addressed to the following:

By e-mail (preferred): datarequest@pacificorp.com

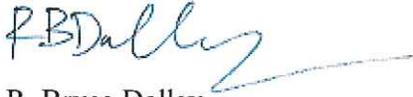
By regular mail: Data Request Response Center
PacifiCorp
825 NE Multnomah Street, Suite 2000
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¹ Oregon Laws 2016, Chapter 28, Section 29.

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Please direct any informal inquiries to Natasha Siores, Manager, Regulatory Affairs, at (503) 813-6583.

Sincerely,

A handwritten signature in blue ink that reads "R. Bryce Dalley". The signature is fluid and cursive, with a long horizontal flourish extending to the right.

R. Bryce Dalley
Vice President, Regulation

Enclosure



Application for Transportation Electrification Programs

April 12, 2017

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Executive Summary

With the passage of Oregon Senate Bill 1547 in 2016, the state’s power companies set out to help accelerate the state’s transition to cleaner, more sustainable transportation fuel. On December 27, 2016, PacifiCorp d/b/a Pacific Power (Pacific Power or Company) filed initial transportation electrification programs with the Public Utility Commission of Oregon (Commission). At Commission Staff’s request, the Company developed this supplemental application to provide additional background information and detail on program designs and objectives. Updates include:

- Information on greenhouse gas emissions from the transportation sector;
- An enhanced discussion of the electric transportation market and barriers to increased transportation electrification;
- A proposed methodology for assessing the cost-effectiveness of transportation electrification programs; and
- Additional detail on proposed program objectives and designs, including expanded timelines and implementation plans.

This Executive Summary briefly outlines the current state of the electric transportation market, presents Pacific Power’s guiding principles in developing the proposed pilot programs and describes the proposed pilot programs and estimated budgets.

The Electric Transportation Market

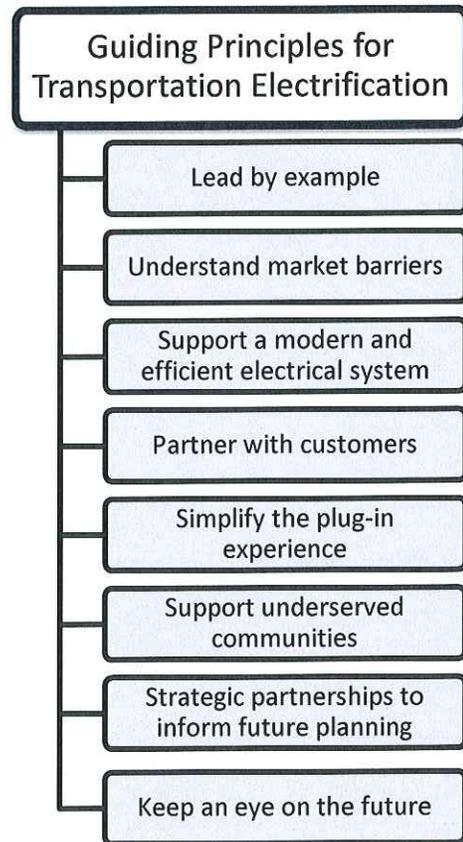
The transportation sector remains Oregon’s largest source of greenhouse gas emission. Widespread adoption of electric transportation presents an opportunity to reduce emission from this sector and generate additional benefits for Pacific Power customers. While the market has continued to grow since the introduction of contemporary mass market electric vehicles in 2010, adoption remains low in Pacific Power’s service area relative to statewide transportation electrification and the market for conventional internal combustion engine vehicles.

Stakeholder Engagement

The Company worked with stakeholders throughout 2016 to develop initial programs that could target significant barriers to transportation electrification, complement existing efforts and provide data and experience to inform future planning.

Market Barriers

Key market barriers driving low adoption include the upfront cost to purchase vehicles and electric vehicle supply equipment (EVSE), awareness of electric vehicles



and their capabilities, and a lack of robust EVSE development, particularly publicly available fast charging stations.

Initial Pilot Programs

Pacific Power designed its initial pilot programs to help reduce market barriers identified in its service area, while complementing and enhancing the efforts of other market actors working to accelerate transportation electrification in Oregon. The proposed pilot programs will test different market intervention strategies, gather data, and develop experience that will be used for future system and program planning.

Pacific Power Transportation Electrification Pilot Programs	
Program	Estimated Budget (2017-2019)
Public Charging Pilot Pacific Power will install, own and operate publicly accessible charging stations in its Oregon service area	\$1.85 million
Outreach and Education Pilot Tactics and messages that increase exposure and access to reliable information about electric transportation options and benefits	\$1.105 million
Demonstration and Development Pilot Grant funding to help non-residential Pacific Power customers develop creative, community-driven EVSE projects	\$1.685 million
Total	\$4.64 million

The Company proposes to implement a surcharge to contemporaneously recover the costs associated with the proposed programs, incremental to cost levels currently included in customer rates. The rate impact of estimated costs is approximately 0.1 percent during the pilot period.

Future Planning

The initiatives described in this application represent Pacific Power’s initial efforts to accelerate transportation electrification through education, partnership and improved access to EVSE. After launching these initiatives, Pacific Power looks forward to continued collaboration with customers and stakeholders as the industry, market and technology evolve.

Chapter 1: Background

OREGON LAWS AND REGULATIONS

Senate Bill 1547

In 2016, the Oregon Legislature passed Senate Bill (SB) 1547, which found that: “[t]ransportation 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 described in ORS 468A.205 and improve the public health and safety.” The Legislature also found that “[w]idespread transportation electrification requires that electric companies increase access to the use of electricity as a transportation fuel.” Finally, SB 1547 required electric companies to propose programs to accelerate transportation electrification by the end of 2016.

Public Utility Commission of Oregon Rulemaking AR 599

Following the passage of SB 1547, the Public Utility Commission of Oregon (Commission) initiated rulemaking AR 599 to prescribe the manner and form of program applications to accelerate transportation electrification. On November 23, 2017, the Commission issued Order No. 16 -447 adopting permanent rules (OAR 860-087-0001 through OAR 860-087-0040) specifying the required content of electric company transportation electrification program applications.

On December 27, 2016, Pacific Power filed its initial transportation electrification program applications. At Commission Staff’s request, the Company developed this supplemental application to provide additional background information and detail on program designs and objectives.

PACIFIC POWER SERVING OREGON

Pacific Power serves roughly 600,000 customers in over 200 communities across the state of Oregon. This diverse and widespread service area covers 21,292 square miles and touches each of the state’s four borders. While the Company serves roughly 75,000 customers in North and Northeast Portland, the majority of Pacific Power customers live in smaller communities and more rural areas. Multnomah County has a population density (population per square mile) of 1,700; the average population density in other Oregon counties served by Pacific Power is only 43, 1/40th the Multnomah County value. Additionally, these counties have 20 percent lower median household income on average than Multnomah County.¹ The implications of these disparities on adoption of electric transportation is described throughout this application. The proposed programs are tailored to the unique circumstances of the Pacific Power’s Oregon service area, reflecting key differences relative to the large urban centers where transportation electrification has been most successful.²

¹ U.S. Census Bureau, *QuickFacts: Oregon*, <https://www.census.gov/quickfacts/table/PST045216/41> (last visited Feb. 27, 2017).

² Zach McDonald, *Comparing the Top 10 Cities for Electric Vehicle Adoption*, (Aug. 2016), <http://www.fleetcarma.com/top-cities-electric-vehicle-sales/> (last visited Apr. 11, 2017).

Figure 1. Pacific Power Oregon Service Area



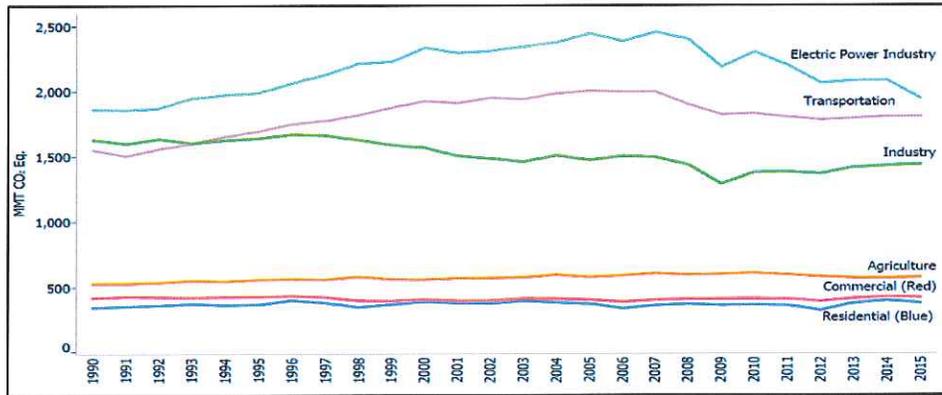
TRANSPORTATION SECTOR EMISSIONS

Greenhouse Emissions by Sector

For the past 25 years, electricity generation has represented the largest source of greenhouse gas emissions nationally and transportation is the second largest greenhouse gas emissions source, estimated at 1.8 trillion metric tons of carbon dioxide equivalent in 2015. Continued reduction in electricity sector emissions is narrowing the gap between these top two sectors (Figure 2).³

³ U.S. Environmental Protection Agency, *DRAFT Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2015*, p. ES-23 (Feb. 2017), <https://www.epa.gov/ghgemissions/draft-inventory-us-greenhouse-gas-emissions-and-sinks-1990-2015> (last visited Apr. 11, 2017).

Figure 2. U.S. Greenhouse Gas Emissions Allocated to Economic Sectors



In contrast, Oregon’s robust hydroelectric power system, long history of energy efficiency, growing contributions of renewable generation, and other clean energy efforts have already allowed the transportation sector to surpass electricity as the state’s largest greenhouse gas emission generator.⁴ The data suggests that increased use of gasoline and diesel as transportation fuel has contributed to challenges in meeting state climate goals. As the Oregon Global Warming Commission’s 2017 Biennial Report to the Legislature found:

As the updated greenhouse gas inventory data clearly indicate, Oregon’s emissions had been declining or holding relatively steady through 2014 but recorded a non-trivial increase between 2014 and 2015. The majority of this increase (60%) was due to increased emissions from the transportation sector, specifically the use of gasoline and diesel. The reversal of the recent trend in emissions declines, both in the transportation sector and statewide, likely means that Oregon will not meet its 2020 emission reduction goal. More action is needed, particularly in the transportation sector, if the state is to meet our longer-term GHG reduction goals.⁵

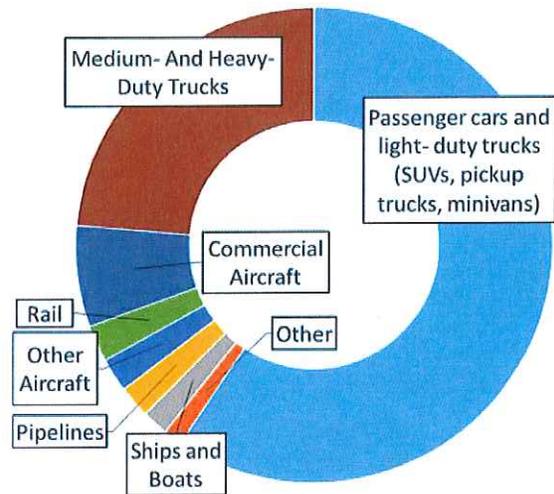
⁴ Oregon Global Warming Commission, *Biennial Report to the Oregon Legislature*, p. 18 (Feb. 2017), <http://www.keeporegoncool.org/view/ogwc-reports> (last visited Apr. 11, 2017).

⁵ *Id.* at 8.

Greenhouse Gas Emissions by Vehicle Class

The U.S. Environmental Protection Agency estimates roughly 60 percent of emissions from the transportation sector in 2015 were created by passenger vehicles (41.9 percent) and light-duty trucks, including sport utility vehicles, pickup trucks, and minivans (17.5 percent).⁶ Pacific Power's initial transportation electrification programs are focused on the "light-duty" vehicle class, the greatest immediate emissions reduction opportunity. Other sources of transportation emissions, including medium- and heavy-duty trucks and buses, can also be significant greenhouse gas emitters. Therefore, initial programs are designed to allow for flexibility in the types of eligible transportation electrification projects. After the proposed pilot period, Pacific Power will evaluate its focus on light-duty vehicles and look for opportunities to target additional vehicle classes.

Figure 3. 2015 U.S. Transportation Sector Emission by Vehicle Type



STAKEHOLDER ENGAGEMENT

Engaging stakeholders in program development is a critical component of the Company's transportation electrification strategy. Throughout the program development process, Pacific Power engaged customers, state agencies, local governments, advocates, auto manufacturers, third-party charging companies and other organizations working to accelerate transportation electrification in Oregon in conversations about barriers and potential solutions. A list of organizations participating in this process is provided in Appendix A.

In August and September of 2016, Pacific Power held Electric Transportation Public Input Workshops to solicit input on program concepts. Public input workshops were held in the following locations and dates:

- Portland: August 3, 2016 (over 30 attendees)
- Medford: August 18, 2016 (11 attendees)
- Bend: September 7, 2016 (8 attendees)

Through the public input workshops, Pacific Power gained insight into barriers for electric transportation nationally, regionally, state-wide, and specific to Pacific Power's Oregon service territory. Key themes included:

- Lack of awareness of electric transportation options and benefits;

⁶ U.S. Environmental Protection Agency, *DRAFT Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2015*, p. ES-51 (Feb. 2017), <https://www.epa.gov/ghgemissions/draft-inventory-us-greenhouse-gas-emissions-and-sinks-1990-2015> (last visited Apr. 11, 2017).

- Need for a robust network of publicly accessible EVSE;
- High cost of plug-in electric vehicle (PEV) options;
- Importance of off-peak charging;
- Need and desire for electric transportation in underserved communities, but barriers to adoption in these areas are not well understood; and
- Electric rates with demand charges create a barrier to direct current fast charger (DCFC) development.

Pacific Power used stakeholder input to create three pilot programs and a new transitional rate.⁷ The Company emailed a four-page overview of these initiatives to interested parties on October 31, 2016, requesting feedback on proposed initiatives. The document was circulated among roughly 150 individuals and the Company received feedback from three parties, including OPUC staff. Comments received included:

- The overview document did not provide sufficient detail to fully evaluate the merits of the proposed pilots and rates.
- The Company should look to coordinate outreach and education efforts with Portland General Electric and other entities working on customer education around electric transportation.
- The on-peak period of the transitional rate should align with Pacific Power's peak demand periods.
- The public DC fast charging transitional rate is an innovative way of addressing demand charge barriers and can serve as a model for other utilities.
- Utilities have a significant role to play in spurring electric vehicle adoption, such as providing consumer education, however, utilities would not best serve customers by owning public fast charging stations.

The Company appreciated the limited feedback it received on the overview document and considered this input in developing its pilot program applications. On December 1, 2016, Pacific Power presented a high-level overview of its proposed pilot programs and transitional rate at Drive Oregon's Energize Oregon Coalition Meeting.

During the development of this supplemental application, the Company solicited input from stakeholders who engaged in the AR 599 rulemaking to determine whether there were specific areas where stakeholders would like to see additional detail in this application. As with the October request for feedback, stakeholder feedback to this request was limited, but incorporated into this supplemental application.

COORDINATION WITH RELATED STATE PROGRAMS

The proposed pilot programs are designed to support and complement other ongoing transportation electrification efforts in the state, including:

- Oregon's Zero Emission Vehicle Mandate;

⁷ The proposed DC Public DC Fast Charger Delivery Service Optional Transitional Rate was filed as Advice No. 16-020 in Docket No. ADV 485 on Dec. 27, 2016.

- Oregon's Clean Fuels Program;
- State tax credits for residential and business vehicle charging equipment and alternative fuel fleet vehicles (currently scheduled to expire at the end of 2017);
- The Oregon Department of Transportation's efforts to increase the availability of EVSE along the state's highways;
- Portland General Electric's proposed transportation electrification programs;
- Drive Oregon's efforts, including the development of the EV Showcase;
- Local communities' climate and/or transportation action plans; and
- Potential outreach and education efforts and EVSE development stemming from the Volkswagen Clean Air Act Civil Settlement.

Oregon's Clean Fuels Program, administered by the Department of Environmental Quality (DEQ), requires a 10 percent reduction in the average carbon intensity of Oregon's transportation fuels by 2025 (relative to 2015 levels). Regulated parties are required to register with DEQ and must comply with the standard by balancing credits and deficits for 2016 and 2017 by the end of the 2017 calendar year and yearly by the end of each calendar year starting 2018. Deficits are generated when the carbon intensity of a specific fuel exceeds the clean fuel standard and credits are generated when the carbon intensity of a specific fuel is lower than the fuel standard. Providers of clean fuels may choose to participate in the program as "credit generators" and sell credits to regulated parties with deficits.

DEQ is currently in the process of updating the program rules establishing how credits are generated from residential electric vehicle charging and how those credits might be aggregated and generate value in the credit market. The Company understands that the Commission intends to open an investigation to evaluate the potential for utilities to generate credits under the Clean Fuels Program on behalf of residential utility customers who charge their electric vehicles. The Company will continue to engage with Commission staff and stakeholders on these issues. The Company is not currently registered as a credit generator⁸ but will continue to assess the benefits of registration as the DEQ and Commission processes resolve. Pending resolution of these important policy issues, the Company did not include Clean Fuels Program revenue as an element of the pilot programs addressed in this application.

THE ELECTRIC TRANSPORTATION MARKET

SB 1547 defines "transportation electrification" as "[t]he use of electricity from external sources to provide power to all or part of a vehicle," meaning that the electric transportation market can be segmented into:

- Vehicles, defined in SB 1547 as "vehicle, vessel, train, boat or any other equipment that is mobile[]"; and

⁸ Pacific Power intends to register to generate credits associated with public charging pods proposed through the Public Charging Pilot and owned by the Company. Given limited availability of data on credit revenue to date, it is difficult to estimate the revenue potential associated with these credits; any revenue that is generated from these credits will likely be used to directly buy down the cost of the proposed pilot program.

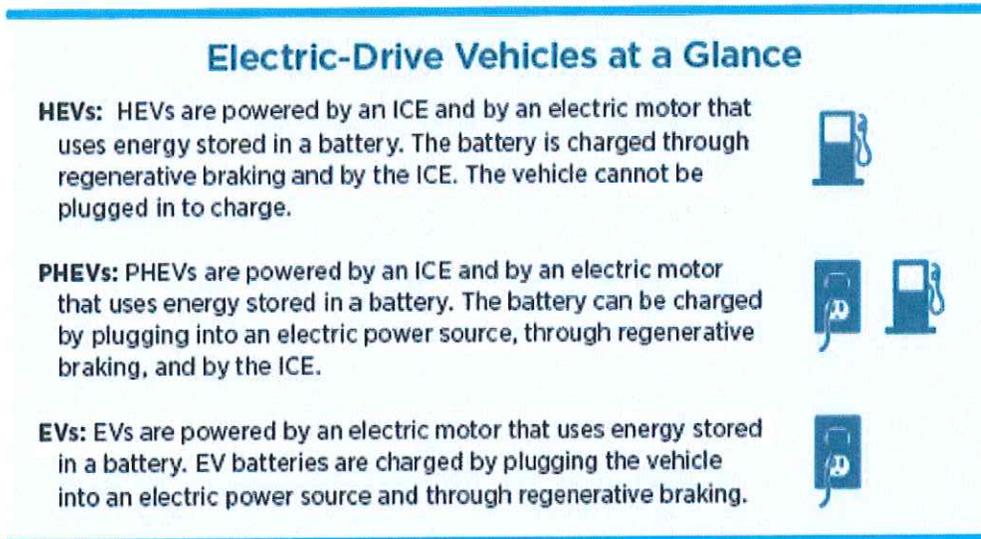
- Equipment required to transfer electricity from an external source to a vehicle, commonly referred to as electric vehicle supply equipment, or “EVSE.”

This section discusses the current state and potential evolution of each market segment generally and in Pacific Power’s Oregon service area specifically.

Vehicles

The initial pilot programs focus on the light-duty vehicle market, the largest contributor to transportation sector greenhouse gas emissions. Light-duty vehicles using electricity to offset some or all fossil fuel consumption associated with traditional internal combustion engines (ICEs) are generally grouped into three categories, as described in Figure 4: hybrid-electric vehicles (HEVs), plug-in hybrid electric vehicles (PHEVs) and pure electric vehicles (EVs, also commonly referred to as battery electric vehicles, or BEVs).⁹

Figure 4. Electric-Drive Vehicle Category Overview



The SB 1547 definition of transportation electrification does not encompass hybrid electric vehicles (e.g., the Toyota Prius), which generate electricity internally. As such, Pacific Power’s efforts focus on PHEVs and BEVs, which are collectively referred to as plug-in electric vehicles, or PEVs, throughout this application.

Contemporary PEVs were introduced with the arrival of the Chevrolet Volt and Nissan Leaf in 2010. With the continued introduction of additional mass-market PEV options and luxury models (e.g., Tesla Model S) in the years since, the national light-duty PEV market has grown from virtually no vehicles sold in 2010 to nearly 160,000 sold in 2016 (Figure 5).¹⁰ While the growth rate is steady and significant, market penetration remains in the early stages, with PEVs representing less than 1 percent of the light duty market in 2016.¹¹ Additionally, the drop in sales

⁹ U.S. Department of Energy, *Hybrid and Plug-In Electric Vehicles*, p.1 (May 2014),

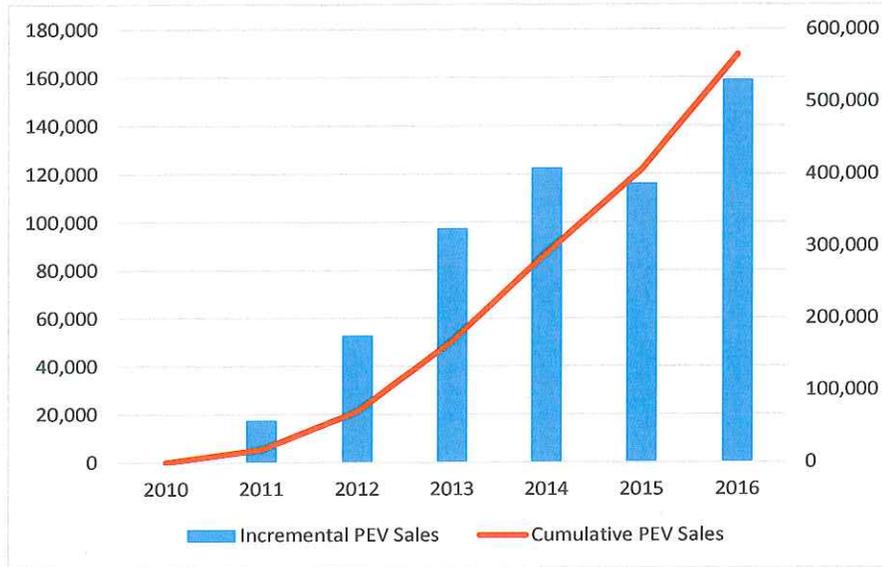
http://www.afdc.energy.gov/uploads/publication/hybrid_plugin_ev.pdf (last visited Apr. 11, 2017).

¹⁰ Created from data from InsideEVs, <http://insideevs.com/monthly-plug-in-sales-scorecard/> (last visited Mar. 1, 2017).

¹¹ National Auto Dealers Association, *Market Beat*, (Dec. 2016),

in 2015 is a reminder that the PEV market is still maturing and is subject to volatility and outside forces (e.g., gasoline prices).

Figure 5. National PEV Sales, 2010-2016

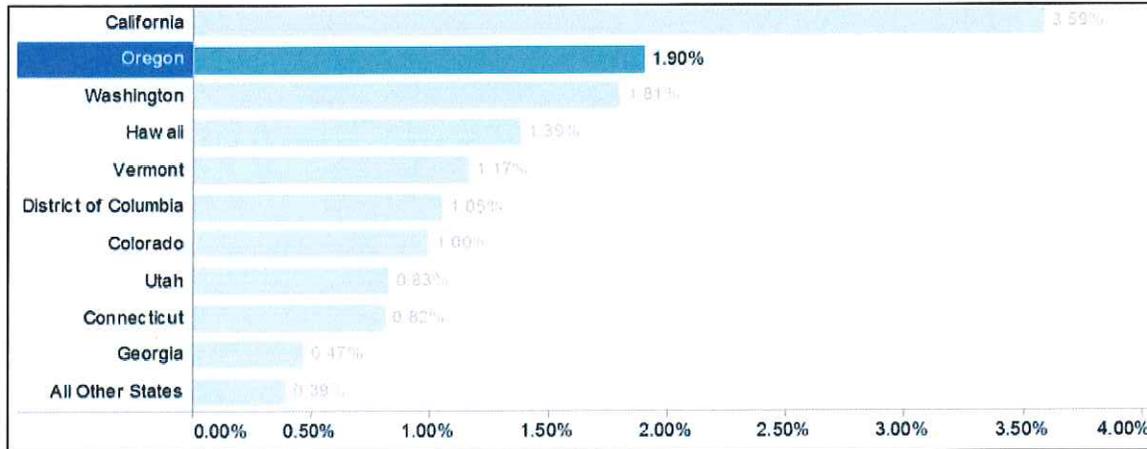


At the state level, California is the largest market for PEVs in terms of both total PEVs sold and percent market share. In 2016, Oregon had the second largest market share at 1.9 percent, roughly twice the national average (Figure 6).¹² Several factors may be contributing to Oregon's above-average PEV adoption, including, proximity to the large California market, the state's adoption of California's vehicle emission standards and Zero Emission Vehicle mandate, the availability of EVSE along major corridors and in Portland, and the efforts of Drive Oregon and other organizations working to increase PEV awareness and the availability of vehicle charging at workplaces.

<https://www.nada.org/WorkArea/DownloadAsset.aspx?id=21474846613> (last visited Apr. 11, 2017).

¹² Auto Alliance, *ZEV Sales Dashboard*, <https://autoalliance.org/energy-environment/zev-sales-dashboard/> (last visited Mar.1, 2017).

Figure 6. Leading PEV States by Market Share, January – October 2016



PEVs in Oregon

As of June 2016, there were roughly 11,000 PEVs registered and sited in Oregon, 60 percent of which are all-electric BEVs (Table 1).¹³ This number represents a fraction of the 4.5 million gasoline and diesel vehicles and 88,000 hybrid electric vehicles registered in the state.

The vehicle registration data show a small PEV share state-wide, but also illustrate a disparity between PEV market penetration statewide and in Pacific Power’s service area. Based on ZIP code-level data, it is estimated that a third of Oregon’s registered PEVs are located in Pacific Power territory, contrasted with 43 percent of all registered vehicles. Further, PEVs represent 18 out of every 10,000 vehicles in Pacific Power’s service territory as compared to 24 of every 10,000 statewide, indicating that the PEV adoption rate is lower in Pacific Power’s service territory than for the state as a whole.

Table 1. Oregon Vehicle Registration Summary – June 2016

Vehicle Fuel	Pacific Power *	Oregon Statewide	Pacific Power % of Statewide
Electric	1,994	6,531	31%
Plug-In Hybrid	1,583	4,305	37%
Plug-In Electric Total	3,577	10,836	33%
Hybrid Electric	35,119	87,668	40%
Gasoline/Diesel	1,910,939	4,450,807	43%
Other	831	1,389	60%
Total	1,950,466	4,550,700	43%
Plug-in Vehicles per 10,000 Vehicles	18	24	77%

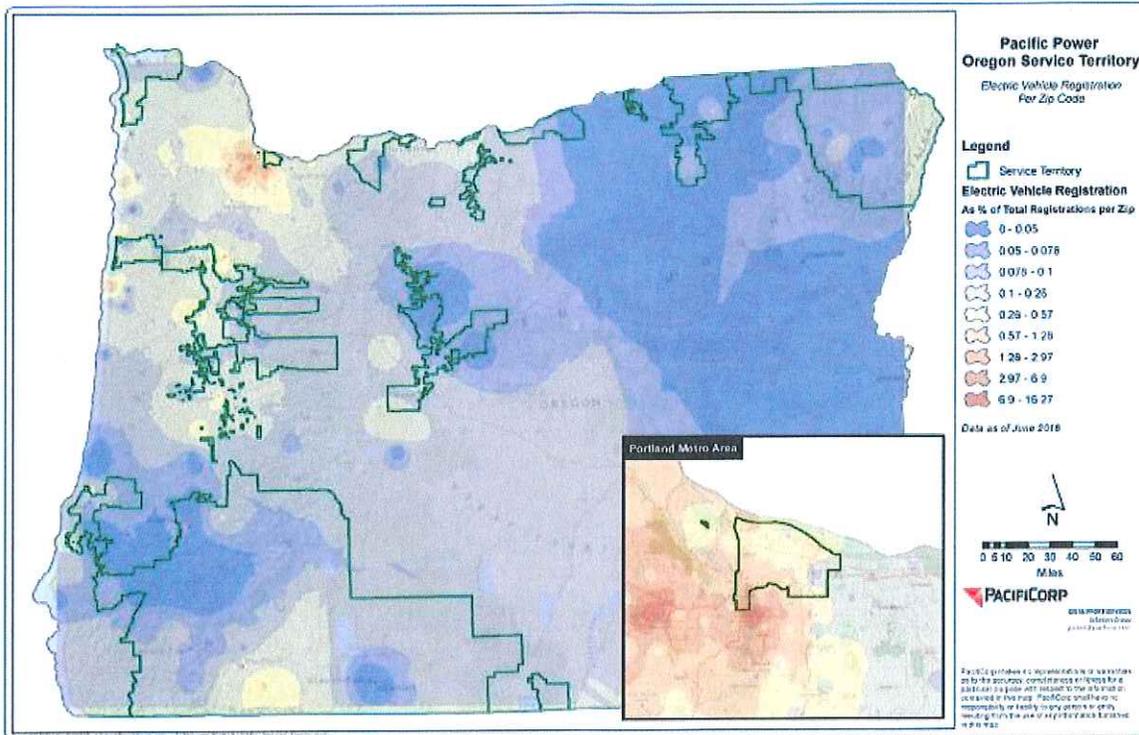
* Estimated based on ZIP code-level data

Figure 7 presents the same Oregon ZIP-code level PEV registration data, with the boundaries of Pacific Power’s service territory overlaid for reference. As shown, the areas of the state with the highest PEV adoption rates are outside the Company’s service area. These findings are consistent

¹³ Data provided by the Oregon Department of Environmental Quality.

with the general characteristics of Pacific Power's Oregon service area described above, including a lack of large urban centers, low population densities, and household income as compared to the Portland area.

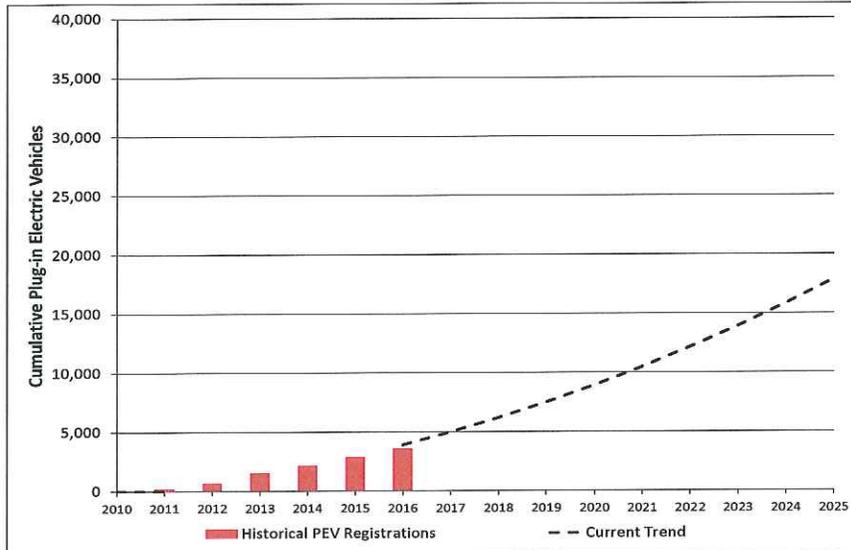
Figure 7. Oregon PEV Ownership Rates by ZIP Code – June 2016



The Evolving Vehicle Market

Figure 8 shows estimated cumulative historical PEV registrations in Pacific Power's Oregon service territory from 2010 through June 2016 and forecasted adoption based on this historical trend. As discussed above, there are an estimated 3,600 PEVs in Pacific Power's Oregon service territory as of June 2016. If the adoption trend from 2010-2015 continues, it is estimated that there will be about 18,000 PEVs registered in Pacific Power territory by the end of 2025.

