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VIA ELECTRONIC FILING

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

Attn: Filing Center

Re: UM 2056—PacifiCorp's Reply Comments

PacifiCorp d/b/a Pacific Power (PacifiCorp or Company) submits the following Reply Comments in response to comments received on the Company's Oregon Transportation Electrification Plan (TE Plan) filed with the Public Utility Commission of Oregon (Commission) on February 3, 2020.

Pacific Power would like to acknowledge and thank all Parties that provided thoughtful comments, questions and feedback including Commission Staff (Staff), Alliance of Western Energy Consumers, ChargePoint, Greenlots, Northwest Energy Coalition (NWEC), and Oregon Citizens' Utility Board (CUB). Comments received were generally supportive of the TE Plan with requests for clarification or additional information. Of particular interest were the challenges to electric vehicle (EV) adoption across a diverse span of customer demographics, as Pacific Power's Oregon service territory includes counties throughout the state.

I. REPLY TO STAKEHOLDER COMMENTS

PacifiCorp's Reply Comments will address these comments and questions received as related to the TE Plan by the following categories.

A. Current Market Adoption

Sections 2.1-2.3 of the TE Plan describe the current level of EV adoption in Oregon and specific to Pacific Power's service territory. Staff requested a map similar to the one in Figure 5 of the TE Plan showing the percentage of Pacific Power's total EV registration by county. Of particular interest was what percentage Multnomah County makes up of the total number of EVs in the service territory.

To create the map depicted in Figure 5 of the TE Plan the Company used data from the Oregon Department of Environmental Quality's (DEQ) Clean Fuel Program summary of EVs by county and utility through September 2019[1]. To determine the percentage of EVs as total registered vehicles by county the Company used total 2018 passenger vehicle counts from Oregon Department of Transportation's (ODOT) Vehicle Registrations by County.[2] As was stated in the TE Plan, county boundaries do not align with service area boundaries. Counties may be served my multiple utilities.

While Pacific Power receives statewide aggregate total EV counts designated to the Company by DEQ, it does not receive a breakdown of where within the service area those vehicles are registered. The Company has opened a dialogue with DEQ and other state agencies about receiving access to a more comprehensive database with additional location information. At the present time the company does not have access to a reliable data source of EV registrations currently assigned to Pacific Power's service area by county.

NWEC requested to learn what type of residential chargers (level 1, basic level 2, or smart level 2) residential customers are utilizing. As part of PacifiCorp's 2019 Residential Survey, PacifiCorp asked Oregon customers how they charge their electric vehicle at their home. Survey results indicate that approximately 50 percent of respondents utilize Level 2 charging, 47 percent utilize Level 1 charging, and the remaining respondents did not know what type of charging they use. Of those respondents with Level 2 charging, 35 percent have a unit that allows them to monitor and control charging remotely.

In addition, NWEC asked for rate, reliability, compatibility, and availability information related to non-utility owned public charging stations in Pacific Power's service area. These questions on public charging stations in PacifiCorp's service area raise an important point about standards in public EV charging. It is difficult to measure and compare public chargers and networks in an "apples to apples" manner. Unlike gas stations that charge customers per gallon of gas dispensed or electric utilities which charge customers based on kilowatt-hours (kWh) consumed, station owners are able to set and change public charging rates at will. The questions raised by NWEC would require a dedicated study or may be addressed through the Oregon Department of Energy's (ODOE) planned research and reporting in response to Senate Bill 1044.

B. Existing Programs and Rates

Section 2.4 of the TE Plan describes current customer rates designed to encourage efficient and economic charging practices. Pacific Power's Oregon Schedule 45 and Rocky Mountain Power's Utah residential time-of-use (TOU) rates were highlighted.

In its comments, Commission Staff asked for clarification regarding how Schedule 45 was described as differing from Schedule 28. Staff inquired how Schedule 45 participants could be

[1] Oregon Department of Environmental Quality. (2019). Air Quality Programs- Data for the Clean Fuels Program. Retrieved from https://www.oregon.gov/deq/aq/programs/Pages/Clean-Fuels-Data.aspx.
[2] Oregon Department of Transportation. (2018). Driver and Motor Vehicles Services Division- Vehicle Registrations by County. Retrieved from https://www.oregon.gov/odot/DMV/docs/2018_Vehicle_County_Registration.pdf.

described as paying the same amount for demand charges as they would on Schedule 28 when they get a 50 percent discount on average.

To clarify, the purpose for Schedule 45 is to help support EV charging from direct current (DC) fast charging stations with low-load factors by providing relief from typical demand charges with the application of a temporary and declining discount while adjusting the on-peak energy rate in a complementary manner. The prices for Schedule 45 were designed to be revenue neutral for the entire class of Schedule 28 customers as Schedule 45 participants (low-load factor DC fast charging stations) are not similar to the typical Schedule 28 customer.

