BEFORE THE PUBLIC UTILITY COMMISSION

OF OREGON

UM 1810

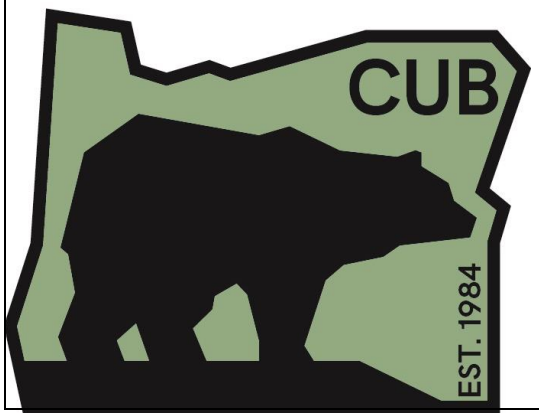
In the Matter of	)
	)
PACIFICORP, dba PACIFIC POWER,	)
	)
Applications for Transportation Electrification Programs.	)
	)

REPLY TESTIMONY

OF THE

OREGON CITIZENS' UTILITY BOARD

May 24, 2017



BEFORE THE PUBLIC UTILITY COMMISSION

OF OREGON

UM 1810

In the Matter of PACIFICORP, dba PACIFIC POWER, Applications for Transportation Electrification Programs.	)	REPLY TESTIMONY OF THE OREGON CITIZENS' UTILITY BOARD

I. INTRODUCTION

My name is Bob Jenks, and I am the Executive Director of the Oregon Citizens' Utility Board ("CUB"). My qualifications are provided herein as CUB Exhibit 101.

CUB submitted extensive testimony on Portland General Electric's Application for Transportation Electrification Programs[1] and, recognizing that many of the same parties are part of this docket, will attempt not to be too repetitive.

CUB is concerned that PacifiCorp ("PAC" or "the Company") is underestimating the number of electric vehicles ("EVs") that are coming to its service territory and that its Application for Transportation Electrification Programs ("the Application") fails to adequately prepare for the EVs that are coming. While the Application's proposed pilot programs contain some good elements, they fail to adequately prepare the Company for the impact of thousands of EVs charged at customers' homes.

[1] *In re PGE's Application for Transportation Electrification Programs*, OPUC Docket No. UM 1811, Reply Testimony of the Oregon Citizens' Utility Board (Apr. 24, 2017) *available at* http://edocs.puc.state.or.us/efdocs/HTB/um1811htb1183.pdf.

Throughout this testimony, CUB uses the term "EVs" broadly. It includes cars that are fully electric ("BEV"), plug-in hybrid electric vehicles ("PHEV"), electric buses, electric forklifts, and other uses of electricity to power a vehicle.

II. PACIFICORP MAY BE UNDERESTIMATING THE IMPACT OF EVs

A. *PacifiCorp's Projection of EVs is Low.*

PacifiCorp claims that, as of June 2016, there were 11,000 EVs in Oregon, one-third (3,577) of which are located in its service territory.[2] Based on EV adoption trends from 2010 to 2015, PacifiCorp projects 18,000 EVs in its service territory by 2025.[3]

First, PAC's reliance on the adoption trend from 2010 to 2015 fails to recognize that EV purchases are expected to accelerate. In its recent IRP, PGE made a mid-level projection of 75,000 EVs in its service territory by 2025 based on trends from recent years.[4] In preparing its Transportation Electrification Program Application, PGE hired Navigant to model the expected EV growth. Navigant used a technology competition model and projected a baseline forecast of EVs in PGE's service territory.[5] Navigant's forecast recognized that transportation electrification would accelerate, and forecasted more than 113,000 EVs in PGE's service territory by 2025.[6] Navigant also identified that in any given year, PGE's service territory totals between one-half to two-thirds of EV sales in the state.[7] If we assume that one-half to two-thirds of future EV sales are in PGE's service territory, then Navigant's projection would suggest that there will be

---

[2] *In re PacifiCorp's Application for Transportation Electrification Programs*, OPUC Docket No. UM 1810, Supplemental Application (Apr. 12, 2017) at 11 (hereafter "PacifiCorp's Application"). Data provided by the Oregon Department of Environmental Quality.
[3] PacifiCorp's Application at 12.
[4] *In re Portland General Electric's 2016 Integrated Resource Plan*, LC 66 (Nov. 15, 2016) at 109.
[5] *In re PGE's Application for Transportation Electrification Programs*, OPUC Docket No. UM 1811, PGE's Direct Testimony and Supplemental Application (Mar. 12, 2017), Appendix A at 7 (hereafter "PGE's Application").
[6] PGE's Application at 71.
[7] PGE's Application at Appendix A, page 10.

approximately 170,000 to 225,000 EVs in Oregon by 2025. If PacifiCorp's territory continues to include one-third of Oregon's EVs, then PacifiCorp should expect 56,000 to 75,000 EVs by 2025. This means that there will be three to four times as many EVs as PacifiCorp is currently planning for. In a reality where EVs can either function as grid assets or liabilities,[8] improper planning can lead to results that stress the electric grid and increase customer costs.