Figure 8. Historical and Forecasted Pacific Power Oregon Plug-in Electric Vehicle Registrations*



* 2016 historical registrations through June 2016

In the rapidly evolving electric transportation market, it is unknown how indicative past adoption will be of future trends, as the Company and others attempt to address market barriers to transportation electrification. Other factors that could affect PEV adoption include:

- **Gasoline cost:** As of March 1, 2017, the average cost of regular gasoline is \$2.50 per gallon, as compared to an equivalent cost of \$0.96 per gallon for electricity.¹⁴ This means that a driver can save about \$1.50 for every gallon of gasoline avoided by driving a PEV. If gas prices increase, the economic proposition for adopting PEVs improves, and vice versa.
- **PEV battery cost:** The battery is the largest driver of PEV cost, and, according to a 2016 report from McKinsey and Bloomberg New Energy Finance, “[t]he costs of a lithium-ion battery pack fell 65 percent from 2010 to 2015, and they are expected to drop below \$100 per kilowatt-hour over the next decade.”¹⁵ The effect of declines in battery costs is evident in recent developments in the PEV market. In December 2016, Chevrolet released the all-electric Bolt, the first BEV with an EPA-rated range of over 200 miles at a manufacturer’s suggested retail price below \$40,000. In 2017, Tesla plans to release the Model 3, advertised at with an electric range of 215 miles at a price of \$35,000.¹⁶
- **Tax incentives:** PEVs currently qualify for a federal tax credit of up to \$7,500, but the credits phase out once an automaker reaches 200,000 units.¹⁷ Chevrolet and Tesla are expected to be

¹⁴ U.S. Department of Energy, *eGallon*, <https://energy.gov/maps/egallon> (last visited Mar. 1, 2017).

¹⁵ McKinsey & Company and Bloomberg New Energy Finance, *An Integrated Perspective on the Future of Mobility*, p. 6 (Oct. 2016), https://www.bbhub.io/bnef/sites/4/2016/10/BNEF_McKinsey_The-Future-of-Mobility_11-10-16.pdf (last visited Apr. 11, 2017).

¹⁶ Tesla, *Model 3*, <https://www.tesla.com/model3> (last visited Apr. 11, 2017).

¹⁷ Plug-In Electric Drive Vehicle Credit (IRC 30D).

the first automakers to reach the 200,000 vehicles based on sales to date and the expected demand for the Bolt and Model 3.

Pacific Power will work with the Department of Environmental Quality to track PEV registrations over time, to understand the effect that market dynamics are having on adoption of PEVs in the Company’s service area.

Electric Vehicle Supply Equipment

EVSE Technology

EVSE transfers electricity from an external source to a PEV. Current EVSE technology is generally separated into three distinct categories: alternating current (AC) Level 1, AC Level 2 and direct current (DC) fast charging. The two AC types provide electricity to the vehicle’s on-board charger, whereas direct current EVSE is able to charge the vehicle’s battery directly. The key difference between the three EVSE types is power and speed of charging. An overview of each is provided in Figure 9.¹⁸

Figure 9. Overview of Electric Vehicle Supply Equipment

EVSE Options					
	Amperage	Voltage	Kilowatts	Charging Time	Primary Use
AC Level 1	12 to 16 amps	120V	1.3 to 1.9 kW	2 to 5 miles of range per hour of charging	Residential and workplace charging
AC Level 2	Up to 80 amps	208V or 240V	Up to 19.2 kW	10 to 20 miles of range per hour of charging	Residential, workplace, and public charging
DC Fast Charging	Up to 200 amps	208 to 600V	50 to 150 kW	60 to 80 miles of range in less than 20 minutes	Public charging

Level 1 refers to a cord with a standard three-prong electrical plug on one end and an SAE J1772¹⁹ connector on the other end, which allows a vehicle to be charged using a standard 120 Volt electrical outlet. This is the simplest, but slowest, means of PEV charging in most cases. Adding two to five miles of driving range per hour of charging, Level 1 EVSE can be a viable option for drivers with vehicles parked in a single location for long periods of time (e.g., at home overnight).

Level 2 represents a faster charging option for drivers who regularly travel longer distances or have limited access to leave vehicles for long periods of time or both. Level 2 EVSE provides five to ten times more driving range than Level 1 EVSE, depending on the type of equipment. Level 2 EVSE requires a dedicated 240 Volt outlet and uses the same J1772 connector as Level 1 EVSE.

¹⁸ U.S. Department of Energy, *Hybrid and Plug-In Electric Vehicles*, p.3 (May 2014), http://www.afdc.energy.gov/uploads/publication/hybrid_plugin_ev.pdf (last visited Apr. 11, 2017).

¹⁹ The SAE J1772 connector is the standard for Level 1 and 2 charging for nearly all PEVs. Tesla vehicles use a proprietary connector, but can use an adaptor for a J1772 connection. Additional description available from the U.S. Department of Energy, http://www.afdc.energy.gov/fuels/electricity_infrastructure.html#level1 (last visited Apr. 11, 2017).

DC fast chargers (DCFCs) represent a significantly faster means of charging most BEVs.²⁰ Though not yet as fast as a gas station fill-up,²¹ the time requirement should decrease as higher-powered charging becomes available. Due to the power required to perform fast charging, these units are not appropriate for in-home charging and are typically deployed for public use.²² Whereas Level 1 and Level 2 EVSE use standardized connectors that can serve all vehicles, there are currently three competing DCFC connection standards:

- CHAdeMO: Primarily used by Japanese automakers, including the Nissan Leaf. Tesla vehicles can also use these stations with an adapter.
- SAE Combined Charging System (CCS): Primarily used by American and European automakers.
- Tesla Supercharger: Are only compatible with Tesla vehicles.

This fragmentation limits driver access to DCFCs and reduces driver confidence that a compatible charger will be available when needed. For example, stations along the West Coast Electric Highway²³ only have CHAdeMO connections, BMW/Volkswagen's Express Charging Corridors use only CCS connections and Tesla's supercharger network is only compatible with Tesla vehicles.

EVSE Landscape

A significant advantage of PEVs is the flexibility to "fill up" wherever appropriate electric service can be accessed. While the time required to charge a PEV battery is not currently on par with a gasoline filling station, PEVs can be charged where the vehicle may otherwise be parked (e.g., home, workplace, public destinations). This creates a landscape of opportunity and challenges.

Home Vehicle Charging

Data suggests that the majority of PEV charging occurs at home. In 2015, the Idaho National Laboratory (INL) published a study presenting findings of five PEV demonstration projects funded under the American Recovery and Reinvestment Act (ARRA) (the INL Study).²⁴ The INL Study provides a rich data source for understanding PEV charging patterns for early adopters, however, "in order to meet the expected enthusiasm for introduction of the Nissan Leaf and Chevrolet Volt, the EV Project elected to limit participation to those vehicle purchasers residing in single-family homes that had a designated overnight parking location for the participating PEV."²⁵ Because the INL Study was limited to consumers in single-family homes with parking spaces that could support Level 2 charging, the results may be less indicative of behavior as the market expands to consumers without simple solutions for home charging (e.g., residents without access to off-street parking).

²⁰ There are currently no PHEVs that can use DC fast chargers. Most newer BEVs can use DCFCs either as a standard or optional feature.

²¹ Based on data provided by the Oregon Department of Transportation, the average duration of a fast charging session at West Coast Electric Highway stations from August 2015-July 2016 was just under 30 minutes.

²² Only 44 out of 2,086 DC fast charging stations nationally are classified as "private" by the U.S. Department of Energy's Alternative Fuel Data Center, <http://www.afdc.energy.gov/locator/stations/> (last visited Feb. 24, 2017).

²³ For a map of stations on the West Coast Electric Highways, see:

https://www.oregon.gov/ODOT/HWY/OIPP/docs/ElectricHwyMapREV_4-15.pdf (last visited Apr. 11, 2107).

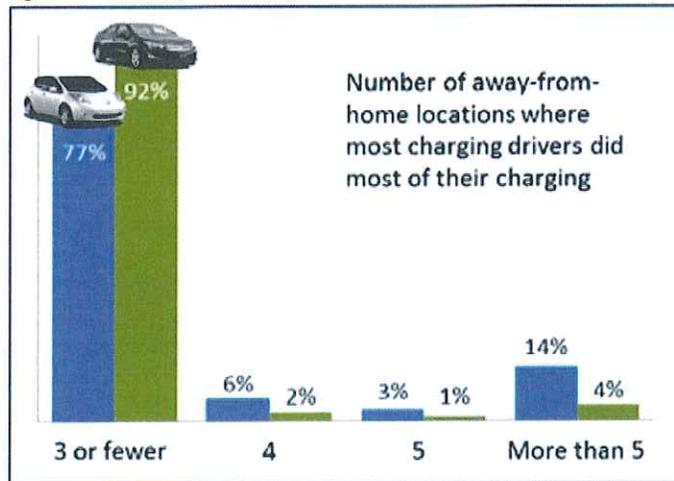
²⁴ Jim Francfort, Brion Bennet, Richard Carlson, et. al., *Plug-in Electric Vehicle and Infrastructure Analysis*, (Sept. 2015), available at <https://inldigitalibrary.inl.gov/sites/sti/sti/6799570.pdf> (last visited Apr. 11, 2017) (hereafter INL Study).

²⁵ *Id.* at 11-50.

Nonetheless, the INL Study can provide valuable insight into how drivers with access to home charging use EVSE.

The INL Study found that, “overall, the Leaf and Volt drivers performed most of their charging at home”²⁶ When charging away from home, most drivers relied on three or fewer locations for most of their needs, as illustrated in Figure 10, with Nissan Leaf (BEV) drivers likelier to use more locations that Chevrolet Volt (PHEV) drivers.²⁷

Figure 10. Usage of Away-From-Home Charging Locations



The INL Study also examined usage patterns of home charging equipment, finding that “when charging at home, participants in the project left their vehicles plugged in at home overnight for an average of 12 hours per charge. The vehicles always required less than 5 hours to fully charge at home using the AC Level 2 EVSE units, and usually only took 1 to 3 hours to charge completely.”²⁸ These findings indicate that although all participants were provided with Level 2 EVSE, given the average length of time that vehicles were plugged in overnight and the amount of charge required, Level 1 EVSE may have been able to meet many participants’ charging needs.

Additionally, because vehicles are only charging for a portion of the time they are connected to the Level 2 EVSE, there is potential for drivers to shift charging to off-peak periods to minimize the impact on the utility system. Both the vehicles and the home EVSE included in the INL Study could be programmed to manage charging times and the INL Study investigated participants’ willingness to use this functionality in response to time-of-use rates or other influencing factors. In particular, research focused on participants in San Francisco and Portland, served by Pacific Gas and Electric (PG&E) and Portland General Electric Company (PGE), respectively. Participants in these markets were asked whether they had used programming functionality on the vehicle, the EVSE, or both, and whether they were on a time-of-use rate. Survey results, provided in Figure 11, indicate that roughly 70 percent of respondents opted for a time-of-use or electric vehicle-specific rate, but that 86 percent used programmable functionality, indicating that a portion of participants chose to manage their charging despite the lack of a financial incentive to do so.

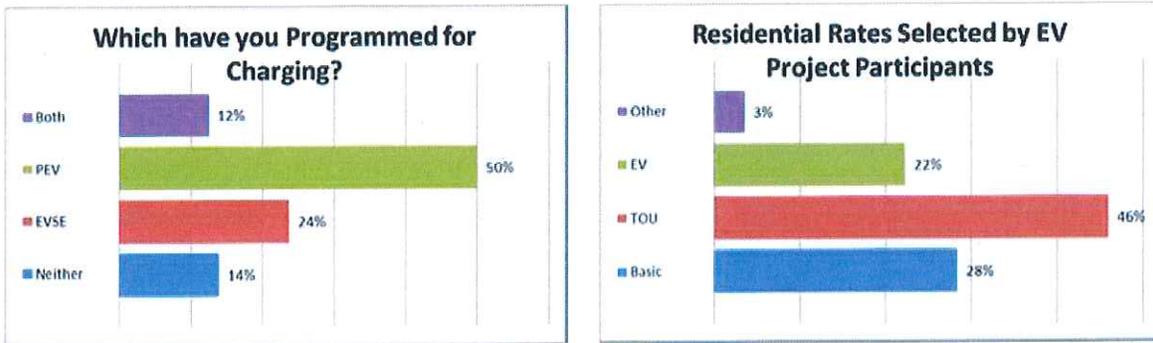
²⁶ *Id.* at 3-4.

²⁷ *Id.* at 3-5.

²⁸ *Id.* at 3-10.

The data also illustrate that the vehicle’s controls were the preferred means of managing charging, though EVSE controls were often used, and in some cases, both were used.

Figure 11. Home Charging Behavior and Time-of-Use Rate Participation

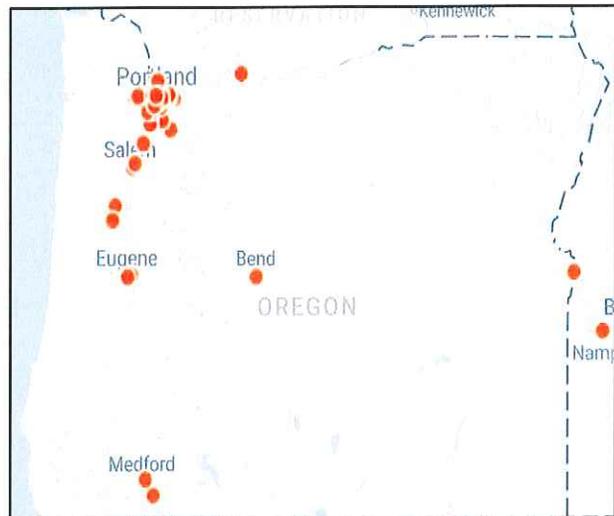


Pacific Power offers an optional time-of-use rate (Schedule 210) to Oregon residential customers with varying rates for consumption occurring during on- or off-peak periods during the summer and winter. By default, this rate would apply to the customer’s entire household consumption, but single family customers with PEVs have the option to establish separately metered service under Schedule 5, and to place this service on a time-of-use rate, if desired.

Workplace Charging

The availability of workplace charging can extend PEV commuting range and allow drivers to meet a larger share of their transportation needs with electricity. The INL Study found that: “Leaf and Volt drivers with known access to workplace charging in this study averaged 23 percent and 26 percent higher annual EV miles traveled than the overall group of vehicles in the project, respectively.”²⁹ Due in large part to Drive Oregon’s promotion efforts, Portland is the top metropolitan area for participation in the U.S. Department of Energy’s Workplace Charging Challenge, however, nationally, “workplace charging is rarely found in rural locations. Only 13 percent of partner worksites are in rural regions and only 2 percent of partners’ PEV-driving employees are found at those locations.”³⁰ This national finding also accurately reflects the Oregon landscape, with the majority of workplace charging in Portland metropolitan area, as shown in Figure 12.³¹

Figure 12. Oregon Workplace Charging Partners



²⁹ *Id.* at 3-8.

³⁰ U.S. Department of Energy, *Workplace Charging Challenge Progress Update 2016: A New Sustainable Commute*, p. 6 (Jan. 2017), <https://energy.gov/eere/vehicles/downloads/workplace-charging-challenge-2016-progress-update>, (last visited Apr. 11, 2017).

³¹ U.S. Department of Energy, *Workplace Charging*, <https://energy.gov/eere/vehicles/workplace-charging-employer-partners> (last visited Mar. 28, 2017).

Pacific Power, along with the other Berkshire Hathaway Energy affiliates, joined the U. S. Department of Energy's Workplace Charging Challenge in 2016.

Public Charging

Public charging can enable transportation electrification by providing options for drivers without access to home or workplace charging and by extending the electric driving range for those with regular access to EVSE. As discussed above, all participants in the INL Study had access to Level 2 charging at their residences, so the INL Study did not address charging patterns or challenges for drivers without access to home charging. The INL Study did find that DCFCs along travel corridors effectively enabled long-distance range for BEVs.³²

While Level 2 EVSE may be a solution in public locations where vehicles typically park for extended periods of time, such as shopping malls, airports, and commuter lots,³³ it will not meet the needs of drivers who want the convenience of a gas station that allows them to fill up quickly and continue on their route. For this reason, available and reliable publicly-available DC fast charging will be critical to widespread transportation electrification.

To date, public DCFC deployment in Pacific Power's Oregon service territory has been limited and competing connection standards further limit access to this equipment. Based on data from the U.S. Department of Energy's Alternative Fuel Data Center,³⁴ there are currently 100 public fast charging locations in Oregon, but only 31 of these are located in Pacific Power's service area. However, this number overstates the number of stations a given electric vehicle driver can use, as illustrated in Table 2. For example, a Nissan Leaf driver can only use 20 of the 31 stations (CHAdeMO + dual-standard) and a Chevrolet Bolt driver can only use 10 of the 31 stations (CCS + dual-standard). Moreover, only one of the dual standard stations in Pacific Power's service area is located outside of Portland.

Table 2. Public DC Fast Charging Stations by Connection Type

Connection Type	Stations	Ports
CHAdeMO	16	17
CCS	6	6
Dual-Standard (CHAdeMO and CCS)	4	10
Tesla	5	36
Total	31	69

Table 2 also illustrates that most of the public DCFC locations in Pacific Power's Oregon service area only have one port, which will reduce driver confidence that a port will be available (i.e., not in use) when needed, particularly as PEV ownership increases.

The state of public DCFC in Pacific Power's Oregon service area highlights one of the key differences between the electric- and gasoline-powered vehicle markets. Gas stations are highly visible, easy to locate, have multiple pumps, and can serve any vehicle. In contrast, the current network of DCFC is sparse, generally lacking multiple charging ports at locations, and is fragmented by competing connection standards.

³² INL Study at 3-3.

³³ *Id.*

³⁴ U.S. Department of Energy, *Alternative Fueling Station Locator*, <http://www.afdc.energy.gov/locator/stations/> (last visited Feb. 24, 2017).

The Evolving EVSE Market

In this application, the Company proposes initiatives to spur EVSE development in its service territory. There are a number of factors that could impact the rate of deployment of EVSE in Oregon, as discussed below.

Development of EVSE Standards and Specifications

The lack of national standards and specification for EVSE energy usage, connectivity, communications, and demand response capability, among others, make it difficult for the Company to promote specific models of EVSE at this time. The Company and the Energy Trust of Oregon use product specifications, such as ENERGY STAR®, to qualify products for energy efficiency programs to ensure that products meet established criteria for quality and efficiency. Additionally, customers recognize that the ENERGY STAR label signifies an energy efficient product.³⁵

In December 2016, ENERGY STAR published its first EVSE specification. The emergence of specifications for energy efficient and demand response capable equipment, and the coming list of qualified products, will enable the Company to consider future initiatives to promote EVSE to customers.

The Northwest Energy Efficiency Alliance (NEEA) is also beginning to investigate potential opportunities to engage the EVSE market, such as increasing the number of PEVs using level 2 or better charging equipment in the home, increasing the efficiency of consumer charging systems from “wire to wheels” and making the majority of these systems capable of “managed” charging to minimize impacts on peak loads in the Northwest. NEEA efforts in this market may affect additional EVSE development in the region.

Increasing Power of Fast Charging Equipment

With the exception of Tesla Superchargers, which can exceed 100 kW, the current network of fast chargers are designed to operate at 50 kW, the maximum that most vehicles can currently accept. However, as vehicle batteries get larger, higher-powered charging capability will be required to enable quick charging. Charging stations capable of charging at 150 kW or higher are being deployed in anticipation of charging standards and vehicles capacities catching up.³⁶

Deployment of New Publicly Available EVSE

As a condition of the Clean Air Act Civil Settlement with the Environmental Protection Agency, Volkswagen committed to invest \$2 billion in zero emission vehicle charging and the promotion of zero emission vehicles. The investment will be made over a 10-year period, with \$800 million dedicated to California. To facilitate this investment, Volkswagen established Electrify America, with a stated plan to focus on:

³⁵ “By far, the most common message associated with the label was ‘energy efficiency or energy savings,’ which is considered high understanding of the label. Sixty-eight percent of households surveyed associated the ENERGY STAR label with this message.” U.S. Environmental Protection Agency, *National Awareness of ENERGY STAR for 2015*, p. 14 (2016), <https://www.energystar.gov/awareness> (last visited Mar. 1, 2017).

³⁶ Bengt Halvorson, *First U.S. 350-kW Charging Station Will Allow Speedy L.A.–Vegas EV Road Trips*, (Dec. 2016), <http://blog.caranddriver.com/first-u-s-350-kw-charging-station-will-allow-speedy-l-a-vegas-ev-road-trips/> (last visited Apr. 11, 2017).

[i]nvesting in electric vehicle (EV) charging infrastructure to increase availability of chargers, with construction starting in 2017. Our planned investments will focus on:

- Installing chargers locally in approximately 15 metro areas consisting of 300+ stations (L2 or DC Fast Chargers (50 to 150+ kW))
- Developing a high-speed, cross-country network consisting of 200+ stations (DC Fast Chargers)³⁷

It remains to be seen how much of this charging infrastructure will be deployed in Pacific Power's Oregon service area, but given the stated objectives above, any investment will likely be concentrated in Portland and along major highway corridors.

The electric transportation market is growing steadily; however, adoption remains low in Pacific Power's service area relative to statewide transportation electrification and the internal combustion engine (ICE) vehicle market. Technological advancements, such as battery range, vehicle cost, equipment standards and demand response capabilities, present opportunities for increased adoption. This evolving market also creates uncertainty that makes it difficult to forecast adoption trends and increases the risk of stranded assets for EVSE.

Pacific Power's initial programs consider the state of the electric transportation market described above. The proposed pilot programs are designed to tackle key market barriers and account for the quickly evolving vehicle and EVSE markets. The following section outlines the key barriers contributing to the relatively low adoption of electric transportation in it Pacific Power's service area.

MARKET BARRIERS

Despite Oregon's position as one of the leading markets for PEVs in the United States, the market share is under 2 percent and heavily influenced by adoption in the Portland metropolitan area (see Figure 7). Among Pacific Power customers, the market share is lower than the state-wide average. In a 2016 customer satisfaction survey, only 7 percent of Pacific Power's residential customers responded that they would "probably" (6 percent) or "definitely" (1 percent) consider a PEV in the next five years. This section outlines major market barriers to widespread transportation electrification in Pacific Power's service area, including barriers specific to the more rural areas of the state the Company serves.

The Electric Vehicle Transportation Center categorizes the barriers facing electric vehicles as "internal" and "external." "Internal factors include battery costs, purchase price, driving range and charging time. External factors include fuel prices, policy incentives, consumer characteristics, availability of charging stations, travel distance, public visibility and vehicle diversity."³⁸ While both internal and external factors can significantly affect PEV adoption, the ability of the Company or other Oregon stakeholders to influence internal factors such as technology, list price, and

³⁷ Electrify America, *Our Plan*, <https://www.electrifyamerica.com/our-plan> (last visited Apr. 11, 2017).

³⁸ Makena Coffman, Paul Bernstein and Sherilyn Wee, *Factors Affecting EV Adoption: A Literature Review and EV Forecast for Hawaii*, p. 2 (Apr. 2015), <http://evtc.fsec.ucf.edu/publications/documents/HNEI-04-15.pdf> (last visited Apr. 11, 2017).

charging capabilities is likely limited. As such, the section below focusses on external factors that the Company or other actors in the state may be able to influence.

Consumer Attitudes

Research into consumer attitudes toward electric vehicles reveals a disconnect between the benefits of electric transportation and consumer willingness to purchase an electric vehicle. For example, the National Renewable Energy Laboratory (NREL Study) surveyed consumers on their opinions of PHEVs and BEVs (referred to in the study as AEVs, or all-electric vehicles), finding “nearly half (46%) stated PHEVs were ‘just as good as’ or ‘better than’ traditional gasoline vehicles; 41% stated BEVs were ‘just as good as’ or ‘better than’ traditional gasoline vehicles.” Despite the positive opinion of PEVs, only 23 percent and 19 percent indicated that they would consider or expect to purchase a PHEV or AEV, respectively.³⁹

A 2013 Oregon Department of Transportation (ODOT) study indicates this disconnect may be exaggerated in more rural areas of the state where many Pacific Power customers live. The ODOT study investigated differences in vehicle usage patterns between residents in urban (Multnomah and Marion), mixed (Umatilla and Deschutes), rural (Lincoln, Douglas and Malheur), and Eastern urban (Crook, Grant and Union) counties. As part of this study, residents were surveyed about their vehicle usage and purchase patterns, finding:

...fuel efficiency ranks as the single most important factor in the next vehicle purchase across all counties, even more important than price and safety. However, *urban residents are much more likely than mixed or rural residents to consider purchasing an electric or hybrid vehicle.*⁴⁰

Numerical results from the ODOT survey are provided in Table 3.⁴¹

Table 3. Oregon Vehicle Purchase Attitudes

Next Vehicle Purchase: Will You Consider an Electric or Hybrid Vehicle?

Type of Vehicle	Urban	Mixed	Rural	Additional Eastern Rural
Consider Electric	29%	15%	17%	14%
Consider Hybrid	41%	29%	30%	27%

The results of the ODOT study are somewhat counter-intuitive. Fuel efficiency is the most important factor for all regions, but likelihood of considering an electric vehicle for the next purchase varies considerably by county type (Table 3). Even in urban counties, only 29 percent of respondents indicated they would consider purchasing an electric vehicle. Although not addressed

³⁹ Mark Singer, *Consumer Views on Plug-in Electric Vehicles – National Benchmark Report (Second Edition)*, pp. 14-15 (Dec. 2016), available at http://www.afdc.energy.gov/uploads/publication/consumer_views_pev_benchmark_2nd_ed.pdf (last visited Apr. 11, 2017) (hereafter NREL Study).

⁴⁰ Oregon Department of Transportation, *Final Report on Impacts of Road Usage Charges in Rural, Urban and Mixed Counties*, p. 17 (Jun. 2013), <http://www.oregon.gov/ODOT/HWY/RUFPP/Road%20Usage%20Charge%20Program%20Documents/08-Impacts%20of%20Road%20Usage%20Charging%20in%20Rural,%20Urban,%20Mixed%20Counties%202013.pdf> (last visited Apr. 11, 2017) (emphasis added).

⁴¹ *Id.*

in the ODOT study, these results suggest two possible reasons for this disconnect, which are not mutually exclusive:

- Consumers in more rural communities are less aware than urban customers that PEVs are more fuel-efficient than traditional ICE vehicles.⁴²
- Consumers in more rural communities are aware of the fuel efficiency of PEVs, but are less willing to consider these vehicles for other reasons (i.e., there are additional market barriers for rural communities).

The following discussion explores key barriers related to consumer attitudes generally and in Pacific Power's service area.

Upfront cost

In the NREL Study, "a majority, 57% and 62%, stated they would not purchase or lease PHEVs or AEVs, respectively."⁴³ Respondents indicating they would not consider a PEV were asked to explain the primary reason for their lack of willingness. Despite the lower long-term cost to operate electric vehicles⁴⁴ and industry efforts to release more affordable mass market vehicles,⁴⁵ the majority indicated the primary reason they are not considering a PEVs is that they are too expensive (Figure 13).⁴⁶ This finding was consistent for consumers surveyed by NREL in 2015 and 2016.

Figure 13. Reasons for NOT considering a PEV



⁴² Most PEVs are rated at over 100 miles per gallon equivalent (MPGe). Wikipedia, *Miles per gallon gasoline equivalent*, https://en.wikipedia.org/wiki/Miles_per_gallon_gasoline_equivalent#Examples (last visited Apr. 11, 2017).

⁴³ NREL Study at 15.

⁴⁴ Electric Vehicle Transportation Center, *Electric Vehicle Life Cycle Cost Analysis*, <http://evtc.fsec.ucf.edu/research/project6.html> (last visited Apr. 11, 2017).

⁴⁵ Joe Pugliese, *How GM Beat Tesla to the First True Mass-Market Electric Car*, (Feb. 2016), <https://www.wired.com/2016/01/gm-electric-car-chevy-bolt-mary-barra/> (last visited April 11, 2017).

⁴⁶ NREL Study at 16.

In addition to vehicle cost, AR 599 stakeholders indicated that the cost to install and operate EVSE poses a barrier to transportation electrification. As shown in Figure 14,⁴⁷ the hardware and installation are of particular concern for DCFC, where the cost per charging port can exceed \$50,000.

Figure 14. Ballpark EVSE Unit and Installation Costs

EVSE Type	EVSE Unit* Cost Range (single port)	Average Installation Cost (per unit)	Installation Cost Range (per unit)
Level 1	\$300-\$1,500	not available	\$0-\$3,000** <i>Source: Industry Interviews</i>
Level 2	\$400-\$6,500	~\$3,000 <i>EV Project (INL 2015b)</i>	\$600-\$12,700 <i>EV Project (INL 2015b)</i>
DCFC	\$10,000-\$40,000	~\$21,000 <i>EV Project (INL 2015d)</i>	\$4,000-\$51,000 <i>EV Project (INL 2015d) and (OUC 2014)</i>

In addition to the upfront hardware and installation costs, owners of EVSE will have ongoing costs for network services (if applicable),⁴⁸ maintenance and electricity supply. Again, these costs are most significant for DCFCs, because they have cooling systems and other components that require periodic maintenance and replacement. Additionally, the high power draw of DCFC can incur demand charges under typical utility rates, which are based on maximum demand, not the amount of energy that is supplied to vehicles. For example, a 50 kW DC fast charger with 750 kWh of monthly usage in Pacific Power’s Oregon service area will have a monthly electric bill of \$427, meaning that the station owner will need to charge a driver \$0.58/kWh just to recover the electricity costs, with no consideration for upfront costs or other ongoing expenses.⁴⁹ At \$0.58/kWh, it would cost over \$17 to drive a Nissan Leaf 100 miles;⁵⁰ more than the cost to drive a comparable vehicle 100 miles on gasoline.

Several market actors are currently working to address the challenges presented by cost, focused primarily on vehicles rather than EVSE. For example, the Federal Plug-In Electric Drive Vehicle Credit provides a tax credit up to \$7,500 for qualified, new plug-in electric drive motor vehicles including passenger vehicles and light trucks. The State of Oregon offers Energy Incentive Program tax credits to cover up to 35-percent of the cost to install non-residential EVSE or electrify fleets. Incentives specific to EVSE are scheduled to sunset at the end of the 2017 calendar year. Oregon House Bill 2704, currently being considered by the Oregon Legislature, would establish a rebate program for the purchase or lease of PEVs. Additional intervention is required to address the upfront cost, particularly for EVSE.

⁴⁷ U.S. Department of Energy, *Costs Associated With Non-Residential Electric Vehicle Supply Equipment*, p. 30 (Nov. 2015) http://www.afdc.energy.gov/uploads/publication/evse_cost_report_2015.pdf (last visited Apr. 11, 2017).

⁴⁸ Owners not wishing to charge drivers to use EVSE or track/manage EVSE usage may be able to avoid network service costs.