Commission Staff also wanted to know whether deliveries of power are greater right after the on-peak period ends for Schedule 45. The Company agrees that this is an important question to answer. Unfortunately, a full year of Advanced Metering Infrastructure (AMI) data is not yet available and the Company believes that it should have this before it attempts to analyze usage patterns for Schedule 45, since the number of participants and the volume of load is so small.

Rocky Mountain Power's Utah residential TOU pilot description prompted NWEC to ask for key findings, load impacts and seasonal daily load profiles from the pilot. In addition, they requested Pacific Power's seasonal daily load profile and how residential charging data could inform the pilot.

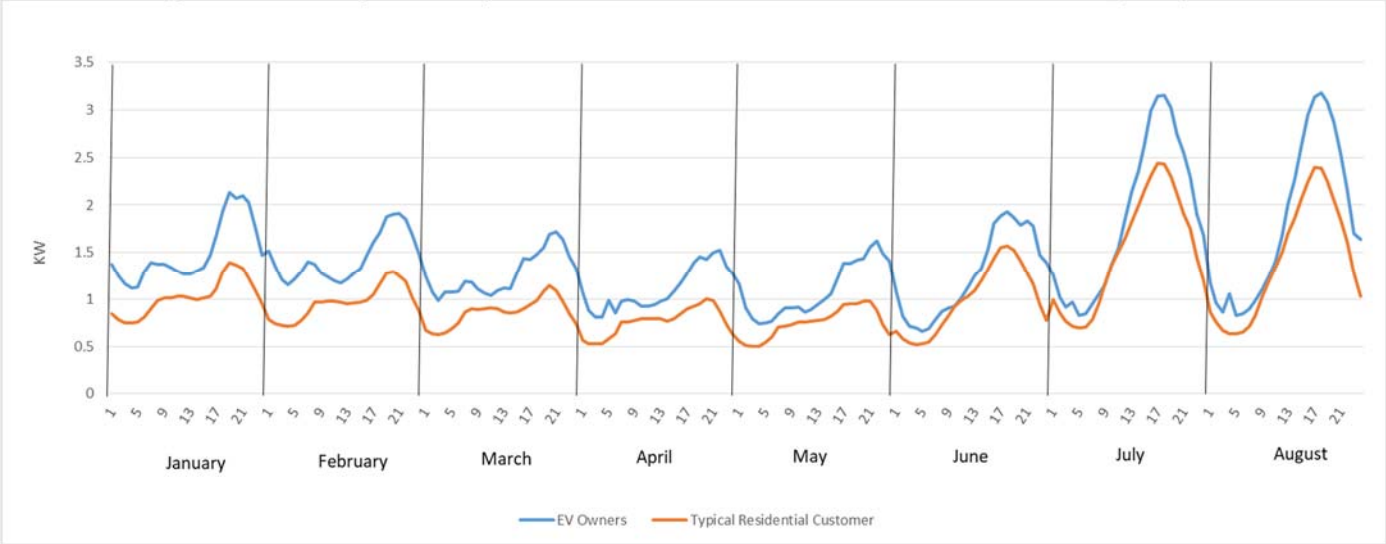
At this time, Oregon specific data is limited regarding residential EV charging patterns and energy usage. However, insight can be provided by evaluating preliminary load research data from the Company's Utah EV TOU study. The EV TOU study was developed to understand how peak load for EV customers may shift under two TOU pricing regimes. This required an understanding of a typical EV owner's electric usage pattern compared to EV owners under a TOU program.

At the end of 2018, PacifiCorp analyzed energy usage patterns of three groups of participating Rocky Mountain Power customers: 1) Control, 2) TOU Rate 1, and 3) TOU Rate 2. This included 40 customers in a control group who were not subject to a time-varying rate and 59 in one of the two electric vehicle time of use options (i.e., TOU Rate 1 or TOU Rate 2).

As provided in Figure 1, general observations of charging patterns and energy use can be made by evaluating the average profile for a residential (Schedule 1) customer and the average profile of an EV owner not enrolled in a TOU program. However, care should be taken when drawing conclusions from the differences between both profiles. Differences between the profiles are not completely attributable to EVs charging alone. For example, EV owners tend to have higher than average incomes, which is affiliated with larger homes, which in turn tend to have higher than average energy usage.

As illustrated in Figure 1 households with EVs consume more electricity than a typical residential customer. The profiles tend to be more closely aligned in the morning. However around hour 17 and 18, there is a notable increase in energy usage for EV owners. This would indicate that many EV owners tend to charge their vehicles once arriving home from work.

Figure 1. Average Monthly Utah Electric Vehicle and Schedule 1 Profiles (2019)*



**Profiles are for the whole home and not end-use specific*

Load research results indicate that most EV owners begin charging their vehicles once they arrive home. This is supported by research conducted as part of the PacifiCorp 2017 Residential Survey, which solicited residential customers on the timing of when they charge their vehicle. In Utah, 53.9 percent of respondents begin charging once they arrive home from work, which is similar to Oregon respondents which indicate that 50.5 percent of EV owners begin charging once they arrive home.