⁴⁹ For a breakdown of monthly electrical service costs, see Exhibit C to Pacific Power Advice No. 16-020, filed with the Public Utility Commission of Oregon on Dec. 27, 2016.

⁵⁰ Assuming 30 kWh/100 miles for a 2017 Nissan Leaf, <http://www.fueleconomy.gov/feg/Find.do?action=sbs&id=38428> (last visited March 31, 2017).

Awareness

As illustrated by Figure 13, the availability, dependability and performance of PEVs are the next greatest barriers cited by NREL Study respondents after cost. While certain PEV technology limitations exist, these concerns generally indicate a lack of awareness and reliable information about PEV capabilities and benefits (e.g., vehicle cost, available tax credits, available PEV models, charging options and vehicle dependability):

- A National Academy of Sciences study describes the challenge relative to ICE vehicles: “Consumers know the attributes and features to compare to evaluate their ICE-vehicle choices, and they are accustomed to buying, driving and fueling these vehicles. Indeed, one of one main challenges to the success of the PEV market is that people are so accustomed to ICE vehicles.”⁵¹
- A 2016 study by UC Davis found that: “...the results of this research indicate a lack of general consumer awareness of availability is the first problem to be overcome to expand ZEV markets, followed immediately by aiding consumers to learn what it is they don’t know about ZEVs (or to unlearn what they think they know but is factually incorrect or otherwise different from what their knowledge would be if based on actual experience).”⁵²
- General exposure to PEVs and EVSE are positively correlated to favorable perception of PEVs. For example, the NREL Study found that “[r]espondents who reported being aware of charging stations had the highest percentage (56%) reporting a positive view. Similarly, respondents able to plug-in at home were more likely to report the positive view. Respondents reporting an awareness of PEVS (those who could name one of the top best-selling PEVs, those who had seen PEVs in parking lots, seen PEV ads, seen PEVs in social media, or were aware of PEV tax incentives) were more likely to report a positive view.”⁵³
- Poor understanding of PEV technology and benefits extends beyond consumers. The National Academy of Science reports that, “knowledge of PEVs at dealerships is (at best) uneven and (at worst) insufficient to address consumer questions and concerns.” The report cites research indicating low buyer satisfaction with the purchase experience for PEVs, poor dealership performance in Consumer Reports mystery shopping research, and low motivation for salespeople to make a PEV sale.⁵⁴

An array of public and private market actors provide a wide range of information and resources to help the public understand PEV options and benefits (e.g., the U.S. Department of Energy Alternative Fuels Database, Local Clean Cities organizations, Drive Oregon, EVSE companies, vehicle manufacturers). However, awareness of options and benefits remains a barrier. Two potential reasons for this cited by the National Academy of Science are: 1) The sheer number of

⁵¹ National Academy of Sciences, *Overcoming Barriers to Electric-Vehicle Deployment Interim Report*, p. 38 (2015), <https://www.nap.edu/catalog/21725/overcoming-barriers-to-deployment-of-plug-in-electric-vehicles> (last visited Apr. 11, 2017) (hereafter National Academy of Sciences Study).

⁵² Kenneth S. Kurani, Nicolette Caperello and Jennifer TyreeHageman *New Car Buyers' Valuation of Zero-Emission Vehicles: California*, p. 72 (Aug. 2016), <https://www.google.com/search?q=New+Car+Buyers%E2%80%99+Valuation+of+Zero-Emission+Vehicles%3A+California&sourceid=ie7&rls=com.microsoft:en-US:IE-Address&ie=&oe=#spf=1> (last visited Apr. 11, 2017).

⁵³ NREL Study at 27.

⁵⁴ National Academy of Sciences Study at 52.

web resources might cause consumers to become overwhelmed and confused, and 2) finding an easy-to-use source of credible, reputable information can be difficult. Additional work is needed to ensure that Pacific Power customers have access to consistent, centralized information from a trusted source.

Lack of EVSE

Associated with both upfront cost and awareness, data suggest that a lack of EVSE is a primary barrier to transportation electrification. Research indicates that, when home charging is possible, the majority of charging is performed at home.⁵⁵ Because home charging through a standard outlet and without any additional equipment may meet the needs of many residential customers, and given the lack of a specification for qualified efficient equipment and uncertainty as to whether programmed charging will ultimately occur in the vehicle or in the charger, Pacific Power's initial efforts will focus on development of non-residential and public EVSE.

Access to public charging

Access to public EVSE can provide emergency charging, enable long-range travel and increase access for drivers unable to charge at their residences or workplaces. While those with access tend to charge at home, a significant segment of drivers are not able to do so. For example, only 49 percent of NREL Study respondents reported the ability to consistently park their vehicles near electrical outlets at home.⁵⁶

Range anxiety

Lack of confidence in the dependability and range of vehicles is cited as a primary barrier to PEV adoption. As highlighted in the awareness discussion, the ICE experience is ubiquitous to consumers. Drivers expect visible, convenient and frequent filling station access—whether or not it is required for their average driving patterns. Fifty-six percent of NREL Study respondents reported that a “pure electric vehicle” would need to be able to travel 300 miles on a single charge to be willing to consider purchasing one.⁵⁷ This is likely a direct result of lack of awareness of how and where vehicles can be charged and the availability and visibility of public EVSE.

The NREL Study indicates that the existence of visible public EVSE can help improve consumer perception and willingness to consider PEVs. Respondents who answered yes to “Are you aware of any electric vehicle charging stations along the routes you drive and the places you visit in a typical day that you could use if you drove an electric vehicle?” were the most likely to believe that PEVs were as good or better than gasoline vehicles and to consider acquiring a PEV. The same correlation exists with access to a location to charge a vehicle at home.

While market actors are working to develop more robust public EVSE (see Chapter 3), investment in dual-standard, public DCFC equipment has been slow to develop in the Company's service area, particularly outside highway corridors and Portland. Additional intervention is required to overcome this barrier.

⁵⁵ INL Study at 3-5.

⁵⁶ NREL Study at iii.

⁵⁷ NREL Study at 19.

Intervention Strategies

The research cited above indicates that a separation exists between the capabilities of PEVs and consumer's willingness to accept the technology. Key market barriers driving this disconnect include the upfront cost to purchase vehicles and EVSE, awareness of PEVs and their capabilities, and a lack of robust EVSE development, particularly publicly available EVSE. The remainder of this application outlines Pacific Power's strategy to help reduce these market barriers and describes each of the initial interventions proposed by Company.

Chapter 2: Transportation Electrification Strategy

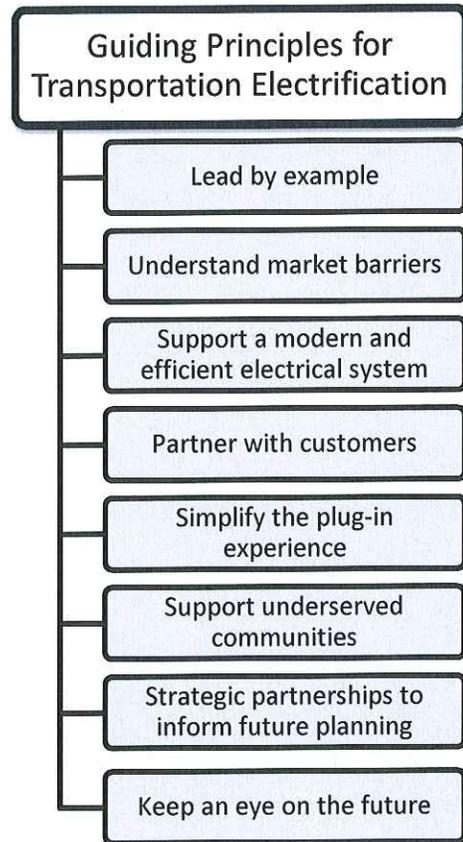
GUIDING PRINCIPLES

Given the rapidly evolving state described in Chapter 1, Pacific Power’s strategy to enter this new market focuses on gathering information and remaining responsive to market conditions. The Company is relying on a set of guiding principles to inform current and future strategies and initiatives. These principles and specific examples of how they are applied are presented below.

Lead by example

Adopting and supporting electric transportation in its operations is important to drive market development and empower Pacific Power customers to do the same. To this end, the Company is engaged in several electric transportation initiatives:

- Pacific Power pledged to commit at least 5 percent of its annual vehicle replacement budgets to purchase PEVs through 2024.
- Pacific Power is a partner in the U.S. Department of Energy’s Workplace Charging Challenge and is committed to providing vehicle charging options to employees.
- Pacific Power is committed to the White House’s efforts to accelerate electric vehicle deployment along Department of Transportation Alternative Fuel Corridors.⁵⁸



Understand Oregon customers’ specific market barriers to adopting electric transportation

The Company performed extensive industry research and stakeholder outreach to identify barriers to transportation electrification and determine which of these were best addressed by the Company. The proposed pilot programs will provide deeper insight into barriers specific to Pacific Power’s Oregon customers and to test Pacific Power’s ability to address these barriers through education, outreach, partnerships and encouraging and deploying public EVSE.

Use electric transportation to support a modern and efficient electrical system

If deployed correctly, electric transportation can increase electrical system efficiency and reduce costs for all Oregon customers. Through the initial proposed pilot programs and the deployment

⁵⁸ These efforts were announced by the Obama Administration and may not reflect the priorities of the current administration, <https://www.whitehouse.gov/the-press-office/2016/11/03/obama-administration-announces-new-actions-accelerate-deployment>.

of an advanced metering infrastructure (AMI),⁵⁹ the Company seeks insight into customers' energy consumption patterns, the impacts of EVSE (particularly DCFCs) on the grid, and the extent to which loads can be shifted through education and economic signals. The Public Charging Pilot program, will test the potential for integration of advanced technologies into public EVSE, such as energy storage and renewable generation, to mitigate potential adverse grid impacts of high-powered charging. Data collected will inform future system planning and the long-term strategy for how electric transportation can improve the efficiency of the electrical system rather than hinder it.

Partner with customers to deploy vehicle charging solutions

Pacific Power's proposed Development and Demonstration Pilot program will enable innovative, non-residential plug-in electric charging solutions through competitive grant funding. The Company is partnering with its customers and communities to test customer-specific solutions, support underserved populations, and gain new insight into market barriers and charging patterns that will inform future system and program planning. Additionally, through its proposed Public Charging Pilot program, the Company will work with local governments to identify locations with a need for, and interest in, visible, publicly available DCFCs.

To reduce the cost of operation of public DCFCs for customers, the Company proposed a new transitional rate to stimulate public EVSE development in its communities.⁶⁰ The proposed rate will address traditional demand charge barriers while maintaining a price signal to encourage efficient use of the electric system.

Simplify the PEV charging experience

Customers new to PEVs and/or EVSE require comprehensive and objective information to make informed decisions about desired equipment features, siting, connection to electrical service and how to find and use public EVSE. Through education and awareness-building campaigns, technical assistance and strategic partnerships, the Company will simplify the experience for customers by serving as a "one-stop shop" for electric transportation information. This includes leveraging existing information and services and developing customized resources when necessary. Through the Public Charging Pilot program, the Company will develop public EVSE that mirrors the convenience, accessibility and reliability of gasoline fueling stations.

Support underserved communities

Electric transportation presents an affordable solution for low and moderate income customers; however, the industry is still working to identify the best solutions to address the barriers for this group of customer. With private investment currently focused on large urban areas and early adopters, Pacific Power has a unique opportunity to support EVSE development in the underserved areas of the state. Some of these areas are also air quality maintenance areas, where low- or zero-emission electric transportation could provide the added environmental benefit of reducing emissions from traditional vehicles. In 2016, Pacific Power was pleased to partner with Hacienda CDC, Drive Oregon, and the City of Portland to test plug-in electric car sharing for income-qualified customers. The Company looks forward to partnering with its customers through the initial pilot programs to continue testing innovative solutions for underserved communities.

⁵⁹ On April 8, 2016, Pacific Power formally announced plans to install a network of 590,000 "smart meters" in Oregon through 2019. AMI will provide a platform for two-way communication between the customer meter and Pacific power, enabling near real-time data collection and demand response capabilities.

⁶⁰ Public Utility Commission of Oregon Advice No. 16-020, Docket No. ADV-485.

Leverage funding and lessons learned from strategic partnerships to inform future planning

On December 22, 2016, the U. S. Department of Energy awarded \$3.9 million to PacifiCorp to accelerate the development and adoption of PEVs. PacifiCorp is leading the project in collaboration with Idaho National Laboratory, the state of Utah, several universities, and regional organizations including Drive Oregon, and the Rogue Valley Clean Cities Coalition. While project funds are primarily targeted at electrifying corridors in Utah, Idaho, and Wyoming, the project includes several aspects that present potential benefits to Pacific Power customers, including:

- Funding for the Rogue Valley Clean Cities Coalition and Drive Oregon to perform outreach and education in Pacific Power territory;
- Developing new tools for utility integration of charging equipment that may inform potential new policies and practices to reduce EVSE cost and time associated with new charger installations; and
- Investigating “smart mobility” through the integrating of electric bus service, electric taxis, e-bikes, car sharing, and crowd sourced commuting service to eliminate the need for personal vehicles within urban areas.

The project presents an exciting opportunity for PacifiCorp to work with a team of strategic partners and leading experts to accelerate transportation electrification and develop resources that can be used across the Company’s six-state service area.

Other potential opportunities to work with organizations promoting transportation electrification include expanding the reach of Drive Oregon’s EV Showcase efforts and coordinating with Volkswagen’s commitments to promote zero emission vehicles and EVSE under the Clean Air Act Civil Settlement.

Phase-in investments and keep an eye on the future

The Company proposes three-year pilot programs to test key program concepts before making larger investments. Given the rapidly changing nature of the electric transportation market, it is critical to test the effectiveness of different means of addressing barriers while minimizing the risk of stranded investments to customers. The proposed Demonstration and Development Pilot will support innovative transportation electrification projects in Pacific Power’s service area. In addition, the Company will look for opportunities to test advanced technologies to minimize grid impacts and “future-proof” locations by ensuring locations can accommodate higher-powered chargers and new technologies as they become available.

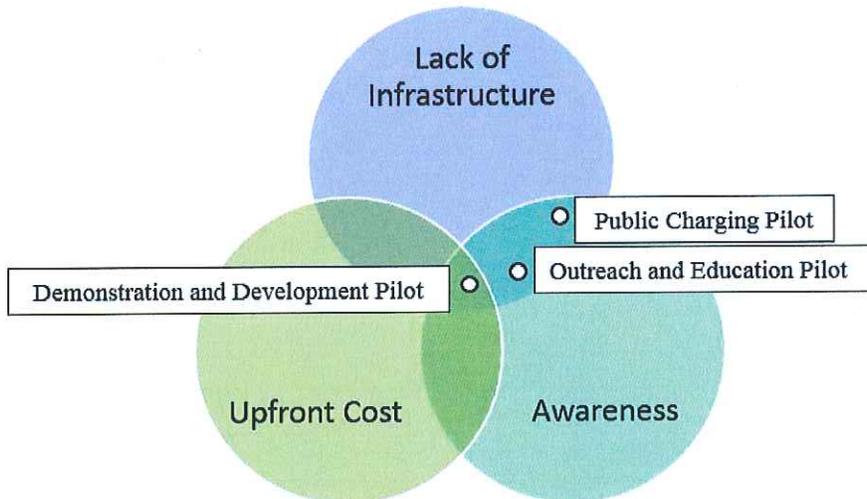
INITIAL PILOT PROGRAMS

Pacific Power developed its initial proposed pilot programs based on stakeholder input, market research, key market barriers and the guiding principles described above. These initial pilot programs represent an estimated investment of \$4.6 million over three years, designed to test different market intervention strategies and gather experience and data that can be used for future system and program planning.

Pacific Power is one of many actors working to address these barriers in Oregon, including electric companies, state and local policy makers, environmental advocates, vehicle manufacturers, charging service providers, and other organizations. The proposed pilot programs are designed to complement and enhance the efforts of other market actors, including those discussed in the Stakeholder Engagement section of this document.

The initial proposed pilot programs are summarized briefly below and described in detail in Chapters 3 – 5 of this application, including how they align with the transportation electrification rules developed through AR 599. Figure 15 provides a graphical representation of how the three proposed pilot programs are expected to complement each other to address major market barriers to transportation electrification.

Figure 15. Pacific Power Initial Transportation Electrification Strategy



Public Charging Pilot (Chapter 3)

Three-Year Budget: \$1.9 million

Pacific Power will test utility EVSE ownership by installing, owning and operating a limited set of publicly accessible charging “pods” in its Oregon service area. The Company expects to focus on site, equipment, and service provider selection in 2017; installation is expected to begin in 2018.

Outreach and Education Pilot (Chapter 4)

Three-Year Budget: \$1.1 million

Pacific Power will capitalize on its position as a trusted advisor to customers to test a diverse set of tactics and messages that increase exposure and access to reliable information about electric transportation options and benefits. Program elements include:

- Customer Communications
- Self-service Resources
- Community Events
- Technical Assistance

Demonstration and Development Pilot (Chapter 5)

Three-Year Budget: \$1.7 million

Through a competitive grant funding process, Pacific Power will help non-residential customers develop creative, community-driven EVSE projects in its Oregon service area.

COSTS-EFFECTIVENESS OF INVESTMENTS IN TRANSPORTATION ELECTRIFICATION

Given the new role for the Company proposed in this application and the uncertainty around the impact the proposed pilots may have on the electric transportation market, prospective cost-effectiveness analysis was not performed for the proposed pilots. However, as assessment of pilot costs and benefits will be part of pilot evaluation efforts, and will inform future program planning and transportation electrification strategy, the Company presents its proposed framework for cost-effectiveness analysis below.

Categories of Demand-Side Management

The California Standard Practice Manual (Standard Practice Manual), originally published in 1983, and most recently updated in 2002 established a standard framework for assessing the cost-effectiveness of demand-side management (DSM) programs from a variety of stakeholder perspectives.⁶¹ Although developed in California, the perspectives and methodologies established in this document have become the industry standard for assessing DSM programs across the nation. The Standard Practice Manual establishes the following categories of DSM programs:

- **Conservation** programs reduce electricity and/or natural gas consumption during all or significant portions of the year. ‘Conservation’ in this context includes all ‘energy efficiency improvements’. An energy efficiency improvement can be defined as reduced energy use for a comparable level of service, resulting from the installation of an energy efficiency measure or the adoption of an energy efficiency practice.
- **Load Management** programs may either reduce electricity peak demand or shift demand from on peak to non-peak periods.
- **Fuel Substitution** programs increase annual consumption of either electricity or natural gas relative to what would have happened in the absence of the program by inducing the choice of one fuel over another.
- **Load Building** programs increase annual consumption of either electricity or natural gas relative to what would have happened in the absence of the program by increasing sales of electricity, gas, or electricity and gas.
- **Self-Generation** refers to distributed generation (DG) installed on the customer’s side of the electric utility meter, which serves some or all of the customer's electric load, that

⁶¹ State of California, *California Standard Practice Manual: Economic Analysis Of Demand-Side Programs And Projects*, (Jul. 2002), http://www.calmac.org/events/spm_9_20_02.pdf (last visited Apr. 11, 2017) (Hereafter Standard Practice Manual).

otherwise would have been provided by the central electric grid. In some cases, self-generation products are applied in a combined heat and power manner, in which case the heat produced by the self-generation product is used on site to provide some or all of the customer's thermal needs.

Standard Cost-Effectiveness Tests

The Standard Practice Manual establishes five standard tests for assessing demand-side management programs, as summarized below:

Table 4. Overview of Standard Cost-Effectiveness Tests

Perspective	Measurement
Participant Cost Test (PCT)	Quantifiable benefits and costs to the customer due to participation in a program.
Ratepayer Impact Measure (RIM)	What happens to customer bills or rates due to changes in utility revenues and operating costs caused by the program?
Total Resource Cost Test (TRC)	The net costs of a demand-side management program as a resource option based on the total costs of the program, including both the participants' and the utility's costs.
Societal Cost Test (SCT)	A variant of the TRC test that includes the effects of externalities (e.g., environmental, national security), excludes tax credit benefits and uses a different (societal) discount rate.
Program Administrator Cost Test (PACT)	The net costs of a demand-side management program as a resource option based on the costs incurred by the program administrator (including incentive costs) and excluding any net costs incurred by the participant.

The categorization of programs is critical to determining the appropriate means of assessing their cost-effectiveness. While transportation electrification requires substituting one transportation fuel for another, within the context of the energy sector, these programs may be viewed as load building, as transportation electrification will increase use of electricity without a corresponding decrease in consumption elsewhere in the energy sector. However, a program should not automatically be considered load building if it focuses on components of electric transportation. For example, a program encouraging customers to install efficient Level 2 EVSE instead of baseline equipment may appropriately be considered a conservation program, as it will save electricity relative to what would have otherwise occurred. Similarly, a program to directly control the timing of EVSE operation may appropriately be considered load management. In short, the primary objectives of a given program focusing on components of electric transportation should be considered when assessing cost-effectiveness.

In Oregon, the Total Resource Cost (TRC) test is the primary criterion for assessing the cost-effectiveness of conservation programs, including in the Company's Integrated Resource Plan, allowing the cost of energy efficiency to be compared directly with supply-side alternatives. For load building programs however, the Standard Practice Manual indicates:

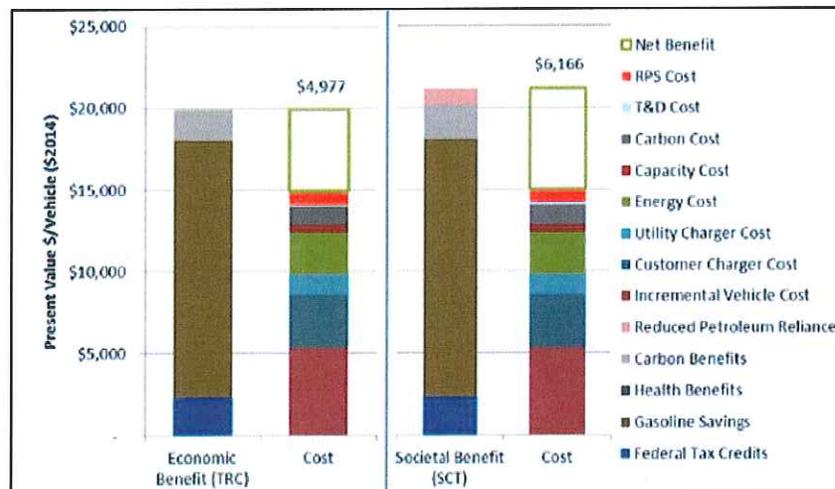
For load building programs, *only the RIM tests are expected to be applied*. The Total Resource Cost and Program Administrator Cost tests are intended to

identify cost-effectiveness relative to other resource options. It is inappropriate to consider increased load as an alternative to other supply options.⁶²

The quote above highlights that the question for load building programs is not whether they are less costly than alternative resource options, but rather, whether the benefits of the new load will be larger than the costs to encourage and serve that new load. As the TRC, SCT and PACT (also known as the Utility Cost Test) are all designed to compare DSM programs that reduce load against supply-side alternatives, they are less applicable to some transportation electrification programs.

Figure 16, presenting estimated TRC and societal benefits and costs from transportation electrification from analysis performed by ICF and Energy+Environmental Economics for the California Electric Transportation Coalition (CaETC),⁶³ illustrates an additional inherent issue with applying the TRC test to utility investment in transportation electrification. The TRC is designed to measure benefits to the electric utility and its customers from demand-side management programs, however, as shown in the figure, the primary benefit of transportation electrification from these perspectives is gasoline savings, which accrues only to program participants, not to all customers. The same holds true for the societal test, as shown in the figure.

Figure 16. California Regional Monetized and Societal Benefits



While educating customers on the benefits of electric transportation is a primary component of the Company's transportation electrification strategy, the PCT also has limitations in assessing utility investment in transportation electrification. The PCT only investigates whether customers who take advantage of programs are better off financially than if they had not participated in the program, but does not assess whether it is appropriate for non-participating customers to pay for benefits that accrue to others.

For the reasons above, when considering the standard DSM tests, the RIM test is the most applicable test for assessing load building programs, including programs designed to accelerate transportation electrification. However, if a program's focus is to improve the electrical efficiency

⁶² *Id.* at 6 (emphasis added).

⁶³ Energy+Environmental Economics, *California Transportation Electrification Assessment Phase 2: Grid Impacts*, Figure 1, p. 16 (Oct. 2014), http://www.caetec.com/wp-content/uploads/2016/08/CaETC_TEA_Phase_2_Final_10-23-14.pdf (last visited March 1, 2017).

of EVSE, for example, the program should use established processes for assessing energy efficiency programs. As the programs proposed by the Company in this application likely fall in the category of load building, the following sections focuses on how to apply the RIM test to investments in transportation electrification.

Benefits and Costs of Transportation Electrification Programs

For benefits, the Standard Practice Manual specifies:

The benefits calculated in the RIM test are the savings from avoided supply costs. These avoided costs include the reduction in transmission, distribution, generation and capacity costs for periods when load has been reduced and the increase in revenues for any periods in which load has been increased. The avoided supply costs are a reduction in total costs or revenue requirements and are included for both fuels for a fuel substitution program.⁶⁴

In the case of transportation electrification load building programs, there are no periods when load has been reduced, and thus, no avoided supply costs. Hence, the benefits are the increase in revenues for any periods in which load has been increased. This increased revenue is a benefit to customers because a utility's fixed costs can be spread over more kilowatt-hours, reducing the fixed cost recovered per kilowatt-hour. That is, load building can put downward pressure on rates if significant investment is not required to serve these new loads. This increased revenue would include both retail revenue from operators of EVSE and revenue from drivers for use of Company-owned EVSE. Additionally, any tax credits the Company receives from investments in the program should be considered a benefits, as these will be passed on to customers.

For costs, the Standard Practice Manual specifies:

The costs for this test are the program costs incurred by the utility, *and/or other entities incurring costs and creating or administering the program*, the incentives paid to the participant, decreased revenues for any periods in which load has been decreased and increased supply costs for any periods when load has been increased. The utility program costs include initial and annual costs, such as the cost of equipment, operation and maintenance, installation, program administration, and customer dropout and removal of equipment (less salvage value).⁶⁵

Accordingly, the costs of transportation electrification programs would include increased supply costs to serve new load (including any required upgrades to the distribution system) and any costs borne by the utility (or other program administrator) in implementing the program, including incentives to participants, capital expenditures, operations and maintenance, and administrative costs. Costs borne by program participants are excluded because they have no impact on the utility's ratepayers.

The pilot programs proposed in this application are designed to target known barriers to transportation electrification, test the Company's ability to move the market and acquire data that can be used for future system and program planning. Given the pilot nature of these programs and the uncertainty around program participation and utilization, the Company has not attempted to

⁶⁴ Standard Practice Manual at 13.

⁶⁵ *Id.*

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quantify benefits and costs at this time, aside from program-specific budgets presented later in this document.

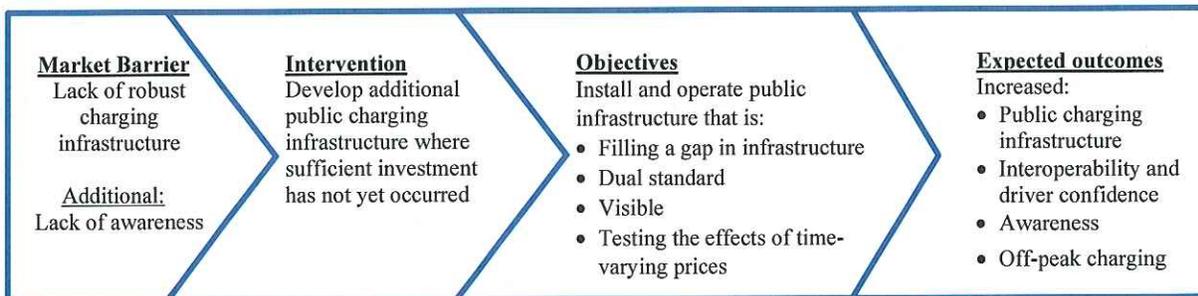
Chapter 3: Public Charging Pilot

PROGRAM DESCRIPTION: OAR 860-087-0030 (1) (A)

A robust network of publicly accessible EVSE is shown to help enable long range travel, increase access to those without home charging capability and increase the likelihood that a consumer will consider PEVs on par with or better than gasoline-fueled vehicles.⁶⁶ However, there is currently a dearth of publicly available DCFCs in Pacific Power’s Oregon service. Moreover, most of the fast charging stations that do exist limit consumer accessibility with fragmented charging standards and a lack of multiple charging ports. As investment in publicly available DCFCs has been slow to develop in the Company’s service area, particularly outside highway corridors and Portland, the Company proposes to increase availability through this pilot program.

Through the Public Charging Pilot, Pacific Power proposes to own a limited number of publicly available charging sites in its Oregon service area. Equipment will be available for use by any driver, regardless of whether they otherwise receive electric service from Pacific Power. Between 2017 and 2019, the company expects to construct up to seven charging “pods” with configurations similar to Portland General Electric’s Electric Avenue.⁶⁷ Each pod’s configuration will be tailored to the site’s facilities, available space and anticipated utilization; however, pods will consistently feature multiple adjacent dual-standard DCFC, at least one level 2 port⁶⁸ and visible signage. The Company will first identify suitable sites in the public right-of-way (e.g., curbside) to enhance visibility and convenience for drivers and to establish partnerships with local governments. If suitable locations cannot be identified, the Company will investigate opportunities to site equipment on its own property. Agreements to site pods on publicly accessible non-residential customer property will be considered if suitable public or Company-owned sites are unavailable.

Figure 17. Public Charging Pilot Program Theory



⁶⁶ NREL Study at 27.

⁶⁷ In July 2015, Portland General Electric launched the current iteration of Electric Avenue, six charging stations clustered curbside in the right-of way in downtown Portland, Oregon. <https://www.portlandgeneral.com/our-company/news-room/news-releases/2015/07-28-2015-electric-avenue-opens-at-pge-headquarters-in-downtown-portland>

⁶⁸ While the primary focus of these pods is fast charging, not all plug-in electric vehicles are capable of using DCFCs. Including Level 2 charging equipment broadens the set of customers who can use this equipment.

Purpose

The Public Charging Pilot will test a proactive approach to increase public dual-standard DCFC availability in Pacific Power’s Oregon service area and will generate valuable charging and utilization data that will inform future program development and system planning. Company-owned charging pods will create a visible, reliable, simplified driver experience that resembles a conventional gasoline filling station (i.e., convenient locations, universal vehicle access, multiple ports, quick fill-up time and ease of payment). Additionally, pricing structures will educate drivers on the importance of off-peak charging.

The Company has also proposed a Demonstration and Development Pilot program to test a grant funding model to encourage customer- and community-led EVSE development and a new transitional rate to reduce the cost of public DCFC operation. These combined efforts will stimulate additional public EVSE development and PEV adoption in underserved areas and to inform Pacific Power’s future role in the transportation electrification market.

Program elements, objectives, timeline, and expected outcomes: OAR 860-087-0030 (1) (a) (A)

Program Elements

Site Selection

To increase visibility and convenience for customers, the Company plans to prioritize siting charging pods in the public right-of-way, preferably curbside. Because of existing franchise agreements with local governments, Pacific Power may be well-positioned to offer this service to its communities. Interested local governments will be asked to identify sites with adequate parking that can be converted to electric vehicle-only spots. Preference will be given to sites providing Pacific Power a donated or low cost easement and/or funding to offset the cost to Pacific Power’s customers.

If suitable locations on public property cannot be identified, the Company will look for opportunities to site charging pods on its own property for ease of permitting and assurance of long-term project viability. Preliminary analysis indicates that the majority of Pacific Power properties are remote and/or secure sites, meaning accessible, convenient and visible properties are limited in Oregon. Pros and cons of siting pods in these two types of locations are summarized in Table 5. If the Company is unable to identify suitable locations at public or Company-owned locations, the Company will investigate opportunities to site charging pods on non-residential customers’ property.

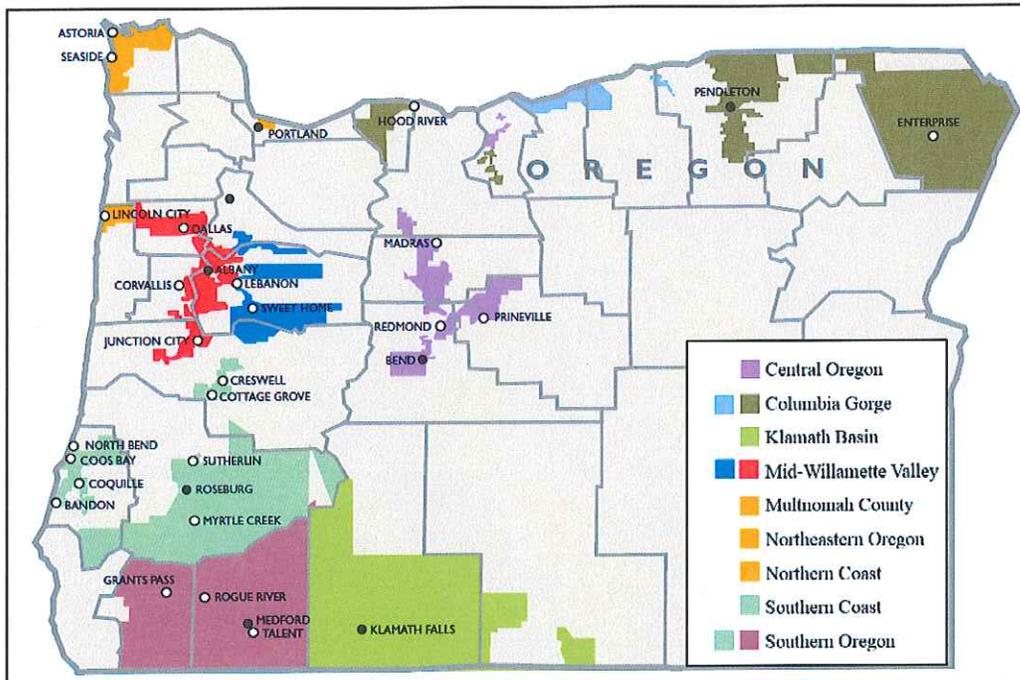
Table 5. Public Charging Pod Site Considerations

Location	Pros	Cons
Company property	<ul style="list-style-type: none"> • No additional real estate cost • No easement required • Faster development timeline • Assurance of long-term access 	<ul style="list-style-type: none"> • Location may not be visible/convenient • Limit access due to secure facilities (e.g., gates, badge required)
Public right-of-way	<ul style="list-style-type: none"> • Possibility of donated real estate • More visible 	<ul style="list-style-type: none"> • Requires easement

	<ul style="list-style-type: none"> • More convenient and accessible (e.g., curbside downtown) • Fosters community involvement 	<ul style="list-style-type: none"> • Uncertain access to necessary electrical service • May reduce parking spaces
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For community engagement purposes, Pacific Power divides its Oregon service area into nine regions (see Figure 18). The Company will attempt to site charging pods in as many regions as possible, but site selection will ultimately depend on factors such as enthusiasm of public partners and availability of suitable property.

Figure 18. Pacific Power Customer Engagement Regions



Once an initial list of potential locations is compiled, the Company will evaluate potential sites on a series of criteria intended to minimize costs, maximize benefits, and complement existing public charging stations (see Table 6). Pacific Power intends to site charging pods in locations that optimize driver use, visibility and cost; however, the Company anticipates diversity among site types and configurations (e.g., in commercial centers, along commuting corridors, near multifamily housing, etc.). Differences in site locations and equipment configuration will allow the Company to better understand best practices for siting based on the desired outcome (e.g., maximum utilization, maximum visibility, filling gaps in long-range corridors, etc.).

Table 6. Charging Pod Site Selection Considerations

Criteria	Considerations
Convenience and anticipated use	<p>Expected utilization and accessibility are primary considerations. Site selection criteria will identify locations most likely to meet driver needs and increase public perception that electric vehicle charging is convenient and reliable. Evaluation for convenience and anticipated use will include:</p> <ul style="list-style-type: none"> • Ease of public access (e.g., no gates, parking all hours)

	<ul style="list-style-type: none"> • Ability to dedicate parking space for charging vehicles • Proximity to major travel corridors • Ability to serve multifamily housing residents • Proximity to local attractions or amenities attractive to drivers waiting for charging to complete (e.g., shopping, coffee, parks or scenic areas) • Proximity to existing public EVSE⁶⁹
Visibility	<p>The INL Study suggests that locating DCFC in “an obvious publicly accessible venue” is a shared trait among the most used EVSE.⁷⁰ To ensure charging pods are likely to be used and increase awareness, Pacific Power will select sites that maximize visibility, based on the following criteria:</p> <ul style="list-style-type: none"> • Physical visibility of charging pods, whether along the highway or from the road or sidewalk in town. • Site traffic, drivers are likely to want to stop at the location. • Opportunities for signage and branding
Availability of necessary electrical service	<p>DCFCs typically requires access to three-phase power. Pods will feature multiple DCFCs, with capacities at or above 50 kW each. To minimize system upgrade costs and system impacts, site evaluation will consider:</p> <ul style="list-style-type: none"> • Existing access to three-phase power and/or cost to run three-phase power to site • Ability of existing electrical infrastructure to meet needs and/or cost of required site upgrades, such as transformer upgrades
Future-proofing	<p>As stated in Chapter 1, PEV battery size and charging speed continue to increase, requiring greater system capacity.⁷¹ As transportation electrification continues, demand for ports at public charging may increase, as well. To account for future needs, evaluation will consider sites’:</p> <ul style="list-style-type: none"> • Ability to accommodate higher power chargers (i.e., 100 – 300 kW per charger) • Space and capacity to add additional charging ports if demand increases
Permitting	<p>For public property, Pacific Power will consider the ease and cost of permitting and securing easements.</p>

Equipment and Service Provider Selection

In August 2016, Pacific Power issued a Request for Information (RFI), to gather information on equipment options and indicative pricing for EVSE and network services. The Company received only four responses among thirty-six vendors invited to participate. Accordingly, the proposed

⁶⁹ Given the limited number of pods proposed, the Company intends to focus on locations that are not near existing public DCFC stations. However, popular existing charging locations without sufficient number or dual-standard ports may also be suitable locations for Company-owned charging pods.

⁷⁰ INL Study at 11-14.

⁷¹ A typical DCFC requires 50 kW capacity; however, some stations are being constructed to handle 100 – 350 kW.

budget was based on limited information provided in response to the RFI and high-level industry estimates.

In 2017, Pacific Power will issue a request for proposals (RFP) to competitively select a provider for the following services:⁷²

- Charging equipment
- Network services
- Site design
- Installation
- Maintenance services

Pacific Power’s preference is to select a single vendor offering turnkey services for pod design, installation, equipment and maintenance for up to seven pods, but bidders will be allowed to bid on individual components if they so choose. The Company will encourage bidders to coordinate responses if appropriate (i.e., a network service provider and EVSE provider may choose to coordinate to present one turnkey proposal). As the pilot represents Pacific Power’s initial investment in public EVSE, the Company will look for bidders to leverage experience, lessons learned, and best practices in site identification, equipment configuration and station design. To allow for an apples-to-apples comparison between proposals, the RFP will ask bidders to provide information and pricing based on the following typical site configuration:

- Four DCFC chargers with dual-standard ports
- One level 2 charger with one or two ports
- Clustered or adjacent configuration
- Ability to collect and transmit utilization data
- Ability to set station pricing to align with the structure of the illustrative tariff included as Exhibit PAC/201 to the testimony of Mr. Robert M. Meredith.
- Driver payment methods accepted
- Whether a network membership will be required, and if so, how the bidder will address interoperability with other networks

Evaluation will focus on the criteria described in Table 7.

Table 7. Equipment and Service Provider Evaluation Criteria

Criteria	Considerations
Pod Design	Bidders will provide details on equipment model(s), configurations, communication protocols and payment options. In addition, the RFP will ask bidders to address mechanisms to simplify the driver’s experience, including payment methods and interoperability to allow vehicle types to access the equipment and all drivers to use the network.
Cost	Bidders will provide upfront and ongoing costs to install and operate the proposed pod concept.
Deployment Plan	Bidders will provide a detailed strategy and timeline to design and install the pod concept.

⁷² Timing is indicative and may change subject to application approval process.

Equipment Specifications	Bidders will be evaluated based on features and capability of equipment, along with the warranties offered.
Maintenance Plan	Pacific Power will evaluate proposals based on the robustness of maintenance protocols, the ability to serve pods across the Company's Oregon service area and whether maintenance will engage local providers, which is expected to increase local benefits.
Visibility	Bidders will describe the signage type and placement, branding and other visibility opportunities.
Data	Pacific Power will evaluate data collection and reporting capabilities including mechanism to track and communicate utilization, reliability and revenues in real time.
Future Proofing	Bidders will recommend strategies to protect against stranded assets and account for market evolution, such as higher powered EVSE and longer-range travel. This may include designing pods with additional space for future chargers, installing higher-powered chargers or equipment that can be upgraded without replacement as the market evolves (e.g., modular) and/or transformer capacity and conduit that allow for projected 150 – 350 kW charging or greater.

In addition to the standard pod concept described above, RFP respondents will be required to answer the following questions:

- How does the proposal solution minimize the risk of stranded investment for the Company and its customers?
- Does equipment use open or proprietary communication protocols? The Company's preference is to select equipment and network services that use open communication protocols to minimize the risk of stranded investments, but will not make this a requirement for participation in the RFP.
- How could the concept be modified to include energy storage or renewable generation?

Bidders will be asked to demonstrate their qualifications in the following areas:

- Experience performing the requested services,
- Experience partnering with electric utilities and local governments on EVSE deployments,
- Financial strength and anticipated longevity as a service provider (i.e., assurance the provider will not go out of business.)
- Knowledge of Pacific Power's Oregon service territory.

The vendor will help the Company select locations from the potential site list and finalize individual pod designs once locations have been selected. Pod designs may vary by site based on available space, expected utilization, parking space configuration (e.g., linear, diagonal, clustered). If possible based on cost and other considerations, some sites may feature advanced technologies such as energy storage or renewable generation to allow the Company to experiment with means of managing power draw during peak periods in advance of higher-powered charging.

Program Objectives and Expected Outcomes

Pacific Power's objective for the Public Charging Pilot is to test the ability of utility-owned charging pod development to overcome barriers to transportation electrification. In addition, the

Company expects to gather data about charging patterns and increase awareness of electric transportation in its Oregon service area. Market barriers, intervention strategies and objectives are described below and summarized in Table 8.

Market Barrier: Lack of Public EVSE

The Public Charging Pilot will directly address barriers to widespread transportation electrification created by the public charging landscape in its Oregon service area. As discussed in Chapter 1, a robust network of public EVSE helps enable long range travel, increase access to those without home charging capability and improves the likelihood that a consumer will consider PEVs on par with or better than gasoline-fueled vehicles. The majority of investment in public DCFCs to date in Pacific Power's service area has been limited to Portland and major corridors. Moreover, most of the fast charging stations that do exist limit consumer accessibility with fragmented charging standards and a lack of multi charging ports. In addition, stakeholder engagement identified poorly maintained equipment as a barrier to driver confidence.⁷³ In conjunction with the Company's proposed Public DC Fast Charger Optional Transitional Rate and Demonstration and Development pilot, the Public Charging Pilot will increase availability of visible, reliable and accessible public DCFCs in the Company's service area.

By increasing publicly accessible, dual-standard DCFCs and directly overseeing charging pod maintenance, Pacific Power expects to improve driver confidence that charging will be available when needed and increase access for drivers unable to charge at their residence or workplace. The Public Charging Pilot envisions a role for Pacific Power in spurring EVSE development, but, in conjunction with the other initiatives mentioned above, will also inform whether there is a continuing role for the Company in ensuring public EVSE is available in its Oregon communities beyond the initial proposed investment.

Market Barrier: Lack of Awareness of Electric Transportation Options and Benefits

A secondary objective of this program is to increase awareness of transportation electrification in Pacific Power's Oregon service area by developing charging pods in visible locations (e.g., curbside downtown) where drivers spend time. Visibility will be a significant consideration in the site selection process and signage and branding opportunities will factor into vendor selection.

In addition, the Company will attempt to identify opportunities to incorporate advanced technologies, such as energy storage and renewable generation. Enabling development of more projects that can demonstrate these emerging capabilities is expected to enhance the awareness-building opportunity presented by charging pods.

Additional Objectives and Outcomes

Other program objectives addressed by pod design, vendor selection criteria and driver pricing principles include:

- Learning about driver usage patterns and sensitivity to price signals;
- Establishing driver pricing that stimulates competition and encourages off-peak charging; and

⁷³ Jeff Allen, *Expanding the Fast Charging Network*, (Jun. 2016), <http://driveoregon.org/wp-content/uploads/2016/08/Drive-Oregon-DCFC-Paper-EVS29-June-2016.pdf> (last visited Apr. 11, 2017).

- Testing advanced technologies to mitigate potential adverse electrical grid impacts of fast charging pods in advance of higher-powered charging.

Program Timeline

As described in Table 7, equipment and service provider bidders will propose detailed deployment timelines. Pacific Power expects to issue the equipment and service provider RFP near the end of the second quarter of 2017.⁷⁴ Pacific Power expects to select a vendor(s), understand detailed timelines and identify at least the first pod location by the fourth quarter of 2017, subject to the application approval and RFP processes. The Company expects that construction on the first charging pod will begin by the first quarter of 2018 with a total of three pods installed in 2018, and an additional four pods installed in 2019. The Company expects to conclude program evaluation and, if recommended, file program extension or revisions in the third quarter of 2019.

While dependent on location and configuration, INL research indicates DCFC installation requires roughly 30 – 60 days from the agreement to proceed when “things go smoothly” and over 90 days with “delays in administration and materials.”⁷⁵

Phased Approach

Pacific Power is entering a new and evolving market with the proposed Public Charging Pilot. Electric companies, third party charging companies, governments and other market actors working to develop public EVSE continue to encounter unexpected challenges, identify new solutions and expand best practices. Pacific Power proposes a phased roll out to capitalize on the lessons learned through pod deployment. While the Company plans to leverage the selected vendor’s experience and the experience of other utilities to mitigate implementation risks, Pacific Power recognizes that first-hand experience will be invaluable to successful charging pod deployment and expects to develop its own best practices for site selection, pod design and implementation over the course of the pilot. The phased approach is consistent with other utility EVSE development projects as illustrated by the following examples:

- **Georgia Power:** In 2014, Georgia Power Company (Georgia Power) announced its “Get Current” initiative to install and operate a network of fifty public “charging islands” throughout the state by the end of 2016.⁷⁶ The first eleven islands launched simultaneously on October 1, 2015.⁷⁷ As of March 2017, additional islands were phased in totaling 36 installations.⁷⁸
- **Avista Corporation (Avista):** On April 28, 2016, Avista received approval of Electric Vehicle Supply Equipment Pilot Program in Washington, including the installation of seven public DCFC stations in its Washington service area over a two year period. Avista estimated two installations in its first year and five in its second year. As of February 1, 2017, the company

⁷⁴ All project timelines are subject to change as required by the program application approval timeline.

⁷⁵ Jim Francfort, *PEV Non-Residential Charging Infrastructure Lessons Learned*, p. 25 (Nov. 2015), https://cleancities.energy.gov/files/u/news_events/document/document_url/89/11-04-15_pev_lessons_learned.pdf (last visited Apr. 11, 2017).

⁷⁶ Urvaksh Karkaria, *Georgia Power motors into transportation fuel business with \$12M pilot*, (Oct. 2014), <http://www.bizjournals.com/atlanta/blog/atlantech/2014/10/georgia-power-to-invest-12m-in-driving-electric.html?r=full> (last visited Apr. 11, 2017).

⁷⁷ <https://www.georgiapower.com/docs/about-us/news/2015-09/EVcharging.pdf> (last visited Apr. 11, 2017).

⁷⁸ <https://www.georgiapower.com/about-energy/electric-vehicles/charging-locations.cshtml> (last visited Mar. 1, 2017).

completed one DCFC installation, estimating its next two sites to complete by Q2 2017. One additional site is expected to complete in 2017, with one remaining site expected in 2018 and two to be designed as the Company gathers more information and lessons learned.

The phased approach allows the Company to adjust to conditions as they occur, including optimizing interfacing opportunities with the Company's advanced metering infrastructure program.⁷⁹ In addition to risks, a phased roll out allows Pacific Power to gather more information about the types of sites and configurations that attract the most drivers. The following examples illustrate the types of challenges that Pacific Power may be able to identify and address through staged pod deployment:

- **Driver behavior:** A key strategist in the development of Portland's Electric Avenue reported that more drivers than expected charge for a brief period; enough to enable 30 to 50 miles but not to completely fill up.⁸⁰ The length of observed charging sessions at initial stations may inform the number of chargers required to meet driver demand at future stations.
- **Interoperability:** Between 2011 and 2015, the West Coast Electric Highway (WCEH) deployed public EVSE at retail sites every 35-50 miles along the Oregon and Washington stretches of I-5 and several "Eco Tourist" corridors.⁸¹ When the WCEH contracted for equipment, CHAdeMO was the only available fast charging standard.⁸² As competing standards entered the market, the WCEH was limited in its ability to serve drivers. A phased deployment, along with efforts to future-proof pods, may allow Pacific Power to accommodate technology changes that may arise during the pilot period.
- **Permitting and code compliance:** In 2016, the state of California adopted changes to building code 11B, creating state provisions for EVSE accessibility for persons with disabilities.⁸³ Phased pod deployment would allow Pacific Power to account for design, cost and timeline changes resulting from permitting and code changes, as well as differences in local requirements between site locations.

Market baseline assumptions: OAR 860-087-0030 (1) (a) (B)

As described in Chapter 1, Pacific Power's service area is characterized by low adoption of electric transportation, low likelihood to consider a PEV in the next five years and limited access to publicly available EVSE. Per Table 8 below, Pacific Power proposes the Public Charging Pilot to test this model's ability to affect current market baselines by increasing the availability of EVSE in Pacific Power's service area.

⁷⁹ Pacific Power will be deploying smart meters in its Oregon service area in 2018 and 2019.

⁸⁰ Justin Gerdes, *10 EV Charging Lessons Learned From Portland's Electric Avenue*, (Mar. 2012), <https://www.forbes.com/sites/justingerdes/2012/03/27/10-ev-charging-lessons-learned-from-portlands-electric-avenue/#3472d2845e09> (last visited Apr. 11, 2017).

⁸¹ For additional information on the West Coast Electric Highway, visit <http://www.westcoastgreenhighway.com/electrichighways.htm> (last visited Apr. 11, 2017).

⁸² Oana Leahu-Aluas, Nick Nigro, Dave Roberts, et. al., *EV Infrastructure Corridor Development Workshop: Lessons Learned from the West Coast Experience* p. 20 (Jul. 2015), http://altfueltoolkit.org/wp-content/uploads/2015/09/Portland_EV_Workshop_Summary_Report.pdf, (last visited Apr. 11, 2017).

⁸³ <http://www.dgs.ca.gov/dsa/Programs/progAccess/accessmanual> (last visited Apr. 11, 2017).

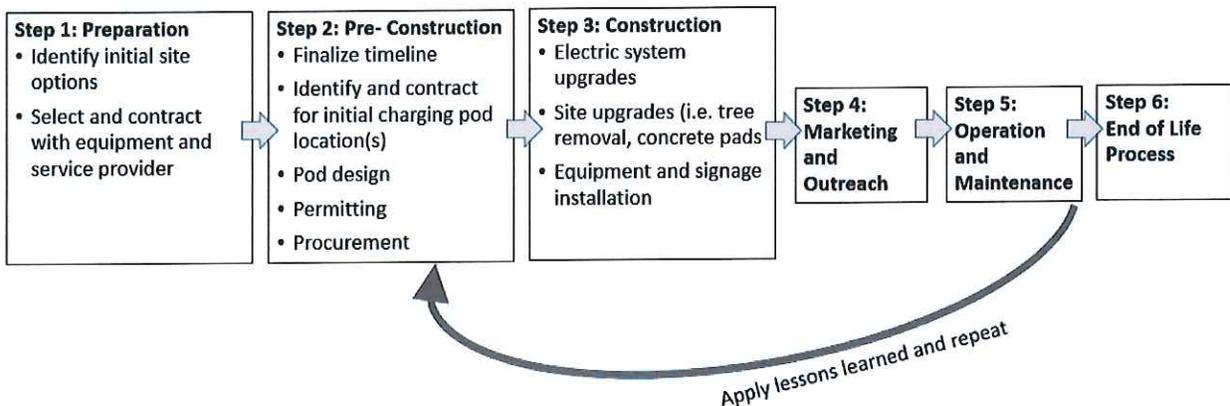
Table 8. Public Charging Pilot Program Model

	Barriers	Objectives	Program elements	Measures	Expected outcomes
EVSE	Lack of private investment in public EVSE in Pacific Power’s service area, particularly DCFC	Increasing development of EVSE in Pacific Power’s service area, where sufficient investment from other entities has not yet occurred	<ul style="list-style-type: none"> • Install and operate public charging pods featuring DCFC • Site selection criteria that considers whether location fills gaps in access to public charging 	<ul style="list-style-type: none"> • Number of pods with DCFC installed during pilot period • Utilization rates • Typical charge times and kWh usage • Revenue generated 	<ul style="list-style-type: none"> • Increased publicly available EVSE in Pacific Power’s service area • Pods that are used • Understand cost-effectiveness of Pacific Power ownership model
	Low driver confidence in reliable access to charging	Increase driver confidence in availability of public charging that meets driver’s needs	<ul style="list-style-type: none"> • Install and operate public charging pods in Pacific Power communities • Use dual standard connectors equipment • Include multiple chargers • Ensure high levels of equipment up-time 	<ul style="list-style-type: none"> • Number of Pacific Power charging “pods” featuring dual standard connectors • Percent of time station was functioning properly • Driver feedback about convenience and access 	<ul style="list-style-type: none"> • Increased public EVSE with dual standard connectors • Increased reliability of EVSE • Positive driver feedback about convenience and reliability of Pacific Power charging pods
	High-powered chargers’ impacts on the electrical grid during peak periods	Mitigate the impacts of DCFC on the electrical grid, including increased EVSE investment	<ul style="list-style-type: none"> • Station pricing that encourages usage during off-peak periods • Opportunities to integrate energy storage or on-site generation 	<ul style="list-style-type: none"> • Usage patterns relative to stations without time-varying pricing • Ability of on-site energy storage or renewable generation to reduce demand during peak periods 	<ul style="list-style-type: none"> • Messaging to customers about the importance of off-peak charging • Reduced utilization during on-peak periods • Experience with on-site energy storage and generation
Awarene	Low awareness of electric transportation	Increase exposure to electric transportation technology in Pacific Power communities	<ul style="list-style-type: none"> • Signage and/or other visibility measures are required for pods • Site selection criteria considers visibility 	<ul style="list-style-type: none"> • Number and location of pods • Estimated reach of communications and signage 	<ul style="list-style-type: none"> • Increased visible EVSE and signage in Pacific Power’s service area • Messaging to customers about the importance of off-peak charging

Major performance milestones: OAR 860-087-0030 (1) (a) (C)

Figure 19 provides an overview of the anticipated pilot milestones. RFP respondents and selected vendor(s) will develop detailed timelines and major performance milestones specific to the pod concept.

Figure 19. Proposed Public Charging Pilot Implementation Process



Where applicable, a description of program phases, including a proposal for when each subsequent program phase will be submitted for commission review: OAR 860-087-0030 (1) (a) (D)

The Public Charging Pilot for 2017-2019 represents the first phase of Pacific Power’s ownership of public EVSE. During the pilot period, the Company will engage a third-party consultant to evaluate the effectiveness of the pilot, including estimating benefits to ratepayers. Based on program evaluation results, the Company may request an expansion of the program in 2019. To the extent possible and consistent with any necessary regulatory approvals, Pacific Power will continue to operate pilot public charging pods for at least the depreciable life of the equipment.

Expected utilization, participation eligibility, and any incentive structure: OAR 860-087-0030 (1) (a) (E)

Utilization

Equipment utilization (the number of charging events in a given time period) can vary greatly based on location, price structure and local PEV adoption levels. Collecting utilization data and attempting to better understand what drives utilization of public EVSE is an objective of the proposed Public Charging Pilot; however, is not the primary measure of pilot success. As mentioned previously, robust public charging is associated with many benefits, including enabling long range travel, increasing driver confidence, reducing range anxiety and increasing awareness of electric transportation. While utilization is important to track and understand, these benefits can be achieved even at lower utilization levels.

The following examples illustrate the variation and industry understanding of expected in utilization.

- **West Coast Electric Highway:** Based on data provided by the Oregon Department of Transportation, utilization levels for DCFC along the West Coast Electric Highway ranged from 2 charging events per month to 118 events per month between August 1, 2015, and

July 31, 2016. Some West Coast Electric Highway charging equipment is in less-visited locations by design to provide a charging option at regular intervals along major corridors.

- **EV Project:** Idaho National Laboratory's analysis of five PEV demonstration projects funded under ARRA assessed public EVSE and found:
 - Public DCFCs were used much more frequently than most public AC Level 2 EVSE;
 - The median use frequency of public DCFCs was 7.2 events per week, based on averaging each DCFC's use over the course of the entire EV Project with one site averaging 70 events per week;
 - The most highly used DCFCs tended to be located close to interstate highway exits;
 - Highly used individual public charging sites were found in most studied regions, indicating that public charging station utilization is dependent on local factors; and
 - More research is needed to fully characterize public charging "hot spots" and develop rules of thumb for identifying public charging locations with potential for high utilization.⁸⁴

Utilization rates observed at other DCFC deployment projects may not be representative of Pacific Power pod locations due to differences in PEV adoption levels, population density, and other factors, but serve to demonstrate the variability in equipment utilization based on location and objectives. As described in the Estimated Participant Costs section below, the Company will assess expected utilization rates when proposing rates to charge drivers for public charging service.⁸⁵

Open public access is an important component of pod design. Any drivers may use the program's charging pods regardless of whether he or she otherwise receives electric service from Pacific Power. Drivers may need to sign up for a network membership, depending on the network solution selected through the RFP process.

This program does not include any incentive payments.

Identification of market barriers, program implementation barriers and program strategies to overcome identified barriers: OAR 860-087-0030 (1) (a) (F)

See Table 8 for a discussion of market barriers and programs strategies to overcome identified market barriers.

Implementation Barriers

Provider Selection

The Company has designed its equipment and service provider selection process to capitalize on provider expertise to mitigate potential implementation barriers; however, the selection process may pose a challenge to implementation. As indicated in Table 7, the Company issued an RFI to

⁸⁴ INL Study at 3-1 to 3-25.

⁸⁵ Pacific Power intends to file a tariff containing rates for electric vehicle charging at Company-operated public charging pods. Given current market dynamics and the fact that the first Company-operated charging pod is unlikely to be operational until 2018, Pacific Power is not currently proposing a charging rate at this time, however an illustrative tariff is included as Exhibit PAC/201 to the testimony of Mr. Robert M. Meredith.

better understand the market for EVSE hardware and software (i.e., vendors, products, indicative pricing, upcoming market changes). While over thirty vendors received an invitation to respond, only four responses were received. Program implementation could face significant delays if a similar lack of interest is demonstrated toward the equipment and service provider RFP, however, the Company is confident that a better response rate can be achieved for a solicitation for a fully-formed program concept and RFP (as opposed to an RFI). Pacific Power will work with stakeholders, such as Drive Oregon, to ensure the Company develops a robust vendor list.

Site Identification

While Pacific Power has outlined a robust process to develop a catalogue of prospective public or Company-owned sites and to engage the selected vendor(s) in final site selection, it is possible that the Company will fail to identify suitable sites in its service area. If this occurs, the Company will attempt to work with its non-residential customers to identify suitable sites on private property.

Unexpected Cost and Delays

Pacific Power is entering a new and evolving market with the proposed Public Charging Pilot. Electric companies, third party charging companies, governments and other market actors working to develop public EVSE continue to encounter unexpected challenges, identify new solutions and expand best practices. Unexpected costs and delays are, by definition, unforeseen but the Company anticipates lessons from initial station deployments can, such as permitting, easements and site improvement costs, can be deployed in later stations through the proposed phased rollout.

Description of the electric company's role and, if applicable, a discussion of how the electric company proposes to own or support charging infrastructure, billing services, metering, or customer information: OAR 860-087-0030 (1) (a) (G)

Pacific Power will own all charging equipment through this pilot and will engage service providers to manage installation, network services, processing of driver payments and equipment maintenance. At the end of the equipment's depreciable life, the Company will offer to gift the equipment to the local government (public location) or private site host (private location). If the local government or site host does not want the equipment or if the equipment was installed on Company-owned property, the Company will attempt to sell the equipment. If the equipment no longer has any market value, the Company will dispose of the equipment.

The network service provider will manage all customer information and payments. Depending on the network solution, customer information may be provided to Pacific Power's third-party evaluator for use in surveying program participants.

Whether transportation electrification adoption attributed to the program will likely necessitate distribution system upgrades: OAR 860-087-0030 (1) (a) (H)

The extent to which the Public Charging Pilot accelerates transportation electrification above the baseline projection provided in Chapter 1 of this application will be assessed through the program evaluation activities discussed in this document. 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 system upgrades, how concentrated this adoption will be and where charging will occur. For example, if a new vehicle uses the pilot's charging pods for all charging, these impacts will have already been considered when designing and installing the charging pod. However, if a customer charges his or her vehicle primarily at home, with occasional use of public charging

Pods, this presents a different type of impact to the distribution system. At current PEV adoption levels and Level 1 and Level 2 power levels, residential charging is not expected to necessitate distribution system upgrades. A key component of Pacific Power's electric transportation strategy is to encourage customers to charge vehicles during off-peak hours, which the Company intends to reinforce with pricing that varies by time of day in addition to messaging through its proposed Outreach and Education pilot program. This clear and consistent messaging should further reduce the likelihood of increased distribution system costs as a result of this program.

With today's technology, the power draw from a single DC fast charger (typically around 50 kW) is unlikely to cause adverse impacts to the electrical system. However, when multiple chargers are located together, and as new equipment becomes more powerful, there is increased potential for adverse impacts, particularly when charging occurs during peak periods. To build a robust, reliable network of public charging, it is critical that potential grid impacts are considered when selecting charging technology and locations. Through the Public Charging Pilot, the Company will test its ability to:

- Site public charging pods in locations with sufficient capacity without sacrificing visibility or expected utilization,
- Integrate advanced technologies that can mitigate potential system impacts, such as energy storage, renewable generation, and/or direct load control, and
- Send price signals to drivers to encourage off-peak charging.

Pacific Power will encourage equipment vendors to propose a suite of technology solutions to allow customization on a site-by-site basis. The phased rollout of pods over a 2-3 year period will allow the Company to test different technologies at different locations and apply learnings to potential future deployments.

Where applicable, a discussion of ownership structure: OAR 860-087-0030 (1) (a) (I)

Pacific Power will own all public charging equipment funded through this program. The Company may contract for use of property where equipment is sited, dependent upon the results of site selection.

Where applicable, a discussion addressing interoperability of invested equipment; OAR 860-087-0030 (1) (a) (J)

Ease of use for the driver is critical to program success. In its request for proposals for equipment and services, the Company will look for RFP respondents to propose solutions that minimize interoperability barriers without sacrificing other key program aspects or evaluability.