Table 1: Oregon and Utah Residential Electric Vehicle Charging Patterns

Timing	Utah	Oregon
Begin charging as soon as arrive home	53.9%	50.5%
Plug in vehicle in the evening	20.8%	23.1%
Program vehicle or charger to delay charging until a time when electric demand is lower	15.9%	13.6%
Other	9.4%	12.8%

Source: 2017 PacifiCorp Residential Survey

C. Forecast of EV Adoption

In Section 2.1.3 of the TE Plan, Pacific Power provides a forecast of the number of EVs in its Oregon service territory through 2030 by vehicle type.

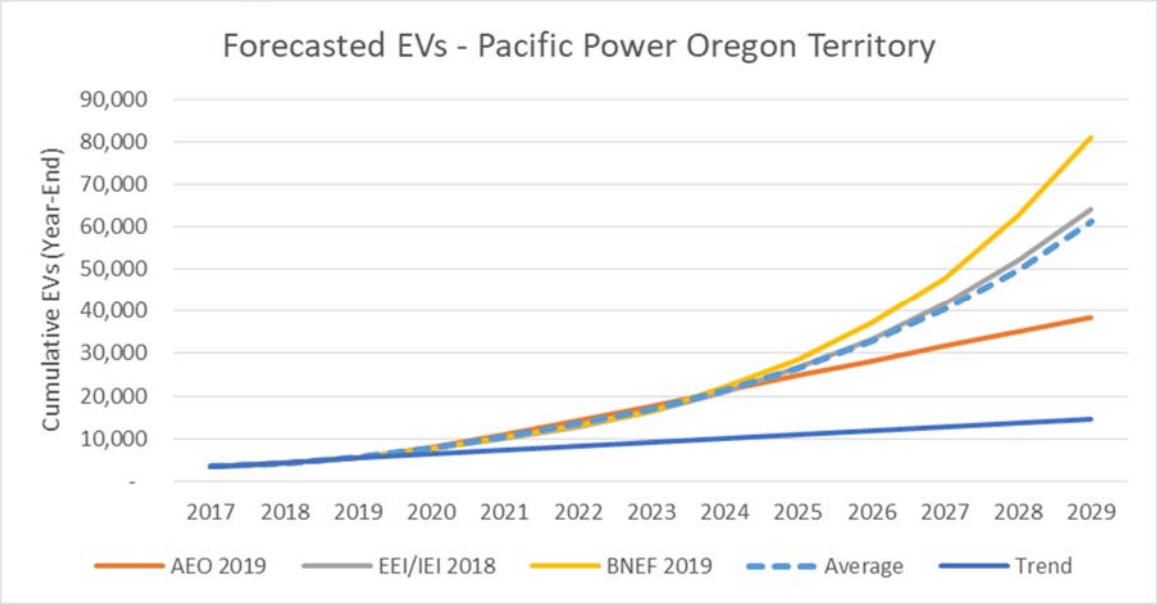
1. Light-Duty Vehicle Forecast

The light-duty vehicle (LDV) forecast is an average of three potential future scenarios using national forecasts of electric vehicle adoption from three industry sources: 1) U.S. Energy Information Administration's (EIA) 2019 Annual Energy Outlook (AEO); 2) Edison Electric Institute (EEI) and the Institute for Electric Innovation (IEI) 2018 Forecast, and 3) Bloomberg

New Energy Finance Electric Vehicle Outlook 2019. To develop these scenarios Pacific Power's third-party consultant, Applied Energy Group (AEG), utilized 2019 actuals as a starting point.

Staff requested that this method be compared to historical numbers from 2017 to 2018. AEG developed a trend analysis utilizing actuals from 2016 to 2019. As Illustrated in Figure 2, this trend analysis is lower than any of the scenarios and does not account for any intervention from public or private programs or increasing codes and standards.

Figure 2: Forecasted Electric Vehicle Growth Scenarios



Additionally, Staff requested clarification of a statement in the TE Plan which described the methodology used to develop an estimate of annual charging load per vehicle and served as an underlying assumption in the LDV forecast. The language used in this paragraph was not clear and should be modified to read "Pacific Power used the Oregon Clean Fuels Program's average daily residential charging value of 8.5 kWh per EV multiplied by 365 days per year to develop an estimate of annual energy use per vehicle (3,103 kWh)." The resulting value is the estimated amount of charging load a typical residential vehicle is assumed to consume during one year of operation.

Related to the LDV forecast, NWEC requested that Pacific Power include the plug-in electric vehicle (PHEV) and battery electric vehicles (BEV) projections from the AEO scenario forecast.

Pacific Power provided a breakout for PHEV and BEV by year in its TE Plan, Attachment 4, Table 4 and Figure 5. As discussed in Attachment 4, the EIA's AEO is the only source that provides a separate adoption forecasts for BEVs and PHEVs. This allowed AEG to forecast adoption separately for these two vehicle types. The AEO scenario forecast by vehicle type, provided in Figure 5 and Table 4 of the TE Plan, utilizes the AEO. The AEO forecast projects

that the majority of the electric vehicles will be BEVs and will grow from 56 percent in 2019 to 75 percent in 2030.