Final pod design will be determined after vendor and site selection. The Company will consider whether implementation of on-site energy storage or generation will be incorporated into pod design during the pilot period. The Company will investigate opportunities to coordinate these capabilities with the forthcoming Advanced Metering Infrastructure roll out, expected in 2018 and 2019.

Where applicable, a discussion of any national standards for measurement and communication: OAR 860-087-0030 (1) (a) (K)

Pacific Power will ask respondents to its RFP to address how their equipment and network comply with any current or upcoming national standards for measurement and communications. The

Company's preference is to select equipment and network services that use open communication protocols to minimize the risk of stranded investments.

**DATA USED TO SUPPORT THE DESCRIPTIONS PROVIDED IN
PARAGRAPHS (1)(A)(A)-(L) OF THIS RULE: OAR 860-087-0030 (1) (B)**

Where available, supporting data have been provided throughout this application. Through the Public Charging Pilot, the Company will gather data specific to its service territory that can be used to inform future planning efforts.

**A DESCRIPTION OF PROGRAM COORDINATION THAT INCLUDES A
DESCRIPTION OF: OAR 860-087-0030 (1) (C)**

Stakeholder involvement in program development: OAR 860-087-0030 (1) (c) (A)

See Chapter 1.

Efforts to coordinate with related state programs: OAR 860-087-0030 (1) (c) (B)

- **Alternative Fuel Vehicle Infrastructure Tax Credit:** The Oregon Department of Energy's Energy Incentive Program offers tax credits to cover up to 35 percent of the cost to install non-residential EVSE or electrify fleets. Incentives specific to EVSE are scheduled to sunset at the end of the 2017 calendar year.⁸⁶ Pacific Power will monitor the availability of state tax credits past 2017 and look for opportunities to capture additional benefits for customers.
- **Oregon Low Carbon Fuels Standard:** Oregon's Clean Fuels Program (OAR 340-253) presents a potential opportunity to capture additional future benefits for all customers through monetizing credits generated by the use of electricity as a transportation fuel. Pacific Power intends to register to generate credits associated with public EVSE installed through this pilot. Although there is not currently sufficient information to estimate the revenue potential associated with these credits, any revenue that is generated from these credits can be used to directly buy down the cost of the proposed pilot program.

Coordination, if any, of delivery with other market actors and activities, and how the market and other market actors can leverage the underlying program or projects within the program: OAR 860-087-0030 (1) (c) (C)

Local Governments

Local governments in Pacific Power's Oregon service area are actively engaged in environmental, climate and transportation planning. City, county and regional government efforts are diverse and expected to continue to expand. Some examples of initiatives in Pacific Power's service area include:

- The City of Portland first adopted an electric vehicle strategy in 2010.⁸⁷ This strategy was updated in 2017 focusing on electrification of the public transit system, shared vehicles, fleets, and enabling cost effective installation of EVSE.

⁸⁶ Oregon Department Of Energy, *Transportation Tax Credits*, <https://www.oregon.gov/energy/At-Work/Pages/Transportation-Tax-Credits.aspx> (last visited Apr. 11, 2017).

⁸⁷ 2017 City of Portland Electric Vehicle Strategy, <https://www.portlandoregon.gov/bps/article/619275> (last visited Apr. 11, 2017).

- In 2016, the City of Corvallis developed the Corvallis Climate Action Plan, which includes an action to “accelerate transition to electric vehicles” within the plan’s Buildings and Energy action area.⁸⁸

The Company has begun initial outreach to local governments and will continue to work collaboratively to identify potential public properties to site charging pods. The Company expects to remain engaged with local governments throughout the design, permitting and installation processes to ensure that sites are in compliance with local requirements and best suited to meet local needs.

Private Charging Providers

Private charging providers are important market actors in Pacific Power’s service area. These providers are encouraged to respond to the Company’s RFP for equipment and services and the Pacific Power will assess distance from other public fast charging locations during its site selection process to create a more robust network of EVSE.

A DESCRIPTION OF THE ELECTRIC COMPANY’S LONG-TERM STRATEGY TO ACCELERATE TRANSPORTATION ELECTRIFICATION IN ITS SERVICE TERRITORY IN AN EFFECTIVE AND EFFICIENT MANNER AND HOW THE PROPOSED PROGRAM FITS WITHIN THE LONG-TERM STRATEGY: OAR 860-087-0030 (1) (D)

See Chapter 2.

A DESCRIPTION OF PROGRAM COSTS THAT INCLUDES, BUT IS NOT LIMITED TO: OAR 860-087-0030 (1) (E)

Estimated total program costs, including incentives, program delivery, evaluation, marketing, and administrative costs: OAR 860-087-0030 (1) (e) (A)

Assuming the deployment of seven public charging pods, the Company estimates the cost of this pilot program at \$1.85 million during the pilot period, as shown in Table 9. Given the time required to issue the RFP, select a vendor, select suitable sites, secure necessary permits and design and install a charging pod, Pacific Power anticipates the first public charging pods will go live in 2018, but will not delay the process if expedited opportunities present themselves in 2017. For the purpose of budgeting, it is assumed that each pod will include four dual-standard DCFC and one level 2 charger.⁸⁹

⁸⁸ *Corvallis Climate Action Plan* p. 12 (Dec. 2016), <http://www.corvallisoregon.gov/Modules/ShowDocument.aspx?documentid=10970> (last visited Apr. 11, 2017).
⁸⁹ Configurations may vary by locations, but each pod will include at least two DC fast chargers and one level 2 charger.

Table 9. Estimated Program Costs

Cost Category	2017	2018	2019	Total
Equipment and Installation				
Equipment Maintenance and Network Admin.				
Program Evaluation				
Program Administration				
Total				\$1,850,000

Assumptions

Equipment cost assumptions were developed based on vendor responses to a Request for Information (RFI) issued by Pacific Power in August 2016. The Company received only four responses among thirty-six vendors invited to participate. Accordingly, the budget proposed for the Public Charging Pilot is expected to allow up to seven pods, based on limited information provided in response to the RFI and high-level industry estimates, but the Company does not have enough information to characterize cost expectations in further detail.

- [REDACTED] equipment and installation cost at each fast charging pod. Assumes [REDACTED] per DC fast charger, [REDACTED] per level 2 charger and [REDACTED] for permitting, installation, and potential integration of advanced technologies.
- [REDACTED] annual cost per pod for network services and equipment maintenance.

Network provider fees for processing driver payments will be assessed and negotiated through the vendor selection and contracting process and may be directly tied to equipment utilization rates. For the purpose of developing the budget presented in Table 9, it is assumed that these fees will be treated as a reduction to driver revenue rather than as a program cost.

There will be additional costs for station operation and maintenance beyond the three-year pilot period, however, driver payments during that period may be sufficient to offset these costs. As discussed in more detail below, the Company will review the activity in the proposed program balancing account, including the impact of revenue from driver payments, periodically. The Company will propose to decrease or increase the Schedule 95 surcharge accordingly to recover the costs associated with the program, net of driver payment revenues.

Estimated participant costs OAR 860-087-0030 (1) (e) (B)

The Company does not anticipate the first charging station will become operational until 2018. Given the dynamic state of the electric transportation market, Pacific Power has not proposed specific charging service rates at this time, but rather has provided with this application an illustrative tariff for Company operated public charging service as Exhibit PAC/201 to the direct testimony of Mr. Meredith. Before the go-live date of the first pilot charging station, the Company will make an advice filing with the Commission requesting approval of a new tariff schedule with specific rates. Establishing rates closer to the time of pod deployment will allow the Company to incorporate further monitoring of the cost of public charging services offered by other entities in its Oregon service territory to propose rates that:

- Stimulate competition during the period when pods will be in operation;

- Encourage off-peak charging;
- Encourage efficient use of the equipment (i.e., parking space turnover);
- Are comparable to typical rates for public charging services charged by other entities in the Company's Oregon service territory;⁹⁰ and
- Recognize the difference in cost and value of DCFC and level 2 charging.

As shown in Exhibit PAC/201 to the direct testimony of Mr. Meredith, Pacific Power expects to implement a simple dollar-per-minute rate that varies by on- and off-peak periods⁹¹ and by DCFC and level 2 charging, for a total of four distinct rates that incorporate the objectives described above.

How the electric company proposes to recover costs: OAR 860-087-0030 (1) (e) (C)

The costs associated with the proposed program will be incremental to cost levels currently included in customer rates. The Company proposes to implement a surcharge to contemporaneously recover the operating costs of the pilot program through its existing Schedule 95, Pilot Program Cost Adjustment (Schedule 95).⁹² The Company further proposes to use a balancing account to track the actual costs and surcharge collections. A tariff advice filing will be made to implement this proposed surcharge at the completion of this proceeding, expected to be in the fall of 2017. The Company will review the balancing account periodically to determine if changes to the surcharge are necessary. The Company proposes to provide annual reporting of the activity in the balancing account to provide an opportunity for prudence reviews of incurred costs.

Driver payments collected through the program will be applied to the balancing account and used to offset program costs. The Company will track driver payment revenues to understand the extent to which it offsets program costs, but does not anticipate that driver payments will necessarily offset the full pilot program cost.

The Company estimates that program costs will result in an average 0.03 percent rate impact over the pilot period.

A DESCRIPTION OF THE EXPECTED PROGRAM BENEFITS THAT INCLUDES: OAR 860-087-0030 (1) (F)

Program benefits, including to whom and when the benefits are accrued: OAR 860-087-0030 (1) (f) (A)

Electric transportation currently represents a small share of Pacific Power's total revenues, however, it also represents an opportunity for growth. As discussed in Chapter 1, only two out of every 1,000 cars registered in Pacific Power's Oregon service territory currently use plug-in electric technology,⁹³ however, based on current trends, the number of PEVs registered in the

⁹⁰ Many different pricing models currently exist in the market, utilizing different combinations of monthly subscriptions, per-charge, per-kWh, per-minute and other charges for service. The Company will attempt to convert these different pricing models to a common metric for direct comparison to the Company's proposed rates.

⁹¹ On-peak periods are defined as Monday through Friday, excluding holidays, 6:00 a.m. to 10:00 a.m. and 5:00 p.m. to 8:00 p.m. for November through March and 4:00 p.m. to 8:00 p.m. for April through October.

⁹² For capital related costs, Schedule 95 will be used to recover the annual revenue requirement (i.e., return on, and depreciation expense).

⁹³ Data provided by the Oregon Department of Environmental Quality, through June 2016.

Company's Oregon service territory is expected to quadruple by 2025. 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 transportation electrification, increasing and pulling forward revenue benefits for customers.

Increased revenue associated with this program can be grouped into two categories: revenues from driver payments at public charging equipment and revenues from charging that occurs at other locations (e.g., homes or businesses) as a result of the program. The first category of funds will be well understood during the pilot period, as the product of the rate that drivers are charged and equipment utilization, less network service provider fees to process payments. Program evaluation efforts will project likely direct revenues over the equipment life and investigate whether additional revenue from charging at other locations can be attributed to the pilot program.

Program experience in 2018 and 2019 will provide information for program evaluation and future planning, however, the majority of revenue generated from both categories described above will accrue after the pilot period. The pilot program will establish a foundation by which long-term revenue, and associated customer benefits, may be realized as the Company investigates its ability to effectively and efficiently accelerate the adoption curve in underserved populations and throughout its Oregon service area. Pacific Power will monitor actual revenues closely and provide information on charging pod costs and revenues to the Commission annually during the pilot period. Revenues from the program will be used to offset the pilot program costs.

Drivers utilizing the charging pods (program participants) will receive a direct benefit during the pilot period through increased access to visible, reliable dual-standard DCFCs, which may enable the adoption, or better utilization, of PEVs and save fuel costs when compared to vehicles operated on fossil fuels.

Oregon's Clean Fuels Program (OAR 340-253) presents a potential opportunity to capture additional future benefits for all customers through monetizing credits generated by the use of electricity as a transportation fuel. The Public Charging Pilot may allow Pacific Power to directly capture credits generated through the use of company-operated charging equipment. The Company is monitoring the Clean Fuels Program to identify opportunities that maximize benefits.

In the context of the proposed method of assessing program cost-effectiveness described in Chapter 2 (the Ratepayer Impact Measure), benefits for this program include driver payments for station use, any federal or state tax credits realized by the Company, and any value derived from credits under the Clean Fuels Program. Costs are those incurred by the Company in running the program including payments to vendors for charging pod design, equipment, installation, management and maintenance, make-ready investments, program management, and energy supply costs. Pacific Power does not propose including environmental or societal benefits in cost-effectiveness analysis.

Electric system benefits: OAR 860-087-0030 (1) (f) (B)

Present PEV adoption levels and the relative nascence of utility transportation electrification programs nationwide make it difficult to forecast long-term electric system benefits of electric transportation acceleration associated with this pilot program. Direct control over where charging pods are located allows the Company to site equipment in locations with necessary system capacity. The Company will also look for opportunities to incorporate project features that can test

and enhance electric system benefits, including integrating on-site energy storage and/or renewable generation. Driver pricing will be structured to encourage charging during off-peak periods to send consistent messaging to drivers about efficient use of the electrical system and to test drivers' willingness to respond to price signals.

If the Company is successful in increasing the adoption of these technologies and practices as use of electricity as a transportation fuel increases, benefits to the electric system may include increased operational flexibility, such as the ability to use energy storage to mitigate impacts of charging during peak periods and the ability to integrate variable generation resources, such as wind generation available during off-peak hours. The pilot will provide the Company with deeper insight into siting best practices, driver charging behaviors and price sensitivities and how to maximize electrical system benefits associated with public charging.

A discussion of how a net benefit to ratepayers is attainable: OAR 860-087-0030 (1) (f) (C)

In this application, the Company proposes a measured approach to investment in transportation electrification, beginning with an initial pilot phase to test program design, market barriers, and the ability to accelerate transportation electrification beyond what might happen in the absence of the program and the benefits associated with this acceleration. The majority of benefits to Pacific Power's customers will not be realized until after the end of the pilot period as vehicles and equipment continue to generate revenue and provide electrical system benefits over their useful lives. Program evaluation efforts will estimate the benefits that can be attributed to this program to determine whether a net benefit, relative to program costs, is likely to be achieved after the pilot period. The findings from this initial phase will be used to determine whether a second phase of the program is likely to generate a net benefit for ratepayers.

A DESCRIPTION OF HOW THE ELECTRIC COMPANY WILL EVALUATE THE PROGRAM THAT INCLUDES, BUT IS NOT LIMITED TO: OAR 860-087-0030 (1) (G)

Timeline of program evaluation and proposed evaluation reporting schedule: OAR 860-087-0030 (1) (g) (A)

Pacific Power anticipates issuing a request for proposals for third-party program evaluation services in the first quarter of 2018. 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 in the second quarter of 2018, leading up to the development of a program evaluation report to be filed with the Commission in 2019. 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. Through pod deployment, the Company and its implementation vendor(s) will generate data on upfront and ongoing costs, stations utilization during on- and off-peak periods, typical length of charging sessions, station reliability, relative usage levels of DCFC and Level 2 equipment. This information will be made available to the program evaluator for use in evaluation program performance and cost-effectiveness.

Estimated cost of evaluation: OAR 860-087-0030 (1) (g) (B)

The Company has budgeted [REDACTED] for program evaluation, spread evenly between 2018 and 2019. This budget estimate is based on the Company's extensive experience contracting with third parties to evaluate energy efficiency programs, recognizing that the exact cost will not be known until contractor bids are received through the competitive bidding process.

How the evaluation will be conducted and whether a third-party evaluation is necessary: OAR 860-087-0030 (1) (g) (C)

The program evaluation will be conducted by a third-party contractor selected through a competitive bidding process. The Company has a long history of working with third-party consultants to evaluate its demand-side management programs and will seek proposals from this qualified pool of consultants to perform evaluation activities for this program. The Company may engage its implementation vendor(s) to perform limited evaluation efforts that it is best suited to deliver, such as analysis of charger utilization and equipment reliability.

Based on all available data and projections of future costs and utilization, the program evaluator will assess cost-effectiveness using the method described previously in this application (i.e., the Ratepayer Impact Measure test).

How the evaluation will address identified barriers: OAR 860-087-0030 (1) (g) (D)

As referenced in Table 8, the Public Charging pilot program will address lack of public EVSE development in Pacific Power's service area and provide ancillary support to overcome barriers associated with lack of awareness of electric transportation options. The evaluation will assess the pilot program's ability to address identified barriers as follows:

Market Barrier: Lack of Publicly Accessible EVSE

Evaluation efforts will focus on the ability of the Public Charging Pilot to effectively increase the availability of public EVSE in Pacific Power's service area, including that which serves underserved communities and addresses barriers created by competing connection standards. The program evaluator will analyze the number and location of pods along with reliability and utilization data to understand the extent to which the pilot program developed reliable, convenient EVSE in areas where sufficient investment has not occurred.

Pacific Power's program evaluator will solicit participant input to answer the following questions:

- Are pods serving drivers without existing access to public, home or workplace charging?
- Did drivers adopt PEVs as a direct result of the presence of pilot charging pods?
- Did drivers perceive an interoperability barrier? If so, how could this barrier be removed?
- Are pods reliable and convenient?
- Are pods located in areas where drivers want to spend time?
- Do drivers understand the pricing model and have they modified when they use equipment to take advantage of off-peak rates?

Market Barrier: Lack of Awareness of Electric Transportation Options and Benefits

Evaluation of the Public Charging pilot's impact on awareness will focus on the estimated impact of signage and outreach efforts. This may include data such as estimated foot and car traffic near pods and signage, views of Pacific Power social media and web content publicizing pod

deployment and estimated reach of earned media surrounding pod deployment. Evaluation will also examine whether outreach materials discussed the benefits of off-peak charging and public EVSE development.

To complement the measures listed above, evaluation will seek to answer the following questions about program design and reception:

- To what extent did the pilot program accelerate transportation electrification?
- Did the pricing model work as intended (e.g., did it encourage off-peak charging)?
- What are the pilot period's major lessons learned?
- What factors led to differences in utilization and community exposure between pods?
- How has the program stimulated innovation, competition and customer choice?
- How has the program supported system efficiency and operational flexibility, including the ability to integrate variable resources?
- How does this model compare to Demonstration and Development Pilot funded EVSE development?
- What is the risk of stranded assets?
- How successful were future-proofing measures?
- What were the costs and benefits of the pilot?
- Should the program be expanded after the pilot period, and if so, how could it be improved?

The answers to these questions will be used to inform future planning after the pilot period.

A discussion of the method of data collection that is consistent with subsection (1)(b) of this rule and how the data will be used to evaluate the effectiveness of the program: OAR 860-087-0030 (1) (g) (E)

During the development of the program evaluation work plan, the Company will work with the selected program evaluation to identify all data needed to answer the questions previously discussed. The Company will provide data on program costs, utilization and up-time by location and other data required to assess program costs and benefits. The third-party evaluator will collect information from customers to answer other questions above regarding program satisfaction, increased miles traveled, driver confidence, etc. The third-party evaluator will be tasked with identifying the best way to solicit feedback from customers, which may include participant surveys and/or review of electric vehicle charger feedback sites such as plugshare.com.

Before selecting a network solution, it is unknown whether drivers will be required to join a network to use pilot charging pods and thus, participants may be difficult to identify for feedback. When reviewing responses to the vendor RFP, the Company will balance the desire to identify drivers for feedback with the desire to address interoperability barriers and make the charging experience simple for drivers. Based on the network solution chosen, the Company will work with the program evaluator to determine the best means of surveying customers (e.g., email surveys, phone surveys, on-site in-person surveys, etc.).

The evaluation will also use Oregon Department of Environmental Quality data on PEV registrations to investigate whether adoption has accelerated above the baseline forecast provided in Chapter 1. While increased adoption may not be directly tied to the pilot program, this will be a useful metric to assess the effectiveness of the coordinated efforts of organization across Oregon working to accelerate transportation electrification during the pilot period.

A DESCRIPTION OF HOW THE PROGRAM ADDRESSES THE CONSIDERATIONS IN OREGON LAWS 2016, CHAPTER 028, SECTION 20(4)(A)-(F).EVALUATION: OAR 860-087-0030 (1) (H)

Senate Bill 1547 identified six considerations for the Commission in evaluating transportation electrification programs for purposes of cost recovery. A discussion of how the pilot program addresses each of these considerations is provided below.

(a) Are within the service territory of the electric company

All charging pods will be located within Pacific Power's service area.

(b) Are prudent as determined by the commission

The Commission's prudence review of utility investment focuses on "whether the company's actions, based on all that it knew or should have known at the time were reasonable and prudent in light of the circumstances which then existed."⁹⁴ In determining prudence, the Commission does not rely on "hindsight judgments" or substitute "its best judgment for the judgments made by the company's managers."⁹⁵ Senate Bill 1547 requires the Company to file applications for programs to accelerate transportation electrification. Pacific Power's proposed Public Charging pilot program represents a prudent approach to meeting the legislative directives of Senate Bill 1547. This pilot program, along with the other pilot programs concurrently submitted by the Company, will test key transportation electrification program design elements at a relatively low cost to customers. The Company intends to use competitive bidding processes for third-party services and its extensive experience effectively managing capital investments to keep costs low for customers. In addition PacifiCorp is uniquely situated to test the market for electric vehicle charging pods within areas of its service territory that have not, to date, been attractive to third party developers. Through the installation and operation of electric vehicle charging pods, the Company will be able to collect data on usage patterns that will be helpful to the development of a robust electric vehicle market in the state of Oregon. PacifiCorp will use a competitive process to select the least-cost, least-risk equipment and installation.

(c) Are reasonably expected to be used and useful as determined by the commission

Charging pods will be sited in areas where they are expected to be used and useful, based on the criteria listed in the "Program Elements" section of this application. Pacific Power will track equipment utilization and report this information to the Commission during the pilot period. The Company notes that even pods with low utilization may be useful if they reduce range anxiety and increase driver confidence that charging options are available when needed.

(d) Are reasonably expected to enable the electric company to support the electric company's electrical system

Having direct control over the location of charging pods will allow Pacific Power to consider impacts on the electrical system when identifying candidate sites. The Company will look for opportunities to integrate advanced technologies to mitigate detrimental electrical system impacts,

⁹⁴ In the Matter of PacifiCorp, d/b/a Pacific Power Req. for a Gen. Rate Rev., Order No. 12-493, Docket No. UE 246 at 25 (Dec. 20, 2012).

⁹⁵ *Id.*

where appropriate. Pricing will be designed to encourage off-peak usage to further mitigate impacts during peak loading periods.

(e) Are 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

Through its vendor and site selection process, the Company will investigate the viability and benefits of integrating advanced technology, including but not limited to renewable generation and energy storage, into charging pods. Pricing will be designed to encourage off-peak usage to further mitigate impacts during peak loading periods.

(f) Are reasonably expected to stimulate innovation, competition and customer choice in electric vehicle charging and related infrastructure and services.

Innovation

Through its RFP process, the Company will encourage equipment and service bidders to propose innovative solutions to integrating advanced technologies, mitigating grid impacts, future-proofing investments and addressing interoperability barriers.

Competition

As discussed in the Chapter 1 of this application, there is currently a dearth of dual-standard public charging pods in Pacific Power's Oregon service area and most communities have no such option. The Company hopes that its presence will stimulate others to develop competing EVSE to enhance choices for customers. Pricing will be designed to stimulate competition both with other transportation fuels and with other public PEV charging options.

Customer Choice

The pilot will provide an additional choice for drivers interested in using public EVSE either as a primary or secondary means of fueling their vehicles. Given the current dearth of dual-standard public charging pods in Pacific Power's Oregon service territory, these charging pods may be the only such option in certain communities, but the Company hopes that its presence will stimulate others to develop similar public EVSE to enhance choices for customers.

Chapter 4: Outreach and Education Pilot

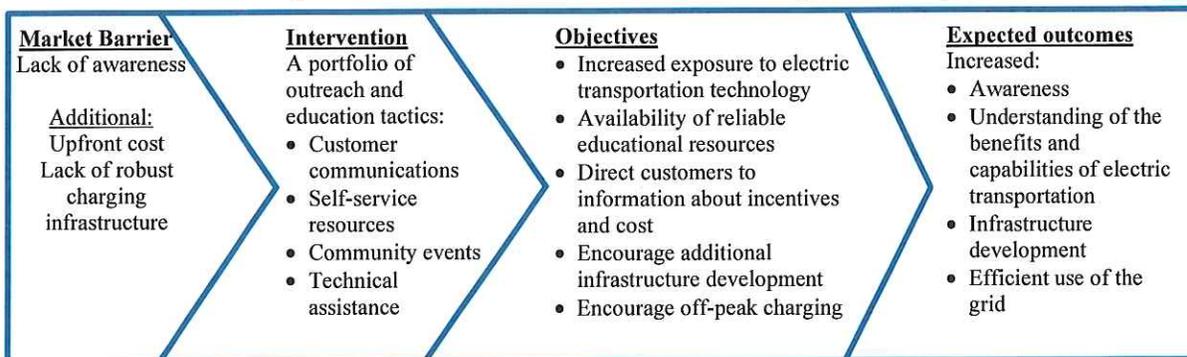
PROGRAM DESCRIPTION: OAR 860-087-0030 (1) (a)

Lack of awareness of electric transportation options and benefits is a primary barrier to the adoption of electric vehicles in Pacific Power’s service area (See Chapter 1). 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 PEVs (e.g., vehicle cost, tax credits, available PEV models, charging options and vehicle dependability) and EVSE. As a trusted advisor for customers, Pacific Power proposes a three-year Outreach and Education Pilot program to address barriers associated with awareness.

The proposed pilot program will test a portfolio of outreach and education tactics, which fall within four primary categories:

- **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 pilot programs proposed in this application (See Chapter 3 and Chapter 5).
- **Self-service resources:** 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.
- **Community events:** Pacific Power will fund an estimated eight ride-and-drive events in its communities, plus sponsor additional events promoting electric transportation as they arise (i.e., events contact Pacific Power for sponsorship, brochures and/or attendance).
- **Technical assistance:** Expert, onsite technical assistance for non-residential EVSE projects (e.g., charging for fleet electrification, workplace charging, public or customer charging).

Figure 20. Outreach and Education Pilot Program Theory



Purpose

The pilot program will test Pacific Power’s ability to reduce barriers to transportation electrification through customer outreach and education. The Company has a long history of educating customers about energy options and emerging technologies across its service area, however, electric transportation is a new and quickly evolving market. In the Company’s experience, a combination of targeted and general awareness tactics that direct customers to additional educational resources maximizes the impact of outreach and education programs. In its initial phase, the Outreach and Education Pilot will test a diverse portfolio of tactics and messages. Lessons learned through this pilot will help the Company develop best practices that will inform future programs.

Program elements, objectives, timeline, and expected outcomes: OAR 860-087-0030 (1) (a) (A)

Program Elements

The proposed Outreach and Education pilot program includes four primary elements designed to address market barriers and support the Company’s long-term transportation electrification strategy presented in Chapter 2.

1. Customer Communications

Pacific Power will deploy a suite of communications designed to increase awareness about electric transportation and direct customers to access the Company’s resources and programs. Communications may also direct customers to external resources, such as available incentives, regional PEV bulk purchasing efforts, or other educational resources (e.g., Driver Oregon’s EV Showcase). For the initial period, the Company will test a wide range of tactics and messages to understand which are most effective in raising awareness. The following communication tactics reflect the Company’s preliminary communications plan. The plan is designed to be flexible and adaptable to account for potential lessons learned and new opportunities.

Table 10. Preliminary Communications Plan

Tactic	Frequency
Paid advertising E.g., digital, paid search and print	Approx. 3-5 total weeks per year to increase awareness of the benefits of PEVs and support tactics such as community events or National Drive Electric week.
Bill inserts Residential and non-residential	One per year
Physical handouts E.g., residential brochure for events, dealerships, upon request	Create once and update if needed
Digital assets E.g., infographic explaining the benefits of PEVs	Create 1 – 2 and update if needed
Customer newsletter stories	Residential – 2x per year Commercial – 1x per year

Organic and promoted social media posts	As content is created through the pilot program and other relevant transportation electrification efforts
Targeted emails to potential high-propensity customers (e.g., Blue Sky ⁹⁶ program participants)	1 – 2 per year

The proposed pilot will build awareness across Pacific Power’s customer base, much of which is underserved by existing messaging about electric transportation. Certain targeted communications may be deployed to maximize the impact of the pilot’s proposed budget. The Company expects to learn more about targeting strategies throughout the pilot, but proposes the following initial principles for targeted communications:

- Target higher-cost tactics to potential high-propensity customers, such as those participating in other environmentally-focused programs. For examples, customers voluntarily participating in the Company’s Blue Sky program.
- Target communications to customer groups with the ability to influence additional customers. For example, targeting a message about workplace charging to businesses customers may result in more electrification per message (e.g., one business customer providing workplace charging may encourage multiple employees to purchase a PEV).
- Ensure access to resources (e.g., materials for Spanish speakers)
- Target different messages to different segments and analyze survey data to adjust strategy as necessary.

During the pilot period, the Company will test messaging to develop best practices. The initial messaging strategy includes the high-level concepts discussed in Table 11.

Table 11. Key Audiences and Messages

Element	Messaging Strategy
Residential customers	Now’s the time to consider a PEV: <ul style="list-style-type: none"> • <i>Drive Green:</i> PEVs produce no tailpipe emissions • <i>Make Life Easier:</i> No need to visit gas station, no oil changes • <i>Save Money:</i> Can be cheaper to operate than ICE • <i>Peace of Mind:</i> More public stations and/or home equipment
Non-residential customers	<i>Be a Green Leader:</i> <ul style="list-style-type: none"> • Electrify your fleet and offer workplace charging as a service and benefit for employees • Make your business a destination by offering public charging
Call to action	General: Access Pacific Power’s resources to learn more Targeted: <i>Understand your options</i> <ul style="list-style-type: none"> • Attend a ride-and-drive to learn more (Residential)

⁹⁶ Pacific Power’s Blue Sky program is a voluntary program that allows customers to green their energy use with renewable energy from the region. For additional information, see www.pacificpower.net/bluesky.

	<ul style="list-style-type: none">• Visit a Pacific Power Public Charging pilot station (Residential)• Request Technical Assistance (Non-residential)• Apply for Demonstration and Development pilot funds (Non-residential)
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The Company will look to partner with, and leverage resources of, other organizations working to accelerate transportation electrification in Oregon to contribute to efficient and consistent messaging to customers. For example, the Company will identify opportunities to co-develop and co-brand educational collateral with Drive Oregon’s EV Showcase efforts to minimize costs while ensuring materials are available for Pacific Power customers.

2. *Self-service Resources*

As noted in a 2015 paper from the National Academy of Sciences:

finding an easy-to-use source of credible, reputable information can be difficult. For example, an online search to find information related to purchasing a PEV yields a wide array of links, such as sponsored advertisements for PEVs, vehicle-manufacturer websites, news articles about PEVs, blog posts from PEV enthusiasts, buyer guides, information from nonprofits encouraging PEVs, information on tax credits, and even paid Google AdWords campaigns for fuel-efficient ICE vehicles and technologies.⁹⁷

Pacific Power proposes to leverage its position as a trusted source of information for its customers to develop convenient self-service online tools and resources. These tools will be available to all customers interested in understanding more about electric transportation. Tools may focus on residential transportation electrification (e.g., a calculator that compares the costs PEV and ICE vehicle ownership), non-residential transportation electrification (e.g., fleet electrification assessment tools) and other sectors that rely on Pacific Power for information (e.g., builder check lists for PEV-ready new construction).

Pacific Power will release an RFP to identify tools and resources that can provide self-service benefits for customers. At a minimum, the Company expects to identify a tool that provides customizable analysis of the costs and benefits of PEV ownership for residential customers. Pacific Power envisions a more robust version of the Alternative Fuel Data Center’s Vehicle Cost Calculator⁹⁸ that can provide information customized to a Pacific Power customer. Based on responses to the RFP, the Company may select additional tools that serve additional sectors or functions. Tools may be added throughout the pilot period based on customer feedback and opportunities that arise.

⁹⁷ National Academy of Sciences Study at 54.

⁹⁸ U.S. Department of Energy, *Vehicle Cost Calculator*, <http://www.afdc.energy.gov/calc/> (last visited Apr. 11, 2017).

3. Community Events

Pacific Power uses event outreach to raise awareness and communicate directly with customers about available programs and opportunities. For example, the Blue Sky program had a booth presence and/or sponsored 87 events in 16 Oregon communities in 2016. In addition, the Company organized eleven energy efficiency workshops with 609 attendees throughout Oregon in 2016.

The initial community event strategy will focus on ride-and-drive events in Pacific Power communities. Data suggest that ride-and-drive events are among the most effective electric transportation direct outreach tactics (see Objectives and Expected Outcomes section). There is no single ride-and-drive model, but ride-and-drive events typically include the following features:

- A centralized time and location for consumers to test drive PEV models and learn more about electric transportation technology.
- Events may be stand-alone or in conjunction with an existing event, such as an Earth Day celebration or auto show.
- Outreach is a primary component, which may include paid advertising (e.g., radio, print, email) along with onsite collateral, such as banners or flyers.
- Partnership between multiple contributors is another common feature (e.g., industry groups, utility companies, local governments, vehicle manufactures or dealerships).

Bend Earth Day Fair

On April 22, 2017, Pacific Power will join Drive Oregon, The Environmental Center and additional market actors in sponsoring a ride-and-drive event in Bend, Oregon.

The event will occur in conjunction with the Bend community's annual Earth Day Fair. Attendees can test drive multiple Nissan Leaf models and learn more about PEVs and charging options.

The event is aligned with a Nissan Leaf bulk purchase opportunity hosted by a Bend area car dealership.

Pacific Power's in-kind sponsorship includes a bill insert to Bend area customers (Figure 21) and social media engagement.

Through the proposed pilot, the Company will proactively identify and organize more ride-and-drive events like this.

Figure 21. Bend Ride-and-Drive Bill Insert

Get on the road to greener driving.

Visit the Earth Day Fair to test drive an all-electric vehicle and discover the benefits.

Saturday, April 22, 12-3 p.m.
The Environmental Center
16 NW Kanast Ave., Bend, Oregon

PACIFIC POWER

Use less, save more

You can fuel an EV for the equivalent of about \$1 per gallon of gasoline, which can make a big difference for your family budget.

\$30,680 Nissan LEAF S (estimated MSRP)

-\$7,500 Federal Tax Credit**

-\$7,500 Dealership Promotion* (Expires 06/30/2017)

\$15,680 Your cost*

Visit www.TheEnergyChallenge.org or Smokey Motors in Bend.

*Financing may apply. Subject to change without notice. **Consult your tax advisor to learn how you qualify.

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The Company will issue a competitive solicitation to identify an event management vendor or multiple local vendors to coordinate the ride-and-drive events. RFP evaluation criteria will identify vendors with experience organizing similar events and the ability to organize and implement these events throughout the Company’s Oregon service area. In addition, evaluation criteria will favor vendors that can leverage a funding match to co-sponsor the events.

The Company will identify event locations that reach diverse areas of the state. As noted previously, the Company divides its service area into nine regions for community engagement (see Figure 18 for a map of these regions). In addition to the ride-and-drive scheduled in the Bend area in 2017, the Portland area will be served by Drive Oregon’s NW Electric Vehicle Showcase.⁹⁹ The location of Pacific Power ride-and-drive events through the proposed pilot will be coordinated with the selected provider to event management vendor and consider the ability to bring exposure to new regions.

In addition to ride-and-drive events, the Company will organize dedication events that celebrate completion of each new pod developed through the proposed Public Charging pilot, and participate in dedication events organized by recipients of funding through the proposed Demonstration and Development pilot program. Pacific Power also plans to provide financial sponsorship or host a booth at existing community events as opportunities arise (e.g., sponsor a local farmers market in exchange for advertising space specific the company’s electric transportation resources).¹⁰⁰ Pacific Power is experienced receiving and evaluating similar event sponsorship and booth requests. For example, the Company co-sponsored the “Electric Avenue” display at the 2017 Portland Auto show. The 1,600 square foot space was coordinated by Drive Oregon and featured PEV and charging information for attendees. Pacific Power joined Clark Public Utility District and Portland General Electric as utility sponsors of the display. The proposed pilot would provide a more reliable potential avenue for similar sponsorship opportunities.

Table 12. Community Event Summary

Event type	Pacific Power involvement
Ride-and-Drive events	Pacific Power estimates that it will coordinate eight events with its event management vendor (one event in 2017, three in 2018 and four 2019.)
Charging pod dedication events	Pacific Power proposes developing up to seven charging pods through the Public Charging Pilot program. The Company will coordinate a dedication event for each pod.
Demonstration and Development project dedication events	Pacific Power will participate in dedication events for projects funded through the proposed Dedication and Development Pilot program where possible. Funding recipients will be expected to serve as lead organizer.

⁹⁹ *Drive Oregon Awarded Nearly \$1 Million for Regional Electric Vehicle Showcase*, (Aug. 2016), <http://driveoregon.org/showcase-award/> (last visited April 11, 2017).

¹⁰⁰ After a vendor is selected to manage ride-and-drive events, the Company will determine the amount of funds remaining in the program budget that can be used to sponsor community events.

Ad hoc event sponsorship	Financially sponsor and/or host a booth for community events promoting transportation electrification. Available funds to be determined after finalizing pricing for ride-and-drive events.
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4. *Technical Assistance*

Pacific Power will sponsor customized technical assistance for non-residential customers considering EVSE projects in Pacific Power’s Oregon service territory. Through a competitive bidding process, the Company will develop a network of qualified consultants to perform on-site EVSE feasibility assessments for interested non-residential customers. Qualified consultants will be required to demonstrate experience performing the requested services and the ability to serve customers across Pacific Power’s Oregon service territory. This service draws on best practices developed through other customer programs, such as energy efficiency engineering services provided through the wattsmart Business program for California and Washington customers.¹⁰¹

Eligible customers will request a custom analysis by submitting an online or written application. Consultants will be deployed to non-residential customer sites to perform custom analysis of EVSE technology options, costs, rates and best practices for siting, configuring, installing and managing equipment. Pacific Power will receive copies of consultant analysis and will follow up with participants through its program evaluation efforts to understand the usefulness of the analysis and whether customers are implementing consultant recommendations. Experience developed through the pilot program will inform future program budgets and program parameters, such as additional eligibility requirements or maximum contractor hours allowed per feasibility study.

Program Objectives and Expected Outcomes

Pacific Power’s primary objective for the proposed pilot program is to test its ability to reduce barriers to transportation electrification through different outreach and education tactics. The suite of tactics proposed is expected to help increase exposure to PEVs, access to reliable information, and understanding of the benefits and capabilities of PEVs and EVSE. In addition, certain elements are expected to encourage efficient use of the electrical grid, enable additional EVSE development, and educate Pacific Power customers about incentives and other resources that can reduce barriers created by upfront cost. Market barriers, intervention strategies and objectives are described below and summarized in Table 13.

Market Barrier: Lack of Awareness of Electric Transportation Options and Benefits

The proposed pilot will test different tactics to increase awareness of electric transportation technology, capabilities and benefits:

¹⁰¹ Examples of wattsmart Business services are located at <https://www.pacificpower.net/bus/se/tr.html>.

- **Customer Communications:** Studies suggest that exposure to PEVs and EVSE are positively correlated to favorable perception of PEVs.¹⁰² Further research indicates that general exposure is the first obstacle to overcome to accelerate adoption of PEVs.¹⁰³ Through customer communications (e.g., bill inserts, emails, paid advertising), Pacific Power expects to increase general awareness of the availability of PEVs and guide customers to educational resources, such as Pacific Power’s website and self-service tools. Brochures and other collateral are expected to further educate customers on electric capabilities, rates, costs and benefits. Targeted outreach will test the ability for different tactics and messages to increase exposure and drive customers to access educational resources. Messaging that encourages customers to charge during off-peak hours is expected to help mitigate the impacts of vehicle charging on the electrical grid.

- **Self-Service Tools:** A 2016 UC Davis study found that consumers first need general exposure to information about PEVs, followed by assistance learning what they don’t know or unlearning inaccurate information.¹⁰⁴

Pacific Power customer research suggests that website and digital channels (e.g., social media, email, text) are increasingly important in communicating with customers. The Pacific Power website totaled roughly 1.7 million users in 2016, roughly 60 percent returning visitors and 40 percent new. Accordingly, Pacific Power proposes to develop self-serve tools and resources, such as a calculator that provides customized information about costs and benefits of owning a PEV. If needed, customer service representatives can use tools to help customers who prefer to collect information through phone and other channels.

- **Community Events:** The National Academy of Science asserts that “the test-drive experience, including an opportunity to become familiar with vehicle range and charging, is a critical aspect of the consumer decision-making process for PEVs. Thus, more initiatives that offer ‘ride and drives’ for a range of PEVs at a single location would be helpful.”¹⁰⁵ Survey data from the Plug-In Electric Vehicle Collaborative’s (PEVC’s) 2015 ride-and-drive series suggests that participating in a ride-and-drive event is correlated with improved perception of PEVs.¹⁰⁶ In addition, over 90 percent of post-event survey respondents indicated that test driving a PEV was very important (54.7 percent) or somewhat important (37.7 percent) in their decision to purchase or lease a PEV (Figure 22). Based on available data, Pacific Power will focus initial community events on ride-and-drives. To capitalize on the secondary awareness benefits of other proposed transportation electrification programs (See Chapter 3 and Chapter 5), the Company will organize dedication events to celebrate completion of Pacific Power

¹⁰² NREL Study at 26.

¹⁰³ Kenneth S. Kurani, Nicolette Capello and Jennifer Tyree Hageman *New Car Buyers' Valuation of Zero-Emission Vehicles: California*, p. 72 (Aug. 2016), <https://www.google.com/search?q=New+Car+Buyers%E2%80%99+Valuation+of+Zero-Emission+Vehicles%3A+California&sourceid=ie7&rls=com.microsoft:en-US:IE-Address&ie=&oe=#spf=1> (last visited Apr. 11, 2017).

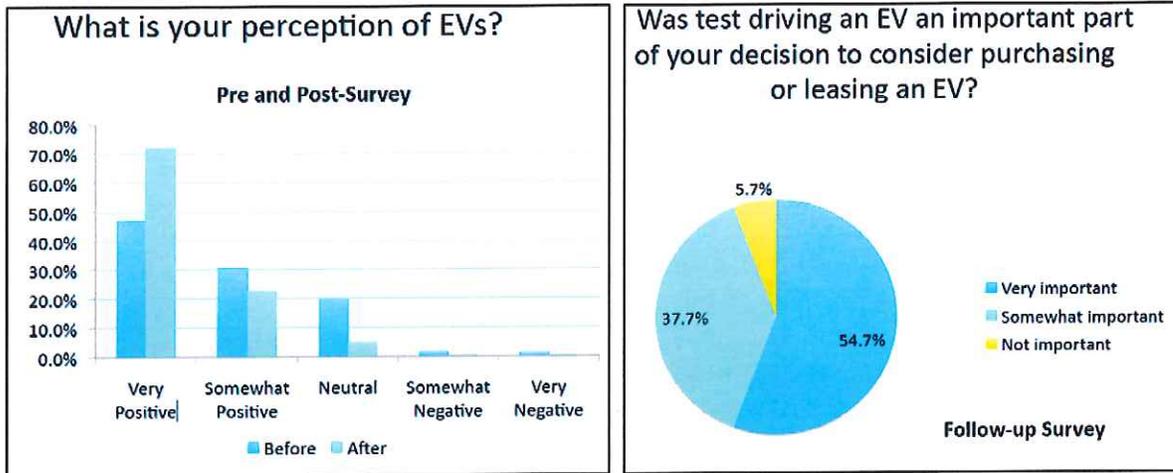
¹⁰⁴ *Id.* at 115.

¹⁰⁵ National Academy of Sciences Study at 56.

¹⁰⁶ Plug-In Electric Vehicle Collaborative, *Best. Ride. Ever! FINAL REPORT*, Addendum F (Feb. 2016), http://www.pevcollaborative.org/sites/all/themes/pev/files/PUBLIC_PEVC%20Best.Ride.EVer%21%202015%20Final%20Report.pdf (last visited Apr. 11, 2017).

charging pods and participate in dedication events hosted by Demonstration and Development funding recipients.

Figure 22. PEVC Ride-and-drive Participant Survey



- Technical Assistance:** As discussed in Chapter 1, home charging options are relatively simple and low cost compared to public, fleet and workplace charging. Concurrently, non-residential EVSE has the potential to increase exposure and provide charging access to more customers. To account for this, the Company proposes additional technical assistance for non-residential customers. The resources are expected to provide an additional level of educational resources for customers that are most likely to require more support. Program evaluation efforts will investigate the extent to which these services led to additional EVSE development and additional barriers to non-residential EVSE adoption.

Market barrier: Upfront Cost

A secondary objective of the proposed pilot is to help reduce barriers created by upfront cost. Data suggests that cost is a commonly cited reason to not consider a PEV. This may be due to actual or perceived costs of PEV ownership. Each element of the proposed Outreach and Education pilot is expected to help Pacific Power customers understand the true costs of PEV adoption, including opportunities to reduce the upfront cost (e.g., tax credits) and how to assess lifetime cost versus an ICE equivalent.

Market barrier: Lack of Accessible EVSE

As noted in Chapter 1, a lack of robust EVSE is a barrier to transportation electrification in Pacific Power’s service area. For example, workplace charging presents an opportunity to increase exposure to EVSE and enable longer-range commuting, however, employers in more rural areas may be reluctant to invest in EVSE at current levels of PEV adoption. Through the proposed Technical Assistance element, the Company expects to help make additional non-residential EVSE projects possible by providing a convenient, no-cost opportunity to access credible expertise and reduce uncertainty about costs and logistics. In particular, the Company expects to help encourage additional workplace, fleet or publicly accessible EVSE.

Additional Objectives and Outcomes

Other program objectives addressed by outreach and education tactics include:

- Making it easy for customers to locate and understand information required to make informed decisions about investments in transportation electrification, such as:
 - Increase understanding of the technology, features and its readiness;
 - Increase understanding of the economics of ownership, including cost to purchase, operate and maintain vehicles and charging equipment;
 - Decrease concern about charging logistics, including access to EVSE (range anxiety); and
 - Increase awareness of environmental and community/social benefits of adopting electric transportation.
- Encouraging efficient use of the electrical system through off-peak charging;
- Collecting data about the types of non-residential EVSE projects contemplated in Pacific Power's service area (through Technical Assistance);
- Coordinating messaging with other entities working to accelerate transportation electrification in Oregon to provide efficient and consistent messaging to customers (e.g., Drive Oregon, Clean Cities Coalitions, other electric companies); and
- Learning about market drivers, consumer interest, and barriers to adoption specific to Pacific Power's Oregon communities (surveys and engagement with communications).

Table 13. Outreach and Education Pilot Program Model

	Barriers	Objectives	Program elements	Measures	Expected outcomes
Awareness	Low exposure to electric transportation	Increase exposure to electric transportation technology and benefits in Pacific Power communities	<ul style="list-style-type: none"> • Customer communications • Community events 	<ul style="list-style-type: none"> • Total impressions of communications and events • Customer survey feedback about awareness 	Increased awareness of transportation electrification technology in Pacific Power's service area
	Lack of credible educational resources	Ensure Pacific Power customers have access to educational resources about transportation electrification, including those that promote an effective use of the electrical system	<ul style="list-style-type: none"> • Self-service tools • Technical assistance • Customer communications that guide customers to educational resources 	<ul style="list-style-type: none"> • Summary of educational resources created through projects receiving funding • Survey feedback from event attendees and customers who access educational resources 	Increased customer understanding of the benefits and capabilities of PEVs and EVSE
	Lack of messaging about off-peak charging	Mitigate the impacts of vehicle charging on the electrical grid	Messaging that encourages customers to charge during off-peak hours	Total impressions of communications and educational resources that encourage customers to charge during off-peak hours	Increased customer exposure to the benefits of efficient use of the electrical grid
Upfront Cost	High upfront cost of electric transportation (vehicle and EVSE)	Help customers understand the true upfront and lifetime costs of PEVs and EVSE	<ul style="list-style-type: none"> • Resources that inform customers about available incentives, such as federal tax credits • Self-service online tools that help customers understand estimated costs and benefits of electric transportation • Technical assistance 	<ul style="list-style-type: none"> • Analytics and survey data for educational resources that inform customers about available incentives • Analytics and survey data for self-service online tools • Evaluation of effectiveness of technical assistance 	<ul style="list-style-type: none"> • Utilization of educational resources that inform customers about available incentives • Utilization of self-service online tools • Survey feedback that educational resources helped reduce concern over upfront costs
EVSE	Lack of accessible EVSE	Encourage additional EVSE development in Pacific Power's service area	Technical assistance for non-residential EVSE projects	Number of technical assistance recipients that result in publicly available EVSE development	Increased EVSE development in Pacific Power's service area

Program Timeline

Upon Commission approval of this application, the Company will begin implementing the program elements described above. The timelines and milestones presented in this application are subject to change based on factors such as approval timing and vendor selection. Major milestones are presented in Table 20 below. Timing for elements falls within two categories:

Startup includes tactics that are developed once, then managed and maintained throughout the pilot period.

- Self-service tools and online resources
- Technical assistance process and tools (e.g., request form, check lists)
- Certain customer communications (e.g., brochures)

Ongoing includes tactics that are scheduled to be developed and implemented throughout the pilot period. These tactics are designed to provide ongoing outbound customer engagement. Each communication is developed specifically for that medium and audience and incorporates learning from previous tactics.

- Certain customer communications (e.g., bill inserts, emails, paid advertising, social media)
- Community events

Development of startup tactics is expected to occur in 2017 and early 2018. Ongoing tactics are expected to occur regularly throughout the pilot period. See Table 10 and Table 12 for details.

Market baseline assumptions: OAR 860-087-0030 (1) (a) (B)

As described in the Chapter 1, Pacific Power's service area is characterized by low adoption of electric transportation, low likelihood to consider a PEV in the next five years and limited EVSE development. Pacific Power proposes the Outreach and Education Pilot to test this model's ability to affect current market baselines by increasing Pacific Power customers' comfort with, and acceptance of, electric transportation in through exposure and access to convenient, reliable information about the benefits and capabilities of PEVs and EVSE.

Major performance milestones: OAR 860-087-0030 (1) (a) (C)

As indicated in Table 14, major milestones fall within three categories: program implementation, program evaluation and reporting. The implementation schedule is indicative of quarterly milestones and subject to change as required by this program application approval timeline and additional factors, such as third-party application evaluator solicitation results.¹⁰⁷

¹⁰⁷ The implementation schedule is indicative of quarterly milestones and subject to change as required by the program application approval timeline and additional factors, such as third-party grant manager solicitation results.

Where applicable, a description of program phases, including a proposal for when each subsequent program phase will be submitted for commission review: OAR 860-087-0030 (1) (a) (D)

The proposed pilot program represents the first phase of Pacific Power's customer outreach and education efforts around electric transportation. During the pilot period, the Company will evaluate the effectiveness of the proposed tactics and the extent to which they improved customer awareness of PEVs and EVSE. Based on program evaluation results, the Company may request an expansion of the program in 2019.

Expected utilization, participation eligibility, and any incentive structure: OAR 860-087-0030 (1) (a) (E)

Customer Communications

Customer communications are intended to increase awareness of electric transportation and educational resources across customer segments. Pacific Power may target particular activities to test specific outreach tactics or use budgets most effectively (Table 11), however, the goal of education and awareness campaigns is to ensure that all customers are aware of, and can easily access, electric transportation information and resources.

The proposed pilot is expected to help the Company understand engagement trends (utilization) for electric transportation communications (e.g., percent of emails opened, page views, number of customers that access a resource after receiving a communication with directions to that resource). As an example of what a mature outreach campaign in a well-understood market looks like, Pacific Power currently generates roughly 80 total impressions per dollar spent promoting energy efficiency to Oregon customers.¹⁰⁸

Self-service Resources

Self-service resources will be broadly available online to Pacific Power customers without fees or other direct cost. Specific tools selected through the competitive solicitation may require customers to log into their online Pacific Power account to enable customization based on their rate schedule, consumption patterns, or other customer-specific data. While these tools will be developed to maximize benefits for Pacific Power customers, the Company recognizes that non-customers may also choose to access these resources. At this point, the Company does not plan to limit access to only Pacific Power customers.

Community Events

Ride-and-drive events, along with public charging pod dedication ceremonies, will be available to the public. Demonstration and Development project celebrations eligibility will be at the discretion of the funding recipient. Pacific Power will target ride-and-drive events to maximize customer exposure across its service area. Opportunities to increase access to underserved populations will be considered in event site selection.

¹⁰⁸ Pacific Power's energy efficiency education and outreach efforts represent a mature program. Results of a new program, such as the proposed transportation electrification outreach and awareness program, may result in lower initial impressions per dollar.

The Company anticipates sponsoring one ride-and-drive event in 2017,¹⁰⁹ three in 2018 and four in 2019. Although attendance will vary, PEVC data suggest attendance may range between 150 and 500 people per event.¹¹⁰ Similar to self-service resources, these events will not be limited to Pacific Power customers. Through participant surveys, the Company will attempt to quantify attendance of Pacific Power customers.

Technical Assistance

On-site technical assistance will be available to non-residential customers¹¹¹ in Oregon contemplating EVSE projects. The budget for these services is designed to fund up to an estimated 100 on-site assessments during the pilot period.¹¹² The Company will track actual costs and customer demand for these services throughout the pilot period to manage to the overall program budget.

Identification of market barriers, program implementation barriers and program strategies to overcome identified barriers: OAR 860-087-0030 (1) (a) (F)

See Table 13 above for a summary of market barriers and program strategies to overcome identified market barriers.

Implementation Barriers

The Company has extensive experience implementing outreach and education efforts and does not anticipate serious implementation barriers. Discussion of potential implementation barriers is provided below.

Customer Interest

The pilot phase of this program will test demand for educational resources, such as technical assistance, self-service tools and ride-and-drive events. The Company cannot predict a level of customer utilization, but will engage experienced vendors and leverage best practices from similar programs (both Pacific Power programs such as the wattsmart Business energy efficiency resources¹¹³ and other electric transportation programs such as the PEVC ride-and-drive series) to optimize usefulness of resources. Through customer communications, the Company will encourage customers to access the wide range of resources available.

Provider Selection

Pacific Power proposes to engage vendors to support the self-service resources, technical assistance and community events elements of pilot program. While providers offer similar services for programs, such as energy efficiency, electric transportation is a relatively new industry. Pacific

¹⁰⁹ Ability to sponsor an event in 2017 will be dependent on the timing of pilot program approval. Additionally, the Company will look to the selected event management vendor to provide guidance on the best time of year for these events. For example, sponsoring an event in December may not be worthwhile due to weather and holiday schedules.

¹¹⁰ Plug-In Electric Vehicle Collaborative, *Best. Ride. Ever! FINAL REPORT*, Addendum B (Feb. 2016), http://www.pevcollaborative.org/sites/all/themes/pev/files/PUBLIC_PEVC%20Best.Ride.EVer%21%202015%20Final%20Report.pdf (last visited Apr. 11, 2017).

¹¹¹ Eligible customers include commercial, industrial, and agricultural customers.

¹¹² This number is subject to change once vendor pricing is established through the RFP and contracting processes.

¹¹³ More information is available at <https://www.pacificpower.net/bus/bst.html>.

Power cannot predict the level of bidder response, but will engage stakeholders to ensure the Company develops a robust vendor list.

Description of the electric company's role and, if applicable, a discussion of how the electric company proposes to own or support charging infrastructure, billing services, metering, or customer information: OAR 860-087-0030 (1) (a) (G)

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 EVSE 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 self-service resources, 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 transportation electrification in its Oregon service area. For example, the Company may co-develop a fact sheet with an interest group such as Drive Oregon or a regional Clean Cities Coalition.

Whether transportation electrification adoption attributed to the program will likely necessitate distribution system upgrades: OAR 860-087-0030 (1) (a) (H)

The extent to which the pilot program accelerated transportation electrification above the baseline projection (provided in Chapter 1) will be assessed through the program evaluation activities discussed later in this document. 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. For example, ten new PEVs in a concentrated area will have different impacts on the distribution system than ten new vehicles dispersed across the Company's Oregon service territory.

One key message for customer communications will be for customers to charge vehicles during off-peak hours. The Company intends to reinforce this message at public charging stations (proposed to be installed through the Public Charging Pilot program) with pricing that varies by time of day. This clear and consistent messaging should further reduce the likelihood of increased distribution system costs as a result of this program.

Where applicable, a discussion of ownership structure: OAR 860-087-0030 (1) (a) (I)

Not applicable. Pacific Power does not propose to own any equipment through this program.

Where applicable, a discussion addressing interoperability of invested equipment; OAR 860-087-0030 (1) (a) (J)

Not applicable. This program does not include any invested equipment.

Where applicable, a discussion of any national standards for measurement and communication: OAR 860-087-0030 (1) (a) (K)

As national standards for measurement and communication develop, this information will be incorporated into technical assistance and educational materials related to EVSE.

**DATA USED TO SUPPORT THE DESCRIPTIONS PROVIDED IN
PARAGRAPHS (1) (A) (A)-(L) OF THIS RULE: OAR 860-087-0030 (1) (b)**

Where available, supporting data have been provided throughout this application. Through the pilot, the Company will gather data specific to its service territory that can be used to inform future planning efforts.

**A DESCRIPTION OF PROGRAM COORDINATION THAT INCLUDES A
DESCRIPTION OF: OAR 860-087-0030 (1) (c)**

Stakeholder involvement in program development: OAR 860-087-0030 (1) (c) (A)

See Chapter 1.

Efforts to coordinate with related state programs: OAR 860-087-0030 (1) (c) (B)

Tax Incentives

The State of Oregon offers Energy Incentive Program tax credits to cover up to 35-percent of the cost to install non-residential EVSE or electrify fleets. Incentives specific to EVSE are scheduled to sunset at the end of the 2017 calendar year.¹¹⁴ Rebates to lower the cost of vehicle purchases are proposed in the 2017 Oregon Legislative session, as well. Educational resources will inform customers of these programs.

Oregon Low Carbon Fuels Standard

Oregon DEQ is currently in the process of updating the program rules that establish how credits are generated from residential electric vehicle charging and how those credits might be aggregated and generate value in the credit market. In addition, the Company understands that the Commission intends to open an investigation to look into the potential for utilities to generate credits under the Clean Fuels Program on behalf of residential utility customers who own electric vehicles. As more guidance is available, educational resources will make customers aware of opportunities created through this program.

Coordination, if any, of delivery with other market actors and activities, and how the market and other market actors can leverage the underlying program or projects within the program: OAR 860-087-0030 (1) (c) (C)

An objective of this program is to coordinate messaging and outreach tactics with other market actors working to accelerate transportation electrification in Oregon.

Collateral and Self-Service Resources

A wide range of stakeholders are working to accelerate transportation electrification in Oregon. (i.e., Drive Oregon, Clean Cities Coalitions, local governments, vehicle manufacturers, charging companies). Through the proposed Outreach and Education Pilot, the Company expects to leverage available opportunities to co-develop or co-brand educational collateral. In addition, the Company is aware of market actors developing self-service tools that may be leveraged for Pacific

¹¹⁴ Oregon Department of Energy, *Transportation Tax Credits*, <https://www.oregon.gov/energy/At-Work/Pages/Transportation-Tax-Credits.aspx> (last visited Apr. 11, 2017).

Power customers. This will ensure resources are maximized and messaging remains consistent and reliable.

Pacific Power's parent company, PacifiCorp, recently received a U.S. Department of Energy grant to support a project to accelerate the development and adoption of PEVs in PacifiCorp's service area (includes Pacific Power's California, Oregon, and Washington service area and Rocky Mountain Power's Idaho, Utah, and Wyoming service area.) While project funds are primarily targeted at electrifying corridors in Utah, Idaho, and Wyoming, the project includes funding for the Rogue Valley Clean Cities Coalition and Drive Oregon to perform outreach and education in Pacific Power territory. The Company will identify opportunities to coordinate proposed pilot program elements with this funding.

Community Events

The Company expects that community event management vendor selection will provide opportunities to coordinate with market actors already working to organize similar events.

Dealerships

As described in Chapter 1, data suggests that lack of reliable education resources at dealerships may pose a barrier to PEV adoption. Through the proposed pilot program, the Company will identify opportunities to provide education resources for customers at dealerships in Pacific Power's service area (e.g., brochures that explains charging options, Pacific Power rates and direct customers to additional Pacific Power resources).

In addition, the Company will continue to identify opportunities to coordinate outreach and education tactics with dealership efforts to promote PEVs. For example, the Bend Area Earth Day event discussed in the Program Elements section above is coordinated with a local dealership Nissan Leaf discount program.

As transportation electrification accelerates in Oregon, Pacific Power expects to identify additional market actors and strategies to coordinate efforts to maximize the impact of this program.

A DESCRIPTION OF THE ELECTRIC COMPANY'S LONG-TERM STRATEGY TO ACCELERATE TRANSPORTATION ELECTRIFICATION IN ITS SERVICE TERRITORY IN AN EFFECTIVE AND EFFICIENT MANNER AND HOW THE PROPOSED PROGRAM FITS WITHIN THE LONG-TERM STRATEGY: OAR 860-087-0030 (1) (d)

See Chapter 1.

A DESCRIPTION OF PROGRAM COSTS THAT INCLUDES, BUT IS NOT LIMITED TO: OAR 860-087-0030 (1) (e)

Estimated total program costs, including incentives, program delivery, evaluation, marketing, and administrative costs: OAR 860-087-0030 (1) (e) (A)

Pacific Power estimates the program costs during the pilot period, including program administration, evaluation and reporting, at roughly \$1.1 million, as presented in Table 15. Estimated expenditures by program element are intended to be indicative of the Company's priorities for this pilot program. Actual expenditures by program 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 15, 2017 spending is expected to be lower than 2018 and 2019, reflecting time required for regulatory approval and program start-up.

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 PEV awareness and acceptance questions in its existing customer research. For these reasons, the Company estimates that program evaluation costs may be lower for the proposed pilot than other pilots proposed in this application (See Chapter 3 and Chapter 5).

Table 15. Estimated Program Costs

Program Element	2017	2018	2019	Total
Customer Communications				
Self-service Resources				
Community Events				
Technical Assistance				
Third-Party Evaluation				
Program Administration				
Total				\$1,105,000

Estimated participant costs OAR 860-087-0030 (1) (e) (B)

Pacific Power intends to offer services through this program at no cost to customers. Customers who choose to adopt electric transportation or EVSE as a result of services received through this program will be responsible for the cost of purchasing, installing and maintaining equipment without financial assistance from the Company.¹¹⁵

Custom technical assistance will require a customer time commitment such that Pacific Power does not anticipate the need for safeguards to ensure program 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.

How the electric company proposes to recover costs: OAR 860-087-0030 (1) (e) (C)

The costs associated with the proposed program will be incremental to cost levels currently included in customer rates. The Company proposes to implement a surcharge to contemporaneously recover the operating costs of the pilot program through its existing Schedule 95, Pilot Program Cost Adjustment. The Company further proposes to use a balancing account to track the actual costs and surcharge collections. A tariff advice filing will be made to implement this proposed surcharge at the completion of this proceeding, expected to be in the fall of 2017. The Company will review the balancing account periodically to determine if changes to the surcharge are necessary. The Company proposes to provide annual reporting of the activity in the balancing account to provide an opportunity for prudency reviews of incurred costs.