2. Medium Duty/Heavy Duty Forecast

Staff also requested a forecast of the corresponding energy and peak load requirements from the medium duty (MD) and heavy duty (HD) vehicle forecast.

Pacific Power developed an estimated MD and HD forecast based on national growth estimates and was not intended to reflect the evolving nature of this market. Based on this vehicle forecast, Pacific Power utilized a load per vehicle methodology to develop the estimated impacts below. Due to the evolving nature of the medium- and heavy-duty market, the impacts in Table 2 are illustrative only and are not intended to reflect the actual loads from MD and HD vehicles. PacifiCorp intends to refine this analysis prior to the next plan. Peak load requirements are addressed in the system impact section response which follows.

Table 2: Pacific Power Oregon Average Cumulative Medium- and Heavy-Duty Vehicle Forecast through 2025

Year	2019	2020	2021	2022	2023	2024	2025	Total
Cumulative MD/HD Vehicles	2	2	6	10	14	20	27	
Incremental EV Impacts								
Vehicles	-	*0*	*4*	*4*	*4*	*6*	*7*	*25*
kWh	*226,000*	*0*	*369,705*	*411,780*	*478,498*	*569,866*	*717,159*	*2,773,009*
average MW	*0.03*	*0.00*	*0.04*	*0.05*	*0.05*	*0.07*	*0.08*	*0.32*

Related to the MD/HD forecast, NWEC asked how transit authorities and school districts within Pacific Power's service area that are already adopting and planning for electric alternatives were considered.

At the time of Pacific Power's TE Plan filing, Pacific Power had two known electric buses in its Oregon service territory. Pacific Power developed the forecast with consideration to the following: 1) the expected lead time for a customer to procure an electric vehicle, and 2) the current projects for MDV and HDV. Based on this, Pacific Power developed its forecast to account for one-year lag time, limited availability, and a slow adoption of MD/HD vehicles, respectively.

D. System Impacts and Mitigation Strategies

Sections 2.1.2 and 2.1.3 of the TE Plan provide forecasts of EV adoption and corresponding growth in energy due to vehicle charging. Commission Staff requested an estimate for the impact on-peak load from current EVs and forecasted additions.

1. System impacts

As discussed in the Company's TE Plan, Pacific Power developed a forecast of vehicles through 2025 as required in docket AR 609. PacifiCorp did supplement this forecast with an estimated load impacts forecast. The study did not include estimated peak impacts as this analysis has not been conducted.

In PacifiCorp's 2019 Integrated Resource Plan (IRP) Reply Comments, PacifiCorp has committed to developing an electric vehicles load forecast. Consistent with the Company's 2019 IRP Reply Comments, this EV adoption forecast, subject to further refinement, will be included in the energy and peak load forecast that informs the 2021 IRP. PacifiCorp anticipates that preliminary load forecast results will be available in July as part of the 2021 IRP public input process.

Section 2.4 of the TE Plan describes current and project system impacts, and Commission Staff requests explanation of how many transformer upgrades PacifiCorp expects EV adoption to require by 2025.

Pacific Power's Oregon service territory consists of urban, suburban, and rural areas that will have different EV adoption rates for each area. It is expected that urban areas will have higher adoption rates of EVs compared to suburban and rural areas. In rural and suburban areas, PacifiCorp expects one percent of the transformers will require upgrades by 2025. Urban area impact studies assume load will increase on feeders that primarily serve residential customers, since it is expected that these customers will have a higher adoption rate. Pacific Power expects a higher percentage of urban feeders could require upgrades. One initial analysis of limited sample size showed up to seven percent of transformers on urban feeders could require upgrades by 2025. These percentages are estimates and are based on limited sample size and the EV forecast.

2. Distribution system planning

NWEC requested further explanation for how Pacific Power will "mitigate" overloading issues related to transportation electrification and encourages more proactive planning and the use of direct load control to mitigate the need for capital investments in the transmission and distribution system.

To ensure that Pacific Power is accounting for potential load constraints generated by electric vehicles, on an annual basis, the Company conducts a 10-year capital planning process in which the Company identifies distribution feeders, distribution substations, and local transmission lines with anticipated thermal or voltage constraints driven by load growth and recent load additions.

This existing process will account for and prepare the system for the installation of residential EV charging and development of commercial charging stations with minimal load. For load additions that exceed 1,000 kilowatts prompt Pacific Power's existing large load interconnection process, providing the mechanisms necessary to evaluate charging needs through a system

impact study process. Thereby ensuring impacts to the distribution and transmission system associated with these load addition are addressed and the reliability of the power system is maintained.

Pacific Power has an interest in understanding the potential of EVs as a future demand response resource. As a result, this potential is currently being quantified in the Company's Conservation Potential Assessment Study and will be supplied to the Company's 2021 IRP for competition with other supply-side resources.