Pacific Power estimates that program costs will result in an average 0.03 percent rate impact over the pilot period.

¹¹⁵ Non-residential EVSE projects may be eligible to receive funding through Pacific Power’s proposed Demonstration and Development pilot program.

A DESCRIPTION OF THE EXPECTED PROGRAM BENEFITS THAT INCLUDES: OAR 860-087-0030 (1) (f)

Program benefits, including to whom and when the benefits are accrued: OAR 860-087-0030 (1) (f) (A)

Electric transportation currently represents a small share of Pacific Power's total revenues, however, it also represents an opportunity for growth. As discussed in Chapter 1, only two out of every 1,000 cars registered in Pacific Power's Oregon service territory currently use plug-in electric technology,¹¹⁶ however, based on current trends, the number of PEVs registered in the Company's Oregon service territory is expected to quadruple by 2025. 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 transportation electrification, increasing and pulling forward revenue benefits for customers.

Increased revenue associated with this program may occur through increased charging in Pacific Power's service area (e.g., homes, businesses, public sites). This includes both charging resulting from efforts to reduce awareness barriers to PEV adoption and charging that results from projects enabled by technical assistance. Program evaluation efforts will investigate whether additional revenue from charging can be attributed to the proposed pilot program.

Given the typical vehicle purchase cycle,¹¹⁷ the majority of revenue generated through the proposed outreach and education efforts will accrue after the pilot period. The pilot program will establish a foundation by which long-term revenue, and associated customer benefits, may be realized as the Company investigates its ability to effectively and efficiently accelerate the adoption curve in underserved populations and throughout its Oregon service area.

The Company expects that all customers will benefit from the increased availability of consistent, reliable educational resources. Further, the tools, information and awareness building efforts provided through this program are expected to help customers capitalize on the financial benefits associated with electric transportation. Participants in the custom technical assistance program and users of the standard tools will receive information that can customers can use to maximize these financial benefits.

In the context of the proposed method of assessing program cost-effectiveness described in Chapter 2 (the Ratepayer Impact Measure), benefits for this program include the increased revenues from charging additional PEVs and utilization of EVSE enabled by technical assistance. Costs are those incurred by the Company in running the program, including vendor payments and costs to develop and implement customer communications. Pacific Power does not propose including environmental or societal benefits in cost-effectiveness analysis.

Electric system benefits: OAR 860-087-0030 (1) (f) (B)

Present PEV adoption levels and the relative nascence of utility transportation electrification programs nationwide make it difficult to forecast long-term electric system benefits of electric

¹¹⁶ Data provided by the Oregon Department of Environmental Quality, through June 2016.

¹¹⁷ On average, Americans hold on to new vehicles for 6.5 years: <http://www.cnbc.com/2015/07/28/americans-holding-onto-their-cars-longer-than-ever.html>.

transportation acceleration associated with this pilot program. Through this pilot program, customers will not only be provided with tools to inform decisions about transportation electrification, but will also be encouraged to manage vehicle charging in a manner than maximizes benefits to the electrical system. Educating customers on how their actions can benefit the electrical system, and evaluating the effectiveness of this messaging is a critical step in maximizing electrical system benefits as electric transportation adoption continues to increase. For example educating customers to charge vehicles overnight could unlock long-term operational flexibility benefits, such as the ability to integrate wind generation.

A discussion of how a net benefit to ratepayers is attainable: OAR 860-087-0030 (1) (f) (C)

In this application, the Company proposes a measured approach to investment in transportation electrification, beginning with an initial pilot phase to test program design, market barriers and the ability to accelerate transportation electrification beyond what might happen in the absence of the program and the benefits associated with this acceleration. The majority of benefits to Pacific Power's customers will not be realized until after the end of the pilot period as customers consider adopting PEVs and EVSE continue to operate over its useful life. Program evaluation efforts will estimate the benefits that can be attributed to this program to determine whether a net benefit, relative to program costs, is likely to be achieved after the pilot period. The findings from this initial phase will be used to determine whether a second phase of the program is likely to generate a net benefit for ratepayers.

A DESCRIPTION OF HOW THE ELECTRIC COMPANY WILL EVALUATE THE PROGRAM THAT INCLUDES, BUT IS NOT LIMITED TO: OAR 860-087-0030 (1) (g)

Timeline of program evaluation and proposed evaluation reporting schedule: OAR 860-087-0030 (1) (g) (A)

As shown in Table 14, Pacific Power anticipates issuing a request for proposals for third-party program evaluation services in the first quarter of 2018. The Company will work with the selected evaluation contractor to scope required evaluation efforts and develop an evaluation plan. Evaluation efforts will begin in earnest in the second half of 2018, leading up to the development of a program evaluation report to be filed with the Commission in 2019. All reporting requirements specified in OAR 860-087-0040 (1) will be addressed either in the third-party evaluation report or in the 2019 year-end report to the Commission.

Estimated cost of evaluation: OAR 860-087-0030 (1) (g) (B)

The Company has budgeted [REDACTED] for program evaluation. This budget estimate is based on the Company's extensive experience contracting with third parties to evaluate energy efficiency programs, recognizing that the exact cost will not be known until contractor bids are received through the competitive bidding process.

How the evaluation will be conducted and whether a third-party evaluation is necessary: OAR 860-087-0030 (1) (g) (C)

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. The Company will engage the ride-and-drive event management vendor to survey attendees on PEV awareness and opinions

before and after participating in the event. The Company will also seek to gather information on attendee perceptions at other events receiving Company sponsorship. The Company will continue to include general PEV awareness and acceptance questions in its existing customer research surveys.

The third-party evaluator will have four primary tasks:

1. Survey recipients of technical assistance services to investigate the effectiveness of services, the completion rate of projects, the services' impact on project completion, reasons why projects were not completed, and whether/how technical services could be improved.
2. Synthesize data from a variety of sources to investigate the pilot program's impact on customer perception and adoption of PEVs and EVSE. Data sources will include website analytics, feedback from website and self-service tool users, event attendees and technical assistance recipients, information from other Company customer research surveys and Oregon DEQ vehicle registration data.
3. Identify the most effective outreach and education tactics and make recommendations for how to increase effectiveness of efforts during or after the pilot period.
4. Assess the extent to which the pilot program led to, or is expected to lead to, increased adoption of PEVs and EVSE and the cost-effectiveness of the pilot program based on the framework presented in this application.

The Company has a long history of working with third-party consultants to evaluate its demand-side management programs and will seek proposals from a qualified pool of consultants to perform evaluation activities for this program.

How the evaluation will address identified barriers: OAR 860-087-0030 (1) (g) (D)

Program evaluation efforts will investigate the extent to which each outreach and education tactic addressed the market barriers summarized in Table 13, and how the combined efforts improved customer awareness of PEVs and EVSE. The evaluation will rely primarily on surveys of program participants (i.e., website visitors, self-service tool users, event attendees, technical service recipients), supplemented with other data sources such as web analytics. This information will be used to answer the following questions:

- To what extent did the pilot program accelerate transportation electrification, and which outreach and education tactics were the most effective?
- How did the program stimulate innovation, competition and customer choice?
- What is the actual demand for each program element in Pacific Power's service area?
- What factors led to differences in the engagement between tactics and messages?
- What were the costs and benefits of the pilot program?
- Should the program be expanded after the pilot period, and if so, how could it be improved?

A discussion of the method of data collection that is consistent with subsection (1)(b) of this rule and how the data will be used to evaluate the effectiveness of the program: OAR 860-087-0030 (1) (g) (E)

Evaluation will include customer surveys and analysis of engagement metrics associated with education resources and outreach campaigns. This program is designed as a pilot to allow the company to collect data required to develop informed metrics and establish specific metrics, projections and best practices for future goal-setting and program development. At this stage, program evaluation will focus on gathering information that can be used to understand customer needs and develop more specific targets and measures of success.

Engagement

Gathering data to inform evaluation and future planning efforts is a key component of this program. Throughout the pilot period, the Company will monitor engagement for all communications, self-service resources and events. Engagement data includes measures such as number of page views, number of emails opened, use of self-service tools, and event attendance. The Company will make this information available to the program evaluator for use in evaluating program performance and cost-effectiveness.

In addition, Pacific Power will survey customers to assess awareness of electric transportation, the Company's outreach and education efforts, barriers to adoption and opportunities for program modifications to better address these barriers. The Company will leverage available survey mechanisms (e.g., existing customer research, survey functionality of the Pacific Power website and self-service tools) to gauge overall awareness and adoption of PEV, along with customer-reported impacts of individual tactics. For example, participants in the technical assistance element will be expected to provide additional survey feedback about usefulness, process, and the degree to which technical assistance lead to the installation of EVSE. Event participants and users of online resources will be asked to complete additional surveys specific to the effectiveness of these tactics, including the impact of the tactic on perception and purchase of PEVs.

A DESCRIPTION OF HOW THE PROGRAM ADDRESSES THE CONSIDERATIONS IN OREGON LAWS 2016, CHAPTER 028, SECTION 20(4)(A)-(F).EVALUATION: OAR 860-087-0030 (1) (h)

Senate Bill 1547 identified six considerations for the Commission in evaluating transportation electrification programs for purposes of cost recovery. A discussion of how the pilot program addresses each of these considerations is provided below.

(a) Are within the service territory of the electric company

Custom technical assistance will be available to non-residential Pacific Power customers in Oregon and community event support will only be available in communities served by the Company. 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.

(b) Are prudent as determined by the commission

The Commission's prudence review of utility investment focuses on "whether the company's actions, based on all that it knew or should have known at the time were reasonable and prudent

in light of the circumstances which then existed.”¹¹⁸ In determining prudence, the Commission does not rely on “hindsight judgments” or substitute “its best judgment for the judgments made by the company’s managers.”¹¹⁹ Senate Bill 1547 requires the Company to file applications for programs to accelerate transportation electrification. Pacific Power’s proposed Outreach and Education pilot program represents a prudent approach to meeting the legislative directives of Senate Bill 1547. This pilot program, along with the other pilot programs simultaneously submitted by the Company, will test key transportation electrification program design elements at a relatively low cost to customers. The Company intends to use competitive bidding processes for third-party services and its extensive experience effectively implementing outreach and education programs to keep costs low for customers.

(c) Are reasonably expected to be used and useful as determined by the commission

This 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 customer outreach and education programs, such as energy efficiency; however, this is a relatively new and quickly evolving industry with marked differences from other Company outreach and education efforts. This pilot program is designed to test the usefulness of these efforts through actual utilization data and other program evaluation measures described in this application.

(d) Are reasonably expected to enable the electric company to support the electric company’s electrical system

Through this pilot, the Company will gain deeper insight into customer transportation decisions, where vehicle charging occurs and charging behaviors. A key component of the pilot will be customer education on efficient use of the electrical system, including the benefits of charging vehicles during off-peak periods.

(e) Are 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

A key component of the pilot will be customer education on efficient use of the electrical system, including how charging vehicles during certain periods can improve operational flexibility and the ability to integrate variable generating resources.

(f) Are reasonably expected to stimulate innovation, competition and customer choice in electric vehicle charging and related infrastructure and services

A primary program objective is to provide objective information about electric transportation options, benefits, available funding sources, Pacific Power programs and other 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.

¹¹⁸ In the Matter of PacifiCorp, d/b/a Pacific Power Req. for a Gen. Rate Rev., Order No. 12-493, Docket No. UE 246 at 25 (Dec. 20, 2012).

¹¹⁹ *Id.*

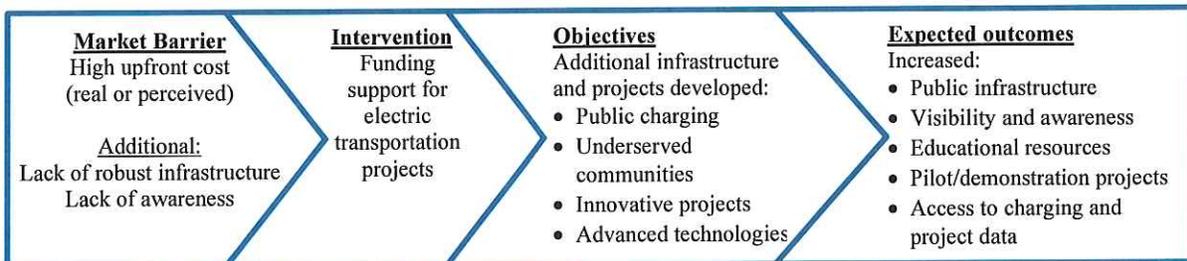
Chapter 5: Demonstration and Development Pilot

PROGRAM DESCRIPTION: OAR 860-087-0030 (1) (A)

Through a competitive grant funding process, Pacific Power will partner with non-residential customers to develop creative, customer-driven electric transportation projects in its Oregon service area. These grants will help non-residential¹²⁰ customers overcome upfront cost barriers and empower more customers to develop projects that can address additional barriers, such as lack of awareness, lack of public EVSE and limited access for low-income and other underserved communities. Grant recipients will be required to share project cost information and EVSE utilization data with Pacific Power, which will help the Company better understand transportation electrification projects in different market segments and potential impacts to the electrical system to inform future planning.

On a quarterly basis, the Company will invite customers across its service area to bring transportation electrification projects forward for grant funding. Pacific Power grants will be available for the EVSE costs associated with a project, which can include make-ready,¹²¹ hardware, installation and upfront software purchase costs. Applicants will own the projects receiving Pacific Power funding and may request up to 100 percent of eligible expenses; however, applicants will be encouraged to explore additional funding opportunities to maximize the impact of Pacific Power’s investment. Financial support will be issued as a reimbursement upon completion of the project.

Figure 23. Demonstration and Development Pilot Program Theory



Purpose

This program will test a different EVSE development model than the Company’s proposed Public Charging Pilot. Rather than Pacific Power owning and operating the EVSE, grant recipients will serve as project lead, responsible for project design, project management, equipment purchase and installation, operations and maintenance, awareness building, data collection, and data transfer to Pacific Power.

Flexibility to adapt to this rapidly evolving market is a key component of the Company’s transportation electrification strategy. To this end, the Demonstration and Development Pilot will make funding available for projects that meet certain criteria, without being overly prescriptive on the specifics of projects. While the Company does not currently know the breadth of projects that

¹²⁰ Eligible customers include commercial, industrial, and agricultural customers.

¹²¹ Pacific Power considers make-ready costs to include service panels, conduit, wiring, and other required upgrades that would not have been installed in the absence of the EVSE.

may receive funding, the following is an example of the type of project the program is designed to enable.

Hacienda CDC Low Income Car Sharing Pilot

In 2016, Pacific Power joined Hacienda Community Development Corporation (Hacienda CDC),¹²² the City of Portland and Drive Oregon in a pilot project designed to test a model for low-income electric vehicle sharing. Through the pilot, low-income community members in an area underserved by existing public transit have access to five PEVs through a vehicle-sharing platform. Hacienda CDC hosts the vehicles at their North Portland headquarters and has access to use the electric fleet for its operations. Pacific Power provided \$10,000 toward the cost of procuring and installing Level 2 charging stations to serve the vehicles. Other pilot project partners procured the vehicles and are responsible for implementing and managing the project. The project launched on March 24, 2017.¹²³

The pilot is testing electric vehicle-sharing's ability to address several barriers of transportation electrification in underserved communities. First, it is increasing exposure to electric transportation technology and dispelling misconceptions about the affordability or the complexity of operating and charging electric vehicles. Second, it provides access to the benefits of electric transportation without the barrier presented by upfront vehicle purchase costs. In addition, the pilot will measure Hacienda CDC's potential cost savings from operating electric fleet vehicles. The project will carefully track data about vehicle use, cost savings, energy and carbon savings and the experience of both vehicle managers and community users. Project data and findings will be made available to Pacific Power to inform future planning efforts.

The project at Hacienda CDC is a prime example of the type of project envisioned for grant funding under the proposed pilot program, as it supports underserved communities, tests new and innovative solutions to addressing market barriers, includes other partners and provides data and learnings that can be applied in Pacific Power's future planning efforts. The Demonstration and Development Pilot will provide a formalized process to identify and financially support similar projects. In addition, the proposed funding model allows communities to identify their own barriers and solutions, which is a priority for Pacific Power in supporting underserved communities.

¹²² Hacienda Community Development Corporation (CDC) provides well-rounded and culturally specific programming to carve out a path towards self-reliance for low-income families. Their programs serve the Latino community and others through affordable housing, after school programs, financial education, parenting support, small business development and homeownership support. More information about Hacienda CDC is available at <http://www.haciendacdc.org/>.

¹²³ First-of-its-kind program brings electric vehicle car sharing to lower-income community, (Mar. 2017), <http://driveoregon.org/first-kind-program-brings-electric-vehicle-car-sharing-lower-income-community/> (last visited Apr. 11, 2017).

Program elements, objectives, timeline, and expected outcomes: OAR 860-087-0030 (1) (a) (A)

Program Elements

Application Evaluation and Selection

Following successful practices of Pacific Power’s Blue Sky funding awards, the Company will engage an independent, third-party grant manager, selected through a competitive request for proposals process, to review and score projects based on established criteria outlined in Table 16.¹²⁴ Pacific Power will work closely with the grant manager to ensure that applicant evaluation tools and practices align with program objectives.

Table 16. Applicant Evaluation Criteria

Criteria	Measures
Project Feasibility/ Utilization	<ul style="list-style-type: none"> • Readiness of the project team and reasonableness of the project plan and timeline. • Feasibility study¹²⁵ results, including compliance with national, state and local safety and accessibility requirements. • Expectation that the EVSE will be sufficiently used, based on an assessment of applicant-provided utilization projections (e.g. community needs assessment data, electric vehicle ownership data, survey data). • Project life (as reported by the applicant) and robustness of the ongoing operations and maintenance plan. • Plan to address interoperability with driver technologies and Pacific Power’s system (e.g. capabilities to interact with AMI when installed). • Expected driver payment pricing model, if applicable.
Use of Funds	<ul style="list-style-type: none"> • Customer and Company financial commitment and leveraging of funds from other sources. • Alignment of project costs with industry standards. • Reasonableness of the proposed budget (i.e., risk of exceeding budget). • How project is designed to avoid risk of stranded investments. • Applicant and project need for funding support.
Innovation	<ul style="list-style-type: none"> • Incorporation of emerging technologies, such as renewable generation, energy storage or direct load control. • Creative project design, partnerships and utilization of resources, particularly in serving underserved populations.

¹²⁴ Since 2006, the Blue Sky funding process has helped bring nearly 100 community-driven renewable energy projects online in over thirty Pacific Power communities, on behalf of participating Blue Sky program customers. A description of each project is available at pacificpower.net/blueskyprojects.

¹²⁵ Customers may request a feasibility study under the proposed Outreach and Education pilot or perform a comparable study at their own expense.

Data Availability	<ul style="list-style-type: none"> • Type(s) of data available through the project. • Plan to collect and analyze data. • Mechanism(s) to share data with Pacific Power. • Ability to incorporate potential future electric grid services (e.g., demand response, vehicle-to-grid integration).
Educational Benefits	<ul style="list-style-type: none"> • Physical and community visibility. • Education plan and awareness building opportunities. • Exposure in communities currently underserved by EVSE, such as multi-family, low-income and remote areas of the state.¹²⁶
Environmental Benefits	<ul style="list-style-type: none"> • Proximity to areas with known air quality issues. • Alignment with the applicant’s broader environmental mission or goals.
Community Benefits	<ul style="list-style-type: none"> • Benefits provided to underserved populations. • Impact of the applicant on the community. • Use of local labor and/or materials. • Accessibility to the public.

Eligible Expenses

Demonstration and Development grants are designed to offset the upfront cost of EVSE development and awareness-building. Given the limited timeframe of the proposed pilot, funding is limited to upfront costs to avoid ongoing funding commitments beyond the pilot period. Additionally, funding is limited to expenses related to the EVSE, reflecting that vehicles may travel in and out of Pacific Power’s service area, but that EVSE is stationary.

Eligible expenses include capital expenses directly associated with the installation of EVSE, such as hardware and installation costs, make-ready costs and upfront software license costs. **Ineligible** expenses include vehicle purchase or lease, project management costs, ongoing operations and maintenance costs, energy costs, ongoing network subscription or other software costs, and site and infrastructure improvements that would occur without the installation of EVSE (e.g., landscaping, information technology network enhancements). Costs associated with outreach and education (e.g., signage, educational workshops) may be considered for funding. Pacific Power will engage the grant manager to identify an appropriate cap for outreach and education expense funding. Eligible expenses will be detailed in funding solicitations and applications will be reviewed for compliance with these guidelines.

The pilot program will help the Company understand costs for varying types of non-residential transportation electrification projects to assess whether future programs, if offered, should be expanded to fund additional components beyond upfront EVSE costs.

¹²⁶ While Pacific Power has identified examples of underserved populations, there are likely additional segments that will be identified through the Company’s proposed transportation electrification pilots. Applicants will be expected to explain how proposed projects serve an underserved population, if applicable.

Funding Timeline

Grant funding will be made available on a quarterly basis through 2019. Pacific Power anticipates issuing the first funding solicitation by the fourth quarter of 2017¹²⁷, allowing time for Commission approval of the proposed pilot program, program material development and initial outreach. While Pacific Power proposes a one-year requirement for project completion based on the best practices developed for the Blue Sky funding process, Pacific Power will continue to monitor this timeline, along with all other initial requirements, for appropriateness in the context of EVSE projects. An overview of the anticipated funding cycle is provided in Table 17.

Table 17. Demonstration and Development Quarterly Funding Cycle

Ongoing Solicitation	<ul style="list-style-type: none"> • Host application materials and additional applicant resources online. • Encourage interested parties to join the funding cycle notification list. • Build awareness through industry groups, Pacific Power’s Regional Business Managers (RBMs) and Pacific Power’s communication channels (e.g. media outreach, website, brochures, newsletters).
Month 1: Application Submission	<ul style="list-style-type: none"> • Send notice of upcoming application deadline for funding cycle to notification list. • Intensify outreach across communications channels. • Close application period.
Month 2: Evaluation	<ul style="list-style-type: none"> • Pacific Power advances eligible applications to the independent evaluator. • Independent evaluator interviews, scores, and ranks the applicants.
Month 3: Selection and Notification	<ul style="list-style-type: none"> • Review independent evaluation results and make final funding determinations. • Notify applicants and execute funding agreements.

Program Objectives and Expected Outcomes

Pacific Power’s objectives for the Demonstration and Development Pilot are to: a) test the ability of grant funding for customer-owned EVSE to overcome barriers to transportation electrification project development, and b) to acquire data on project costs and equipment utilization that can inform future planning efforts. Market barriers, intervention strategies and objectives are described below and summarized in Table 19.

Market Barrier: High Cost to Invest in Electric Transportation Technology

As indicated in Chapter 1, the high cost of investment in electric transportation, real and perceived, is a significant barrier to adoption and is the market barrier directly addressed by the Demonstration and Development pilot program. In some cases, the availability of an additional funding stream may enable a project that would not have otherwise occurred. In other instances, it may enable a more robust project that further accelerates transportation electrification (e.g., additional vehicles, more advanced hardware or software).¹²⁸

The Company expects transportation electrification project expenses to vary between projects selected for funding. The U.S. Department of Energy reports that, “installation costs, however, are

¹²⁷ This schedule is subject to change as required by the application approval timeline and additional factors, such as third-party application evaluator solicitation results.

¹²⁸ Applicants for grant funding will be expected to identify the impact of grant funding on the scope of the project.

highly variable and there is no consensus among industry stakeholders about the direction of future installation costs.” Chapter 1 provides estimated EVSE costs ranges per charger type. While Pacific Power funding will be specific to EVSE costs, this may represent just one expense associated with the transportation electrification project. Table 18 illustrates typical expenses, beyond EVSE, for transportation electrification based on the Hacienda C-EV pilot project.

Table 18. Hacienda CDC C-EV pilot project costs (illustrative)

Upfront costs	Approximate cost
Vehicle purchase	\$0 – donated
Charging equipment purchase	\$7,500
Charging equipment installation*	\$10,000 - \$15,000
Charging network licensing fees - upfront	\$216 per charger for 1 year
Education and outreach	\$0 –existing project partner budgets
Ongoing costs	
Fuel costs (electricity)	TBD
Charging network licensing fees - ongoing	
Vehicle-sharing platform fee	
Charging equipment operations and maintenance	
Vehicle maintenance	

*Includes any required upgrades to electric services

Upfront EVSE expenses may comprise the majority of a project’s costs (e.g., public charging that fills gaps in an underserved community) or represent one of several primary expenses (e.g., electrifying transit buses). In either circumstance, providing an additional funding stream is expected to help reduce the upfront cost burden and enable more projects that advance electric transportation in Pacific Power’s service area.

Market Barrier: Lack of Accessible EVSE

Increasing EVSE development in Pacific Power’s service area is expected to help reduce the barriers created by the fragmented EVSE landscape described in Chapter 1. For example, a 2015 National Renewable Energy Laboratory (NREL) survey found that respondents who were aware of charging stations were most likely to believe PEVs are as good as ICE and to consider a PEV for their next vehicle. To maximize the program’s ability to improve access to EVSE, application evaluation criteria will consider whether projects increase access to public EVSE by filling gaps and serving underserved populations, such as low income, air quality non-attainment or maintenance areas and multi-family housing.

Market Barrier: Lack of awareness of electric transportation options and benefits

Pacific Power’s proposed Outreach and Education pilot is directly targeted towards increasing awareness of electric transportation options and benefits. This program, however, also provides an opportunity to leverage individual projects for educational and awareness-building purposes. Enabling additional transportation electrification projects is expected to increase exposure to visible EVSE and, potentially, vehicles. For example, the same 2015 NREL survey mentioned above found that respondents who reported familiarity with top selling PEV models and have seen PEVs in parking lots were most likely to believe PEVs are as good as ICE and to consider a PEV for their next vehicle. Visibility and educational resources will be a key consideration of the

evaluation process generating additional educational resources about transportation electrification. Applicants will be required to explain how they will use the project to promote awareness of electric transportation, such as installing signage, hosting workshops, developing fact sheets and promoting the project in newsletters or other publications.

Additional Objectives and Outcomes

In addition to addressing the barriers listed above, this pilot will enable customers to identify transportation electrification projects that best meet their needs. Common in the nonprofit, public and healthcare sectors, and in the Company's award-winning Blue Sky program, the community engagement model relies on the support and ideas of the impacted community in designing and implementing solutions.¹²⁹ Pacific Power is enthusiastic about the Demonstration and Development pilot's incorporation of principles of community engagement in identifying opportunities to accelerate transportation electrification in the communities it serves.

This program is designed with flexibility to remain inclusive across Pacific Power's service area and keep pace with the rapidly changing electric transportation market. In addition, the pilot phase of this program is expected to provide Pacific Power with a wide range of data, including information about customer and community barriers to project implementation, identified solutions to best meet their needs, the amount of funding required to make more projects possible, the timelines and milestones associated with various types of electric transportation projects, EVSE usage patterns in different market segments and best practices to inform future program development.

Market baseline assumptions: OAR 860-087-0030 (1) (a) (B)

As described in Chapter 1, Pacific Power's service area is characterized by low adoption of electric transportation, low likelihood to consider a PEV in the next five years and limited access to publicly available EVSE. Per Table 19 below, Pacific Power proposes the Demonstration and Development pilot to test this model's ability to affect current market baselines by increasing EVSE and transportation electrification projects in Pacific Power's service area.

¹²⁹ The community engagement model is defined by Centers for Disease Control and Prevention as, "the process of working collaboratively with and through groups of people affiliated by geographic proximity, special interest or similar situations to address issues affecting the well-being of those people." Centers for Disease Control and Prevention, *Principles of community engagement (1st ed.)*, 1997.

Table 19. Demonstration and Development Pilot Program Model

	Barriers	Objectives	Program elements	Measures	Expected outcomes
Upfront Cost	High upfront cost of electric transportation (vehicle and EVSE)	Help reduce the upfront EVSE cost burden for customers and communities seeking to implement transportation electrification projects	Funding support for the EVSE component of electric transportation projects in Pacific Power's service area	<ul style="list-style-type: none"> • The extent to which Pacific Power funding award enabled the project to happen • How recipients leveraged the savings created by Pacific Power funding (e.g. did Pacific Power funding result in project expansion or serve the community in another way?) 	Increased transportation electrification projects made possible in Pacific Power's service area
EVSE	Lack of accessible EVSE	Encourage additional EVSE development in Pacific Power's service area, where sufficient investment from other entities has not yet occurred	<ul style="list-style-type: none"> • Funding support for the EVSE component of electric transportation projects in Pacific Power's service area • Applicant evaluation criteria for public access to charging equipment 	<ul style="list-style-type: none"> • Number of EVSE projects made possible through funding • Utilization data 	<ul style="list-style-type: none"> • Increased EVSE in Pacific Power's service area • Utilization of EVSE receiving Pacific Power funding
	Charging access for underserved communities (e.g. low-income, air quality non-attainment and maintenance areas, multi-family housing)	<ul style="list-style-type: none"> • Empower customers and communities to develop their own solutions to increase electric transportation access to underserved populations • Enable demonstration projects that serve as a model for further development in underserved communities 	<ul style="list-style-type: none"> • Funding support for the EVSE component of electric transportation projects in Pacific Power's service area • Applicant evaluation criteria for funding need and ability to serve underserved communities 	<ul style="list-style-type: none"> • Number of projects serving underserved communities made possible through funding • Utilization data 	<ul style="list-style-type: none"> • Increased EVSE serving underserved populations in Pacific Power's service area • Utilization of EVSE serving underserved populations that received Pacific Power funding

	Competing standards of EVSE	Promote the installation of EVSE that can support any PEV	Applicant evaluation criteria for incorporation of multiple connector options	Number of projects selected for funding utilizing multiple standards	Increased access to EVSE with multiple connector options
Awareness	Low awareness of electric transportation	Increase exposure to electric transportation technology and benefits in Pacific Power communities	<ul style="list-style-type: none"> • Funding support to encourage development of additional transportation electrification projects • Require signage and/or other visibility measures and evaluate applications based on potential visibility 	Number and location of projects receiving funding	Increased number of publicly visible transportation electrification projects and signage in Pacific Power service area
	Lack of educational resources	Ensure Pacific Power customers have access to educational resources about transportation electrification, including use of innovative solutions and advanced technologies	<ul style="list-style-type: none"> • Require and evaluate applications based on strength of education plan (e.g., case studies, fact sheets, web content, curriculum, community workshops) • Applicant evaluation criteria for testing innovative solutions and advanced technologies 	<ul style="list-style-type: none"> • Summary of additional educational resources created through projects receiving funding • Estimated reach of new education resources created through projects receiving funding • Summary of innovative solutions and advanced technologies receiving funding 	<ul style="list-style-type: none"> • Increased access to transportation electrification educational resources for Pacific Power customers (e.g., case studies, fact sheets, community workshops) • Increased development of transportation electrification projects that serve as demonstration projects for innovative solutions and advanced technologies

Where applicable, a description of program phases, including a proposal for when each subsequent program phase will be submitted for commission review: OAR 860-087-0030 (1) (a) (D)

The pilot program, proposed for 2017-2019, represents the first phase of Pacific Power's efforts to partner with customers to develop innovative demonstration and pilot projects. During the pilot period, the Company will engage a third-party program evaluator to assess the effectiveness of the pilot, including estimating benefits to customers. Based on program evaluation results, the Company may request an expansion of the program in 2019.¹³⁰

Expected utilization, participation eligibility, and any incentive structure: OAR 860-087-0030 (1) (a) (E)

Expected Utilization

The pilot program will help Pacific Power understand customer and community demand for project partnership and the proposed pilot budget is sized to provide confidence to customers that funds will be available when requested, subject to application screening and competition. The Company will track number of applications and requested funds by funding cycle to determine whether interest grows as customers become aware of the program and the effectiveness of program outreach. Customer demand for program services will inform whether competitive solicitation is an effective mechanism to identify and enable pilot and demonstration projects.