3. Rate design

Section 2.4.1 of the TE Plan describes the important role of rate design in efficient management of charging load. Staff requested detailed estimates of how much more efficient EV charging in Pacific Power's territory could become if the proposed rate change is adopted.

Commission Staff correctly identified that the Company's TE Plan "presents rate design as the primary means for efficiently integrating EV's into its service territory in the near-term planning horizon." There are two reasons why the Company has taken this approach. First, rate design is a tool available to the Company by which it may encourage load to occur at the right times. With AMI recently deployed in the Company's Oregon service territory, pricing options present a low cost, off-the shelf way to provide pricing options that incent off-peak charging. Simple TOU pricing can serve the dual goals of accelerating transportation electrification (by making it lower cost to charge at particular times) and encouraging a wise use of the system (by nudging load out of the most critical time periods).

Second, the state of more sophisticated EV charging grid integration solutions is still very nascent and adoption of EVs in the Company service territory is not as well-formed as in other parts of the state or country. A variety of solutions exist that are at this time very expensive to implement and are not well understood yet. This may include vehicle-to-grid, managed charging, gamification, and even some more advanced demand response programs like critical peak rebate. With the small scale of EVs that are presently on the Company's system, pursuing more bleeding edge solutions and taking on what amounts to a research and development program is likely not in the best interest of the Company's customers. The Company hopes to leverage more advanced grid integrated charging solutions after their costs have fallen, EV adoption for the Company has risen, and the appropriate lessons can be learned from other utilities who have a greater scale of EVs to study. Since adoption is still very low in the Company's service territory, there is time for such solutions to be deployed before the Company's grid is adversely impacted.

The rate designs proposed in the general rate case, which, along with other goals, were developed to encourage efficient EV charging, include proposed Schedule 6, a residential TOU option, and Schedule 29, a non-residential TOU option. Both of these options were proposed as pilots, because the Company wants to deploy them at a smaller scale and understand their costs and benefits before potentially making them more widely available. Estimating how they may

influence charging behavior would be speculative at this time and is precisely why the Company is proposing both rates as pilot offerings.

E. Market Barriers and Pacific Power's Ability to Impact

Section 3 of the TE Plan is dedicated to describing market barriers to EV adoption and Pacific Power's influence over these barriers. CUB and NWEC recommended that Pacific Power include a more detailed analysis of market barriers and the Company's ability to influence those barriers, including a relative ranking analysis of the barriers performed separately for urban and rural areas of the service territory.

Table 3 below illustrates a relative ranking of barriers to consumer adoption of EV from the perspective of urban and rural consumers, which is informed by PacifiCorp's customer survey and multiple studies of the market as listed in the TE Plan. This estimate should not be considered a definitive, precise assessment, as the market is dynamic and the relative impact of each barrier on an individual's investment decision will vary significantly. Even barriers with a ranking of 6 out of 6 (least impact) are shown to have material influence on investment decisions for some consumers. For this purpose, rural and urban locations are broadly differentiated by relative population density with, for example, Multnomah County included in urban while Wallowa County would be considered rural.

As described in the TE Plan, Pacific Power summarized key findings from research of multiple sources related to market barriers to consumer adoption of EVs and grouped those findings into six categories.

Table 3. Relative ranking of market barriers

Customer Barriers to Adoption	Rural	Urban	Pacific Power Ability to Impact
	(1=high impact, 6=low impact)		***(1=high impact, 6=low impact)***
Awareness	4	4	2
Decision making	6	3	3
Economic	1	1	1
Policy / Regulatory	5	6	5
Technical/infrastructure	3	2	4
Supply Chain	2	5	6

In the TE Plan, Pacific Power provides evidence of relatively lower penetration rates of EVs in rural counties versus more urban counties in its Oregon service territory. In general, locations outside of the Portland metropolitan area are earlier on the adoption curve for EVs and therefore certain market barriers may be more pronounced in more rural vs urban locations. A description of the differences in urban and rural ranking of barriers is provided below where there is evidence of differentiation.

1. Economics

First cost of EV ownership as well as total cost of ownership are encapsulated in this barrier which is ranked highest across the service territory.

While Pacific Power's ability to impact ***first cost*** of EV ownership is low, the Company's ability to impact ***total cost of ownership*** is high. Programs to provide incentives for charging infrastructure, rate designs to encourage charging during off-peak hours and keep charging impacts affordable, and the potential to increase line extension allowances for new loads are all examples that reduce cost barriers.

2. Supply Chain

This barrier category includes EV model availability and inventory. One striking difference between rural and urban auto markets is vehicle type. From a 2017 National Household Travel Survey from the U.S. Department of Transportation, the top five best selling vehicles in rural America are all pickup trucks.[3] If the preferred type of vehicle is just not available, and any existing types are not easily interchangeable with the preferred vehicle, this barrier is insurmountable for many consumers until a desirable product is available. This barrier ranks high for rural customers, while vehicle type availability is less of a barrier for more urban customers. State policy requires manufacturers to meet sales requirements across their portfolio[4] but doesn't dictate how the types of sales are distributed across the state. If customer preference in a region is for pickups, manufacturers will meet demand.

Pacific Power's ability to influence car manufacturer portfolio plans is low. The good news is that several auto manufacturers have announced plans to release EV pickups within the next few years.

3. Technical / Infrastructure

Range limits and charging infrastructure accessibility are included in this category of barriers, each with a high influence on consumer adoption across the service territory. Drivers in more rural locations are known to travel more vehicle miles per day than urban drivers.[5] Commuting plus other errands and side trips can add to this range anxiety, especially during cold months when range is limited further. Rural locations have fewer options for public charging infrastructure. This barrier is ranked after supply chain barriers for rural customers but just after economic barriers for urban customers where in dense population areas, access to charging infrastructure is also challenged but in different ways. Multifamily housing may not provide

[3] U.S. Department of Transportation. (2017). National Household Travel Survey. Retrieved from https://nhts.ornl.gov/.
[4] Oregon Secretary of State. (n.d.). Department of Environmental Quality- Oregon Low Emission Vehicles. Retrieved from https://secure.sos.state.or.us/oard/displayDivisionRules.action?selectedDivision=1563.
[5] Baatar, B. et al. (2019). Preparing Rural America for the Electric Vehicle Revolution. A Report for the American Center for Progress. Washington DC. Retrieved from https://epm.ucdavis.edu/sites/g/files/dgvnsk296/files/inline-files/Preparing%20Rural%20America%20for%20the%20Electric%20Vehicle%20Revolution.pdf.

home charging access and even single family homes in established neighborhoods may not have garages or off street parking space with home charging infrastructure. When compared to other barriers, access to charging ranks high for both urban and rural customers in different ways.

Pacific Power's ability to influence accessibility of charging is strong compared to other barriers. An example is installation of charging infrastructure in locations where third-party installations are not yet prevalent.

4. Awareness

As noted in the TE Plan, a recent customer survey revealed 64 percent were not aware of EV initiatives. Both rural and urban customers are impacted by this barrier, although it may be stronger for rural locations where, with lower penetration rates, EVs may be less noticeable in neighborhoods.

Pacific Power's ability to influence this barrier is high whether for rural or urban neighborhoods. The Company is physically in the communities served every day and in regular communication with customers. As a trusted resource for electricity service, the Company is well positioned to deliver outreach and engagement with customers on technical, economic and operational questions related to EVs.

5. Policy / Regulatory

This barrier can rank quite high in particular situations where customers are ready to transition into EVs but when it comes to installation of Electric Vehicle Supply Equipment (EVSE) they hit barriers related to siting of infrastructure. Although seemingly lower on the list, it can become a major delay or even a deal breaker. It's ranked higher for rural locations simply because more urban locations have already experienced this barrier and over time have become more familiar with the technology. Policies have adapted as has awareness and acceptance of needs for infrastructure installations.

Pacific Power's ability to influence this barrier is ranked low. Although the Company may provide technical information to help inform state or local entities considering changes to policies or regulations, the Company does not drive those changes. The Company's strength in technical expertise can and has been leveraged by municipalities interested in growing EV adoption and looking for technical assistance with infrastructure design and siting.

6. Decision Making

This barrier includes the purchase process and weighing the myriad of options and choices against each other. This barrier is ranked sixth for rural consumers only because it's further down in the EV acquisition timeline than other barriers. Conversely for urban consumers who may be further along in the adoption of and accessibility to EVs when faced with decision making barriers.

Pacific Power's ability to influence this barrier is ranked high. Similar to addressing the awareness barrier, the Company can provide information and advice to help customers with their decision making process at a relatively low cost compared to other actions.

As CUB noted, this assessment of barriers and influence can inform prioritization of Company actions and investments. In sections 5.1.1 – 5.1.5 of the TE Plan, each description of potential intervention strategies Pacific Power may employ includes which barriers that strategy would address. In many cases, several of the six barrier categories would be addressed by the intervention.

7. Actions Specific to Demographics

More specifically related to Company influence as described in the TE Plan, Commission Staff requested clarification of the effect the Company is anticipating service territory income level demographics to play in barriers to adoption. Specifically, Staff noted "If EVs offer a lower total cost of ownership (TCO), lower income owners of motor vehicles may benefit the most, and rural Oregonians that have higher annual vehicle miles traveled may in fact be better poised to replace internal combustion engines with electric motors."

Staff illustrates a paradox of EV adoption. Those who may benefit most from the economic benefits of EV ownership are unable to purchase an EV. Low income households can face multiple barriers to purchasing a new vehicle including access to credit and down payment savings.[6] While EVs offer a lower TCO the high upfront cost of any new car purchase remains an insurmountable barrier for many who must base purchasing decisions on a month to month basis. The median price of new EV is $9,000-$13,000 more than a comparable internal combustion engine vehicle[7].