The costs associated with the purchase and installation of EVSE can vary greatly and there is insufficient information to assume the number or type of projects that may apply for and receive financial support under this program. The number of projects funded under the pilot program will be heavily dependent on the types of projects proposed, the extent to which projects include advanced technologies such as energy storage, renewable generation or load control and the ability of applicants to leverage other funding sources. The projects proposed under this pilot will provide the Company with information on the range of project types and costs to inform potential future program expansion.

Applicants will be required to estimate EVSE utilization and funding application evaluation criteria will consider expected utilization. Grant recipients will be required to share actual project utilization data with the Company.

Eligibility

All non-residential Pacific Power customers¹³¹ in Oregon are eligible to apply for program funds with preference given to community-focused organizations, such as 501(c)(3) and city, county and regional governments.¹³² To be considered, applicants must:

- Submit a plan to ensure EVSE reliability and utilization over the life of the equipment;¹³³

¹³⁰ The implementation schedule is indicative of quarterly milestones and subject to change as required by the program application approval timeline and additional factors, such as third-party application evaluator solicitation results.

¹³¹ Eligible customers include commercial, industrial, and agricultural customers.

¹³² Non-residential includes multi-unit dwelling sites on a non-residential rate schedule.

¹³³ Applicants are responsible for defining project life. Evaluation will consider the reasonableness of the proposed project life. Funding agreements will allow Pacific Power to rescind the full amount of funding awarded if equipment is removed or taken offline before the end of the agreed upon project life.

- Perform a site feasibility assessment provided through Pacific Power’s proposed Outreach and Education pilot, or other comparable study, to ensure project feasibility and accuracy of project cost estimates;
- Provide interval charging data and information on driver pricing structure, if applicable, to Pacific Power on a regular basis for the life of the project;
- Install permanent, Pacific Power approved signage to increase awareness and understanding of the benefits and opportunities for transportation electrification, the Demonstration and Development pilot program and other available Pacific Power transportation electrification resources; and
- Participate in program evaluation activities, such as surveys and questionnaires.

Incentive Structure

Applicants may request up to 100 percent of eligible expenses, but are encouraged to explore additional funding opportunities to maximize the impact of Pacific Power’s investment. Evaluation metrics will favor applicants providing a funding match and leveraging multiple partners. With a broad network of market actors working to promote electric transportation, it is difficult to identify all funding sources that could be leveraged and new opportunities may arise during the pilot period. Examples of funding sources that may be available for leverage include:

- **Federal grants:** Multiple agencies offer grants that could be used to support the development of electric transportation projects. For example, the Federal Transit Administration’s (FTA) Low or No Emission Vehicle Program provides competitive grant funding to state and local governmental authorities for the purchase or lease of zero-emission and low-emission transit buses as well as acquisition, construction, and leasing of required supporting facilities.¹³⁴
- **Tax incentives:** The Federal Plug-In Electric Drive Vehicle Credit provides a tax credit up to \$7,500 for qualified, new plug-in electric drive motor vehicles including passenger vehicles and light trucks.¹³⁵ The State of Oregon offers Energy Incentive Program tax credits to cover up to 35-percent of the cost to install non-residential EVSE or electrify fleets. Incentives specific to EVSE are scheduled to sunset at the end of the 2017 calendar year.¹³⁶ Rebates to lower the cost of vehicle purchases are proposed in the 2017 Oregon Legislative session, as well. Tax incentives may not be accessible for nonprofit and public applicants.
- **Volkswagen Clean Air Act Civil Settlement:** Volkswagen has committed to make \$73 million available in Oregon through the Mitigation Trust Fund. In addition, Volkswagen has committed to invest \$1.2 billion over ten years to increase Zero Emission Vehicle (ZEV) infrastructure and promote ZEV adoption in states other than California. This may create funding streams accessible to potential Demonstration and Development pilot applicants.
- **Oregon Low Carbon Fuels Standard:** Providers of clean fuels may choose to participate in the program as “credit generators” and sell credits to regulated parties with deficits. As such, funding recipients that operate EVSE may register to generate and monetize credits.

¹³⁴ U.S. Department of Transportation, *Low or No Emission Vehicle Program*,

<https://www.transit.dot.gov/funding/grants/low-or-no-emission-vehicle-program-5339c> (last visited April 11, 2017).

¹³⁵ Internal Revenue Service. 2009. Notice 2009-89: New Qualified Plug-in Electric Drive Motor Vehicle Credit.

https://www.irs.gov/irb/2009-48_IRB/ar09.html (last visited Apr. 11, 2017).

¹³⁶ Oregon Department Of Energy, *Transportation Tax Credits*, <https://www.oregon.gov/energy/At-Work/Pages/Transportation-Tax-Credits.aspx> (last visited Apr. 11, 2017).

The total of Pacific Power funding and all other funding sources, including tax credits, cannot exceed total eligible project costs. Grant recipients will receive reimbursement upon successful completion of the project and confirmation that the project has met all requirements and obligations. Funding is granted as an “up to” amount and final reimbursement may be adjusted for changes in project scope.

Identification of market barriers, program implementation barriers and program strategies to overcome identified barriers: OAR 860-087-0030 (1) (a) (F)

See Table 19 above for a discussion of market barriers and programs strategies to overcome identified market barriers.

Implementation Barriers

Customer Interest

The pilot phase of this program will test demand for this model of funding support. The Company cannot predict a level of customer participation or interest in applying for funding support, but will use best practices learned from other Pacific Power programs that offer competitive funding, such as Pacific Power Foundation grants and Blue Sky funding awards, to promote the pilot. As noted in Table 17, Pacific Power will use existing customer communications channels, media outreach and its Regional Business Managers to reach customers considering EVSE projects as well as to inspire customers to develop additional innovative and impactful projects. Projects selected for funding will be publicized on an ongoing basis to increase awareness and foster additional project development. Through continued solicitation efforts, Pacific Power seeks to develop a robust partnership program, similar to existing Pacific Power funding awards.¹³⁷

Pacific Power will engage other market actors, including charging equipment providers, to leverage the availability of Demonstration and Development grants when helping customers scope and design EVSE projects. The program evaluation will investigate the most common and effective communication channels for informing customers about the pilot program funding opportunity.

Project Readiness

Customers and communities interested in transportation electrification may lack the resources and experience required to design and implement successful projects in this new and evolving market. Applicants will be required to submit a project feasibility assessment, either by taking advantage of the proposed Technical Assistance component of the Company’s Outreach and Education Pilot or by commissioning a comparable study at their own expense. Evaluation criteria will include feasibility measures, such as demonstrated compliance with national, state and local safety and accessibility requirements, project life (as reported by the applicant), robustness of the ongoing operations and maintenance plan, plans to address interoperability with driver technologies and plans to address interoperability with Pacific Power’s system (e.g., capabilities to interact with AMI when installed).

¹³⁷ Since 2006, Pacific Power has awarded over \$900,000 on average per year to an increasingly competitive applicant pool. The Pacific Power foundation has awarded a total of \$58.5 million to nonprofit organizations since 1988.

Pacific Power expects grant recipients to serve as demonstration projects for future project development. In other words, the Company expects initial projects to inspire and provide best practices and lessons learned for future projects. If this occurs, projects may create a positive feedback loop of funding applicants proposing increasingly successful projects.

Description of the electric company's role and, if applicable, a discussion of how the electric company proposes to own or support charging infrastructure, billing services, metering, or customer information: OAR 860-087-0030 (1) (a) (G)

This program will test a different EVSE development model than the Company's proposed Public Charging Pilot. **Pacific Power will not own or manage any equipment under this program.** Demonstration and Development Pilot funding recipients will serve as project lead, responsible for project design, project management, equipment purchase and installation, operations and maintenance, awareness building, data collection and data transfer to Pacific Power.

Pacific Power will solicit applications, develop the application and funding process, work with the independent application evaluator to assess and select projects, monitor project progress, manage the reimbursement process and collect station utilization data from funded projects. Pacific Power will encourage potential applicants to use Technical Assistance proposed through the Company's Outreach and Education pilot but will not require it.

Whether transportation electrification adoption attributed to the program will likely necessitate distribution system upgrades: OAR 860-087-0030 (1) (a) (H)

As Pacific Power does not yet know the breadth of grant recipients, the Company cannot project the extent to which this program will accelerate transportation electrification during the pilot period; however, Pacific Power will closely monitor impacts to its distribution system through the life of the program. The extent to which the pilot program accelerated adoption will be assessed through program evaluation activities, discussed later in this document.

Applicants must provide an approved feasibility study that can be evaluated to identify potential distribution system impacts as well as the reasonableness of required system upgrades. Applications evaluation will consider the extent of distribution system upgrades and whether a proposed project includes technology or additional components that mitigate impacts on the distribution system. Data collected from projects are expected to help Pacific Power understand system impacts across a diverse range of projects.

Where applicable, a discussion of ownership structure: OAR 860-087-0030 (1) (a) (I)

The award recipient will own equipment funded by this program.

Where applicable, a discussion addressing interoperability of invested equipment; OAR 860-087-0030 (1) (a) (J)

As discussed above, applicants will be expected to address interoperability in grant applications.

Where applicable, a discussion of any national standards for measurement and communication: OAR 860-087-0030 (1) (a) (K)

The Company does not plan to mandate particular measurement and communication standards in the initial phase of applications; however, the Company does expect applicants to specify how they will measure utilization, communicate required data to Pacific Power and minimize risk of stranded investments. Pacific Power will monitor the development of standards for measurement

and communication and proposed grant applications to determine whether standards should be incorporated into funding requirements.

DATA USED TO SUPPORT THE DESCRIPTIONS PROVIDED IN PARAGRAPHS (1)(A)(A)-(L) OF THIS RULE: OAR 860-087-0030 (1) (B)

Where available, supporting data have been provided throughout this application. Through the pilot, the Company will gather data specific to its service territory that can be used to inform future planning efforts.

A DESCRIPTION OF PROGRAM COORDINATION THAT INCLUDES A DESCRIPTION OF: OAR 860-087-0030 (1) (C)

Stakeholder involvement in program development: OAR 860-087-0030 (1) (c) (A)

See Chapter 1.

Efforts to coordinate with related state programs: OAR 860-087-0030 (1) (c) (B)

See Incentive Structure section.

Coordination, if any, of delivery with other market actors and activities, and how the market and other market actors can leverage the underlying program or projects within the program: OAR 860-087-0030 (1) (c) (C)

This program is designed to remain technology and provider neutral and all partnerships that meet program eligibility requirements will be considered for funding. Concurrently, as addressed in Chapter 1 of this application, many actors are working to increase awareness and facilitate more transportation electrification projects in the state. With this, other market actors can play a critical role in 1) encouraging the development of projects this program will support, and 2) promoting the funding opportunity to potential applicants. Examples of such actors that Pacific Power expects to coordinate with include:

Local Governments

Local governments in Pacific Power's Oregon service area are actively engaged in environmental, climate and transportation electrification efforts. City, county and regional government efforts are diverse and expected to continue to expand. The following is not an exhaustive list, but sampling to illustrate the type of action underway in the Company's service area:

- The City of Portland first adopted an electric vehicle strategy in 2010.¹³⁸ This strategy was updated in 2017 focusing on electrification of the public transit system, shared vehicles, fleets, and enabling cost effective installation of EVSE.
- In 2016, the City of Corvallis the Corvallis Climate Action Plan. "Accelerat[ing] transition to electric vehicles" is a key strategy of the plan's Buildings and Energy action area.¹³⁹

¹³⁸ 2017 City of Portland Electric Vehicle Strategy, <https://www.portlandoregon.gov/bps/article/619275> (last visited Apr. 11, 2017).

¹³⁹ *Corvallis Climate Action Plan* p.12 (Dec. 2016),

<http://www.corvallisoregon.gov/Modules/ShowDocument.aspx?documentid=10970> (last visited Apr. 11, 2017).

Local government efforts are expected to provide several opportunities for coordination. First, these entities may leverage Demonstration and Development funding to enable or increase the scope of their transportation electrification projects. In addition, local government efforts may spur other parties to develop projects in need of additional funding. Finally, Pacific Power expects to coordinate with local governments to publicize the grant funding opportunity.

Industry and Interest Groups

Industry and interest groups are actively working to promote transportation electrification in Pacific Power's service area. The Company will coordinate with these groups to help direct suitable projects toward the Demonstration and Development funding process. Drive Oregon, for example, was instrumental in facilitating Pacific Power's participation in the Hacienda CDC low income vehicle sharing pilot referenced earlier in this application.

In addition, two regional Clean Cities coalitions operate in Pacific Power's Oregon service area. Rogue Valley Clean Cities operates in Jackson County and Columbia Willamette Clean Cities operates in Benton, Clackamas, Clatsop, Columbia, Crook, Deschutes, Hood River, Jefferson, Lane, Lincoln, Linn, Marion, Multnomah, Polk, Tillamook, Wasco, Washington and Yamhill Counties along with additional counties in Washington. The U.S. Department of Energy's Clean Cities program provides resources and information to help local coalitions reduce petroleum use in transportation. These coalitions leverage federal resources to create networks of local stakeholders that advance transportation projects, including electric transportation. In Oregon, these organizations support important transportation electrification projects, such as the West Coast Electric Highway, along with coordinating regional work groups and initiatives.

As transportation electrification continues in Oregon, Pacific Power hopes to engage additional interest groups.

Trade Allies

Through its experience providing energy efficiency programs and managing the Blue Sky funding award process, Pacific Power understands the value that trade allies and manufacturers have in connecting their customers with opportunities for funding and incentives. Charging equipment and network services companies are regularly engaged in conversations with potential customers in Oregon. Vehicle manufacturers (e.g., electric buses) and auto dealerships are engaged in business outreach conversations with Pacific Power customers, as well. While trade ally business outreach may not be as prominent in parts of Pacific Power's Oregon service area as in major metropolitan areas, the Company expects these providers to play a role in encouraging Pacific Power customers to consider transportation electrification projects and connecting eligible customers to the Demonstration and Development funding opportunity.

Through the pilot phase, Pacific Power expects to identify additional market actors and develop strategies to coordinate efforts to maximize the impact of this program.

A DESCRIPTION OF THE ELECTRIC COMPANY’S LONG-TERM STRATEGY TO ACCELERATE TRANSPORTATION ELECTRIFICATION IN ITS SERVICE TERRITORY IN AN EFFECTIVE AND EFFICIENT MANNER AND HOW THE PROPOSED PROGRAM FITS WITHIN THE LONG-TERM STRATEGY: OAR 860-087-0030 (1) (D)

See Chapter 2.

A DESCRIPTION OF PROGRAM COSTS THAT INCLUDES, BUT IS NOT LIMITED TO: OAR 860-087-0030 (1) (E)

Estimated total program costs, including incentives, program delivery, evaluation, marketing, and administrative costs: OAR 860-087-0030 (1) (e) (A)

The estimated program cost during the pilot period is roughly \$1.7 million, as shown in Table 21.¹⁴⁰ The Company anticipates that roughly 85 percent of program funds will go directly to customers through funding awards, with other program funds dedicated to program administration, evaluation and outreach. The grant funding budget has been sized to assure customers that funding will be available when requested during the pilot period, subject to application screening and competition. Actual funding levels will be driven by customer demand, project viability and requested financial commitment from the Company. Funds not distributed in a given year will be used to increase grant funding availability in the following year. If funds remain un-awarded at the end of the pilot period, the Company will either propose to the Commission to use them for a different transportation electrification program or return them to customers. The 2017 budget reflects a lower relative funding level due to expected program approval and implementation timelines.

Table 21. Estimated Program Costs

Cost Category	2017	2018	2019	Total
Grant Funding				
Application Evaluation				
Third-Party Evaluation				
Program Administration				
Total				\$1,685,000

Application and program evaluation costs are informed by the Company’s experience engaging consultants to perform these services for Blue Sky and energy efficiency programs, respectively. Actual costs for these services will be determined through consultant selection and contracting and will vary based on participation levels.

Estimated participant costs OAR 860-087-0030 (1) (e) (B)

Applicants may request up to 100 percent of eligible expenses,¹⁴¹ but are encouraged to explore additional funding opportunities to maximize the value of Pacific Power’s investment. Evaluation metrics will favor applicants providing a funding match and leveraging multiple partners and

¹⁴⁰ Due to the nature of the grant funding cycle, some funds committed in 2019 will be paid to customers in 2020.

¹⁴¹ See “Eligible Expenses” section above for a list of expenses that grant funding may be used for.

funding sources. Participants will be responsible for all project costs not explicitly included in the project funding agreement.

How the electric company proposes to recover costs: OAR 860-087-0030 (1) (e) (C)

The costs associated with the proposed program will be incremental to cost levels currently included in customer rates. The Company proposes to implement a surcharge to contemporaneously recover the operating costs of the pilot program through its existing Schedule 95, Pilot Program Cost Adjustment. The Company further proposes to use a balancing account to track the actual costs and surcharge collections. A tariff advice filing will be made to implement this proposed surcharge at the completion of this proceeding, expected to be in the fall of 2017. The Company will review the balancing account periodically to determine if changes to the surcharge are necessary. The Company proposes to provide annual reporting of the activity in the balancing account to provide an opportunity for prudence reviews of incurred costs.

Pacific Power estimates that program costs will result in an average 0.04 percent rate impact over the pilot period.

A DESCRIPTION OF THE EXPECTED PROGRAM BENEFITS THAT INCLUDES: OAR 860-087-0030 (1) (F)

Program benefits, including to whom and when the benefits are accrued: OAR 860-087-0030 (1) (f) (A)

Electric transportation currently represents a small share of Pacific Power's total revenues, however, it also represents an opportunity for growth. As discussed in Chapter 1, only two out of every 1,000 cars registered in Pacific Power's Oregon service territory currently use plug-in electric technology,¹⁴² however, based on current trends, the number of PEVs registered in the Company's Oregon service territory may quadruple by 2025. This revenue growth is a benefit to all Pacific Power customers, particularly if vehicle 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 transportation electrification, increasing and pulling forward revenue benefits for customers.

Projects installed in 2018 and 2019 will provide valuable information for program evaluation and future planning, however, the majority of revenue generated from these projects will accrue after the pilot period. The pilot program will establish a foundation by which long-term revenue, and associated customer benefits, may be realized as the Company investigates its ability to effectively and efficiently accelerate the adoption curve in underserved populations and throughout its Oregon service area.

Non-residential customers whose projects are selected for funding will receive a direct benefit during the pilot period, in the form of a payment from Pacific Power to help offset all or part of the initial cost of EVSE deployment. Oregon's Clean Fuels Program (OAR 340-253) presents a potential opportunity for non-residential customers to capture additional benefits through monetizing credits generated by supplying electricity as a transportation fuel. Current program

¹⁴² Data provided by the Oregon Department of Environmental Quality, through June 2016.

rules provide the owner or operator of non-residential EVSE with the first opportunity to generate credits for this EVSE.

In the context of the proposed method of assessing program cost-effectiveness described in Chapter 2 (the Ratepayer Impact Measure), benefits for this program are the new revenues to Pacific Power associated with the project. Costs are those incurred by the Company in running the program and serving the new load, including program management, grant funding and energy supply costs. The Company does not propose including environmental or societal benefits in cost-effectiveness analysis.

Electric system benefits: OAR 860-087-0030 (1) (f) (B)

Present PEV adoption levels and the relative nascence of utility transportation electrification programs nationwide make it difficult to forecast long-term electric system benefits of electric transportation acceleration associated with this pilot program. Customers applying for funding through this program will be encouraged to incorporate project features that can test and enhance electric system benefits, including strategies to shift charging to off-peak periods, mitigate grid impacts during peak periods and integrate on-site generation. If the Company is successful in increasing the adoption of these technologies and practices as use of electricity as a transportation fuel increases, benefits to the electric system may include increased operational flexibility, such as the ability to harness electric transportation for demand response, and the ability to better integrate variable generation resources, such as wind generation available during off-peak hours. The pilot will provide the Company with deeper insight into typical non-residential EVSE configurations, charging patterns, impacts on the electrical system and the feasibility, costs and benefits of incorporating features to mitigate these impacts.

A discussion of how a net benefit to ratepayers is attainable: OAR 860-087-0030 (1) (f) (C)

In this application, the Company proposes a measured approach to investment in transportation electrification, beginning with an initial pilot phase to test program design, market barriers and the ability to accelerate transportation electrification beyond what might happen in the absence of the program and the benefits associated with this acceleration. As discussed above, the majority of benefits to Pacific Power's customers will not be realized until after the end of the pilot period as vehicles and equipment continue to generate revenue and provide electrical system benefits over their useful lives. Program evaluation efforts will estimate the benefits that can be attributed to this program to determine whether a net benefit, relative to program costs, is likely to be achieved after the pilot period. The findings from this initial phase will be used to determine whether a second phase of the program is likely to generate a net benefit for customers.

A DESCRIPTION OF HOW THE ELECTRIC COMPANY WILL EVALUATE THE PROGRAM THAT INCLUDES, BUT IS NOT LIMITED TO: OAR 860-087-0030 (1) (G)

Timeline of program evaluation and proposed evaluation reporting schedule: OAR 860-087-0030 (1) (g) (A)

As indicated in Table 20, Pacific Power anticipates issuing a request for proposals for third-party program evaluation services in the first quarter of 2018. 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 in the second quarter of 2018, leading up to the

development of a program evaluation report to be filed with the Commission in 2019. The program evaluation report will address all reporting requirements specified in OAR 860-087-0040 (1).¹⁴³

Estimated cost of evaluation: OAR 860-087-0030 (1) (g) (B)

The Company has budgeted [REDACTED] for program evaluation, assumed to be spread evenly between 2018 and 2019. This budget estimate is based on the Company's extensive experience contracting with third parties to evaluate energy efficiency programs, recognizing that the exact cost will not be known until contractor bids are received through the competitive bidding process.

How the evaluation will be conducted and whether a third-party evaluation is necessary: OAR 860-087-0030 (1) (g) (C)

Program evaluation will be conducted by a third-party contractor selected through a competitive bidding process. The Company has a long history of working with third-party consultants to evaluate its demand-side management programs and will seek proposals from a qualified pool of consultants to perform evaluation activities for this program.

Program evaluation will attempt to measure the ability of this program to accelerate transportation electrification. The current landscape is populated by a diverse network of public and private market actors working in parallel and these initial pilot programs represent Pacific Power's first intervention in this new and evolving market. Accordingly, the Company's strategy to measure its programs' individual impact on the rate of transportation electrification focuses on the programs' ability to address primary market barriers. Pacific Power will engage the program evaluator to design specific measures based on information collected funding recipient surveys, evaluation of projects selected for funding and analysis of utilization data collected by projects selected for funding.

How the evaluation will address identified barriers: OAR 860-087-0030 (1) (g) (D)

As referenced in Table 19, the Demonstration and Development pilot program will address the upfront cost barrier to transportation electrification and provide ancillary support to overcome barriers associated with insufficient EVSE and awareness. The evaluation will assess the pilot program's ability to address identified barriers as follows:

Market barrier: High Upfront Cost to Invest in Electric Transportation Technology

Providing an additional funding stream will enable development of additional transportation electrification projects in Pacific Power's service area. While Pacific Power funding may only represent a portion of the total project cost, grant recipients will be surveyed to determine whether and to what extent Pacific Power funding allowed the project to occur or expand beyond the original scope. In addition, evaluation will measure the community or customer benefits enabled through funding (i.e., what funding recipients were able to do with funds no longer required for EVSE costs).

¹⁴³ The implementation schedule is indicative of quarterly milestones and subject to change as required by the program application approval timeline and additional factors, such as third-party application evaluator solicitation results.

Market Barrier: Lack of Accessible EVSE

Evaluation efforts will attempt to measure the Demonstration and Development program's ability to spur EVSE development in Pacific Power's service area, including that which is publicly available, serves underserved populations, fills gaps in existing networks and addresses barriers created by competing connection standards. Utilization data will provide insight into equipment usage patterns and will be compared to the applicant's utilization estimates. The location of publicly available EVSE will indicate the ability of these projects to complement existing EVSE development and increase connectivity.

Market Barrier: Lack of Awareness of Electric Transportation Options and Benefits

Evaluation of the Demonstration and Development pilot's impact on awareness will focus on the reach of education and visibility efforts associated with grant recipients. This may include data such as workshop attendance, email or web content views, social media reach and traffic to areas in which EVSE, vehicles or signage as identified and reported by applicants. Evaluation will also examine the extent to which projects selected for funding created replicable examples of innovative program design or incorporation of advanced technologies.

To complement the measures listed above, evaluation will seek to answer the following questions about program design and reception:

- To what extent did the pilot program accelerate transportation electrification?
- How did the program stimulate innovation, competition and customer choice?
- How effective were advanced technologies and innovative project designs in supporting system efficiency and operational flexibility, including the ability to integrate variable resources?
- What is the actual demand for electric transportation project funding in Pacific Power's Oregon service area?
- Which barriers and solutions to overcome barriers have Pacific Power customers and communities identified?
- What factors led to differences in the utilization levels between projects (e.g., location, market segment, project design)?
- How does this model compare to the ownership model in Pacific Power's Public Charging Pilot?
- What is the risk of stranded assets resulting from grant recipients?
- What were the costs and benefits of the pilot?
- Should the program be expanded after the pilot period, and if so, how could it be improved?

The answers to these questions will be used to inform future planning after the pilot period.

A discussion of the method of data collection that is consistent with subsection (1)(b) of this rule and how the data will be used to evaluate the effectiveness of the program: OAR 860-087-0030 (1) (g) (E)

During the development of the program evaluation work plan, the Company will work with the selected program evaluation provider to identify all data needed to answer the questions above. Funding recipients will be required to participate in program evaluation activities, such as surveys and questionnaires, and will be required to provide data on equipment utilization and how often equipment was offline or otherwise inaccessible for program evaluation efforts. Funding recipients will additionally report on the reach of education and visibility measures such as workshop

attendance, email or web content views, social media reach and traffic to areas in which EVSE, vehicles or signage as identified and reported by applicants.

The Company will provide the third-party evaluator with data on program costs and project data provided by program participants. The third-party evaluator will be tasked with identifying the best mechanism(s) to solicit feedback from grant applicants and recipients.

The evaluation will also use Oregon Department of Environmental Quality data on PEV registrations to investigate whether adoption has accelerated above the baseline forecast provided in Chapter 1. While increased adoption may not be directly tied to the pilot program, this will be a useful metric to assess the effectiveness of the coordinated efforts of organization across Oregon working to accelerate transportation electrification during the pilot period.

A DESCRIPTION OF HOW THE PROGRAM ADDRESSES THE CONSIDERATIONS IN OREGON LAWS 2016, CHAPTER 028, SECTION 20(4)(A)-(F).EVALUATION: OAR 860-087-0030 (1) (H)

Senate Bill 1547 identified six considerations for the Commission in evaluating transportation electrification programs for purposes of cost recovery. A discussion of how the pilot program addresses each of these considerations is provided below.

(a) Are within the service territory of the electric company

All projects selected for funding will be located within Pacific Power's service area and owned by a Pacific Power customer.

(b) Are prudent as determined by the commission

The Commission's prudence review of utility investment focuses on "whether the company's actions, based on all that it knew or should have known at the time were reasonable and prudent in light of the circumstances which then existed."¹⁴⁴ In determining prudence, the Commission does not rely on "hindsight judgments" or substitute "its best judgment for the judgments made by the company's managers."¹⁴⁵ Senate Bill 1547 requires the Company to file applications for programs to accelerate transportation electrification. Pacific Power's proposed Demonstration and Development pilot program represents a prudent approach to meeting the legislative directives of Senate Bill 1547. This pilot program, along with the other pilot programs simultaneously submitted by the Company, will test key transportation electrification program design elements at a relatively low cost to customers. The Company intends to use competitive bidding processes for third-party services and its extensive experience effectively managing voluntary customer programs to keep costs low for customers.

(c) Are reasonably expected to be used and useful as determined by the commission

In the initial pilot phase, Pacific Power does not assume an expected volume of applications. Pacific Power intends to use this program to test whether competitive solicitation is an effective mechanism to identify and enable pilot and demonstration projects. In addition, the Company seeks

¹⁴⁴ In the Matter of PacifiCorp, d/b/a Pacific Power Req. for a Gen. Rate Rev., Order No. 12-493, Docket No. UE 246 at 25 (Dec. 20, 2012).

¹⁴⁵ *Id.*

to understand the effectiveness of enabling pilot and demonstration projects in accelerating transportation electrification.

The Company notes that even projects with low utilization may be useful if they increase awareness of electric transportation, increase access for underserved populations, generate case studies and data about advanced technologies and innovative project design, reduce range anxiety and increase driver confidence that charging options will be available when needed.

(d) Are reasonably expected to enable the electric company to support the electric company's electrical system

Pacific Power will require a feasibility study as a component of funding applications and will consider a project's impact on the electrical system when evaluating applications. Projects incorporating features or technologies to mitigate detrimental electrical system impacts will be given priority in application scoring.

(e) Are 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

Pacific Power will require a feasibility study as a component of funding applications and will consider a project's impact on the electrical system when evaluating applications. Projects incorporating features or technologies that improve operational flexibility, such as integrating on-site energy storage and/or generation or encouraging off-peak charging, will be given priority in application scoring.

(f) Are reasonably expected to stimulate innovation, competition and customer choice in electric vehicle charging and related infrastructure and services

Innovation

This program will identify and test innovative electric transportation technologies and project designs. This program will also stimulate additional project proposals that otherwise would not have materialized. Regardless of whether the project is selected for funding, this program may inspire Pacific Power customers and communities to develop and, potentially implement, innovative solutions to accelerate transportation electrification.

Competition

The program is designed as a competitive funding process that inspires a range of innovative and additional transportation electrification projects in Pacific Power's Oregon service area. Pacific Power hopes the program will spur additional market competition, particularly in underserved areas, as market actors leverage the availability of project funding when helping customers scope and design EVSE projects.

Customer Choice

This pilot will test the ability of a funding partnership program to stimulate customer choice through flexibility and broad solicitation and does not prescribe specific eligible technologies or projects. Competitive funding will allow customers and communities across Pacific Power's Oregon service area to bring projects forward that meet their unique needs.

**APPENDIX A –
STAKEHOLDER LIST**

APPENDIX A – STAKEHOLDER LIST

Engaging stakeholders in program development is a critical component of the Company’s transportation electrification strategy. Pacific Power engaged a wide range of stakeholders throughout the development of the proposed pilot programs, including:¹⁴⁶

Avista	Morris Energy Consulting
Bend Environmental Center	Northwest Energy Coalition
Cascades East Transit	Oregon Department of Energy
Central Point Chamber of Commerce	Oregon Department of Environmental Quality
ChargePoint	Oregon Department of Justice
Citizens' Utility Board	Oregon Department of Transportation
City of Bend	Oregon Environmental Council
City of Central Point	Oregon Global Warming Commission
City of Grants Pass	Oregon Municipal Electric Utilities Association
City of Madras	Oregon State University Cascades Campus
City of Portland	Pine Mountain Sports
Climate Solutions	PlugShare
Columbia Corridor Association	Portland General Electric
Delta Products	Public Utility Commission of Oregon
Drive Oregon	Renewable Northwest
Energy Trust of Oregon	Rogue Valley Clean Cities
EV4	Rogue Valley Council of Governments
EVGo	Rogue Valley Transportation District
FleetCarma	Sierra Club
General Motors	Stemach Design & Architecture
Greenlots	TriMet
Josephine County	

¹⁴⁶ This list is indicative of the type and breadth of stakeholder involvement, but may not capture every stakeholder group that participated in the process.