Staff also asked PacifiCorp to clarify what aspects of the TE Plan are uniquely targeted to a rural, low-income population, and requested that the Company respond to the validity of comparing the challenge of establishing EV adoption to the experience in expanding broadband access to rural America.

Targeting specific population segments will be a crucial aspect of program design. TE programs will require flexible program design characteristics and timing to meet different needs in rural and urban areas. Needs of low income populations, weather in urban or rural areas, will require nuanced program design as well.

Supporting vehicle electrification in rural America comes with a unique set of challenges. In the Company's comparison of this technology transition to that of wide-scale broadband access in

[6] The Greenlining Institute. (2018, March). Mobility Equity Framework: Making Transportation Work for People. Retrieved from https://greenlining.org/wp-content/uploads/2019/01/MobilityEquityFramework_8.5x11_v_GLI_Print_Endnotes-march-2018.pdf.
[7] Baatar, B. et al. (2019). Preparing Rural America for the Electric Vehicle Revolution. A Report for the American Center for Progress. Washington DC. Retrieved from https://epm.ucdavis.edu/sites/g/files/dgvnsk296/files/inline-files/Preparing%20Rural%20America%20for%20the%20Electric%20Vehicle%20Revolution.pdf.

rural America, the broadband example highlights a potential outcome Pacific Power is working to avoid, specifically, that rural areas get left behind.[8] To avoid this outcome, the Company wants to support policies and offer programs that assure the dollars and focus of the programs remain available through an adoption period that is likely later and slower than in more urban markets. The broadband "rural digital divide" informs Pacific Power's strategy of rural community engagement in an effort to deploy resources to communities that may not yet have significant TE scale, but are key to ensuring a more inclusive and equitable charging infrastructure that connects urban areas with key transit points and destinations in rural areas.

There are many reasons the adoption curve for vehicle electrification will be different in rural areas. For example, the top five vehicle models owned in rural America are all pickup trucks but none of the electric pickup trucks under development are available today and when they are available they are likely to come at a high up-front cost.[9] Another of the unique challenges relates to access to charging infrastructure. Utilization rates in remote areas are low and, as such, there is little incentive for private networks to expand public charging in many rural spaces. These are just two commonly referenced challenges related to rural electrification and there are many others. Tying these many challenges to thoughtful policies and programs is not easy but it's a common role for utilities that serve rural customers. Utilities can offer long term signals to the market that transformation is real and sustainable. Utilities can provide education and technical support – and over time, offer programs to help accelerate the transformation where other market activities appear less effective.

Also related to the role of serving the EV expansion needs of rural market, NWEC encouraged Pacific Power to consider the key role it plays in accelerating both rural and urban TE as well as the highway corridors that connect them when developing future TE programs.

The Company agrees with NWEC that it plays a crucial role in accelerating TE throughout the state. Pacific Power plays a key role in every community it serves and has a duty as an energy provider to serve customers regardless of the location in which they live. The Company aimed to emphasize the unique challenges of providing transportation electrification programs to customers across a geographically patch-worked service area that includes urban, suburban, and rural communities.

[8] Rogoway, M. (2018). Internet speeds up in Oregon cities, but rural areas still lag. Retrieved from https://www.oregonlive.com/silicon-forest/2018/12/oregon-broadband-reach-increases-but-speeds-remain-slow-in-many-rural-communities.html.

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

F. Program cost effectiveness and the Grid Integration Allowance

1. Cost effectiveness

Section 4.1.1 of the TE Plan describes implementation of Customer Pilot Programs and the impact of limited market data and experience from which to frame costs and benefits.

Related to determining cost effectiveness of utility TE programs, Commission Staff's comment highlights a statement from the TE Plan which characterized how challenging attribution can be. The main reasoning for the challenge in determining attribution is that the EV market is still so early in the adoption stages with several conflating drivers and barriers to consumer adoption that assigning attribution to one intervention as having full influence over the decision is hard to determine with much rigor or certainty. Energy efficiency is a good example of a dynamic but longstanding market where customers are generally familiar with the products, and utility programs have extensive experience in knowing what interventions drive customer action with a reasonably high level of certainty in attribution. It took time for energy efficiency programs to mature and develop that understanding of where clear barriers to customer action remain and where proven interventions can be applied with measurable certainty of attribution. The EV market has yet to reach that mature state.

CUB, Portland General Electric (PGE) and NWEC have also generally commented within TE proceedings that utility TE programs should not be required to meet traditional cost-effectiveness tests because attributing market acceleration precisely to the program actions is difficult to parse and not meaningful to do so. Pacific Power is ready to work with stakeholders to define new options to measuring success of utility programs and to consider proposals for utility investments in TE based upon principles other than looking to cost effectiveness tests used to evaluate energy efficiency programs.

2. Grid Integration Allowance

In comments to PGE's TE Plan in docket UM 2033, CUB proposed a "Grid Integration Allowance" (GIA) which defines an amount of utility investment to be used for efficient integration of charging load based upon the expected increased distribution revenues produced from increased load. The principle driving this proposal is that the utility is required to prepare for new load on the system in the most efficient manner for all customers and so these funds would be used to manage or control integration of new charging load on the system most efficiently. These funds could be used for TE programs that lead to grid connected charging and would also be used for necessary upgrades to the distributions system to accommodate that new load.

CUB's proposal included an example of how this methodology could apply to PGE's system and arrived at an estimate of $58 million in total to support grid integrated charging through 2025. A high level assessment of what this analysis could look like for Pacific Power is as follows. Applying the Schedule 4 residential distribution rate ($0.03598/kWh) to an average annual residential charging load of 3,103 kWh results in an annual increase in distribution revenue of

$112 per vehicle. Assuming 26,620 EVs are within Pacific Power's service territory in 2025 totals $3 million for one year of distribution revenue. Applying a multiplier of four equates to just under $12 million in total through 2025. CUB's example for PGE assumed 85 percent of the charging load to be residential and 15 percent commercial. The basic analysis provided above only assumes residential load for these purposes.

The Company views CUB's proposal as an intriguing approach to the challenges of incentivizing TE. Efficient integration of EVs and charging load has many potential grid benefits, including renewable integration, grid asset optimization, and demand response. CUB's suggestion of a GIA may be an appropriate measure of utility investment in residential TE programming. The Company is open to continuing discussions around this methodology as a starting point to determining an appropriate measure of utility spending on TE. Questions to explore could include defining a reasonable number of years of distribution system revenues to include in the calculation and how to differentiate distribution system upgrades purely related to new EV charging load.

CUB and Commission Staff fine tune their comments in questioning the applicability of the GIA related to Pacific Power's more rural service territory with a larger proportion of low income customers and overall less penetration of EV than PGE. At this time, the Company believes that a mechanism like the GIA could apply broadly across Pacific Power's service territory; however, this approach may fall short of meeting all the funding needs to support state goals and would need to be coupled with other sources. The Clean Fuels Program funding will serve to meet some aspects of TE programming targeted to underserved communities and residential needs and might complement a GIA approach. Exploring other metrics to program success, such as those used in performance based regulation, is an example of additional ideas to consider with Commission Staff and stakeholders in future regulatory proceedings outside of the TE Plan.

G. Additional Comments

Stakeholders requested further clarification or response to additional questions throughout the TE Plan.

NWEC suggested Pacific Power provide additional information on interoperability, vehicle to grid technology and fleet charging optimization and management solutions to what was provided in Section 2.2.2 of the TE Plan. In addition to meeting the requirements set forth in docket AR 609, Pacific Power aimed to focus the Company's TE Plan on information and insights specific to the Company's service area, not merely recite material.

Interoperability between charging networks, equipment, and vehicles continues to be a critical and necessary focus across the nascent TE industry. Pacific Power required participation in and information on Open Charge Point Protocol as part of the charging equipment and network provider request for proposals for the Company's Public Charging Pilot under docket UM 1810. Program staff participates in working groups through Berkshire Hathaway Energy, EEI and the Smart Electric Power Alliance (SEPA) focused on established and emerging TE technologies,

including interoperability, vehicle-to-grid (V2G), managed charging, and other promising technologies.

When appropriate, the Company also attends virtual or in-person technology demonstrations to understand available technologies. While some of these technologies, like V2G, are emerging and will require demonstration pilots, others such as technology solutions that influence charging habits (i.e., FleetCarma) are more mature. The Company will consider technology solutions that align with the TE Plan and within any approved program budgets.

CUB inquired whether the Company had made use of analytical tools similar to the National Renewable Energy Laboratory's Electric Vehicle Infrastructure Projection Tool (EVI-Pro) to estimate customer demand for charging infrastructure. The Company is familiar with EVI-Pro available publically through the U.S. DOE's website. While Pacific Power has not relied on the tool to date to determine the placement of public charging locations, the Company is open to discussing its usefulness as a resource should the Company expand the public charging pilot program.

Finally, NWEC described Section 5 of the TE Plan as lacking actionable next steps and timelines for accountability. PacifiCorp respectfully disagrees that these aspects are required as part of the TE Plan. These elements will be part of program design and will require Commission and stakeholder input as part of a regulatory process.

II. CONCLUSION

Pacific Power's first TE Plan was a foundational planning tool. The TE Plan was drafted and supporting data gathered prior to the COVID-19 pandemic. Some areas of the TE plan, such as the EV forecast, may be impacted by the pandemic and the scale of any potential impacts will become more apparent in the coming months. The Company is grateful to Commission Staff, stakeholders, and customers who provided valuable insights in both the drafting of and response to the TE Plan. TE in Oregon is a transformation that goes beyond a single utility and requires creative problem solving across sectors and industries. Pacific Power looks forward to leading and actively listening to those conversations and continuing to support our customers and their communities.

Sincerely,

Michael Wilding
Director, Regulation