There are reasons to believe that EV sales will continue to accelerate. Auto manufactures and Wall Street investors are not pie-in-the-sky environmentalists, and they clearly are betting on EV sales to accelerate. There are currently at least twenty-nine models of EVs being sold in the US,[9] with more on the way before the end of the year. Auto manufacturers would not be developing these vehicles in order to compete for one to two percent of the US vehicle market. Tesla's market capitalization is greater than Ford's.[10] Wall Street investors clearly expect EV sales to accelerate.

B. *EVs Will Be Concentrated in Specific Parts of PacifiCorp's Oregon Service Territory.*

PacifiCorp cites to the rural demographic of much of its service territory as a reason that its EV growth lags behind the rest of the state.[11] CUB agrees that rural areas will see slower EV growth than urban areas and that this will affect adoption rates in PacifiCorp's territory. However, there are parts of PacifiCorp's service territory where EV adoption may well be greater than the statewide average. Northeast Portland and Corvallis, for example, are served by PacifiCorp and are communities where CUB would

[8] http://www.utilitydive.com/news/electric-vehicles-can-be-grid-assets-or-liabilities-how-utilities-plan-wil/442661/.
[9] https://i1.wp.com/cleantechnica.com/files/2017/04/US-EV-Sales-2016-Mar-2017.png?ssl=1.
[10] http://www.cnbc.com/2017/04/03/tesla-shares-surge-to-all-time-high-pushing-its-market-cap-past-fords.html.
[11] UM 1810/ PAC/100/Morris/5.

expect EV growth to be greater than the statewide average. Regions of PacifiCorp's territory that will experience a higher concentration of EV penetration must adequately prepare for the attendant grid and price stressors from charging events.

C. *Distribution System Impacts Relate To Local Concentration.*

Other utilities that are planning for the projected expansion of EVs are concerned with the impacts on distribution systems, which are likely to be more prominent in areas with higher EV concentrations. For example:

> A study by Xcel Energy concluded that if EVs charge during peak periods, as many as 4% of the distribution transformers on its system could be overloaded at local EV penetration rates of just 5%, even if EV adoption is geographically dispersed.[12]

And:

> The potential problems are clear in a recent estimate from the Sacramento Municipal Utility District (SMUD). Highlighted in a new EV charging report, the utility forecasted that EV-related overloads could necessitate replacing 17%, or 12,000, of its transformers at an average cost of $7,400 each.[13]

In order to ensure that the projected oncoming EVs benefit the electric system to the fullest extent possible, PacifiCorp must prepare and plan for potential distribution system impacts.

D. *PacifiCorp Needs to Prepare for EVs.*

Regardless of the total number of EVs in its service territory, PacifiCorp needs to prepare for the EVs that are coming. Unfortunately, there is little in their application that suggests that the Company is adequately preparing.

[12] Garrett Fitzgerald, Chris Nelder and James Newcomb. Electric Vehicles as Distributed Energy Resources, Rocky Mountain Institute, 2016, p. 26.

[13] http://www.utilitydive.com/news/electric-vehicles-can-be-grid-assets-or-liabilities-how-utilities-plan-wil/442661/

According to the Rocky Mountain Institute, a utility that is not prepared for EVs will likely see higher costs:[14]

> [I]f utilities respond to EV loads late and reactively, that could:
>
> • Shorten the life of grid infrastructure components
> • Require greater investment in gas-fired peak and flexible capacity
> • Make the grid less efficient
> • Increase the unit costs of electricity for all consumers
> • Inhibit the integration of variable renewables, and increase curtailment of renewable generation when supply exceeds demand
> • Increase grid-power emissions
> • Make the grid less stable and reliable

On the other hand, if utilities prepare, EVs can lower costs[15]:

> If utilities anticipate the load of charging EVs and plan for it proactively, they can not only accommodate the load at low cost, but also reap numerous benefits to the entire system. Shaping and controlling EV charging can:
>
> • Avoid new investment in grid infrastructure
> • Optimize existing grid assets and extend their useful life
> • Enable greater integration of variable renewables (wind and solar photovoltaics) without needing new natural-gas generation for dispatchable capacity, while reducing curtailment of renewable production
> • Reduce electricity and transportation costs
> • Reduce petroleum consumption
> • Reduce emissions of CO2 and conventional air pollutants
> • Improve energy security
> • Provide multiplier benefits from increased money circulating in the community
> • Supply ancillary services to the grid, such as frequency regulation and power factor correction

[14] Fitzgerald, Chris Nelder and James Newcomb. Electric Vehicles as Distributed Energy Resources, Rocky Mountain Institute, 2016 p. 6 http://www.rmi.org/Content/Files/RMI_Electric_Vehicles_as_DERs_Final_V2.pdf

[15] Fitzgerald, Chris Nelder and James Newcomb. Electric Vehicles as Distributed Energy Resources, Rocky Mountain Institute, 2016 p. 6 http://www.rmi.org/Content/Files/RMI_Electric_Vehicles_as_DERs_Final_V2.pdf

By adequately preparing for and anticipating the effect that oncoming EVs will have on its system, the Company can realize tremendous grid benefits. The Company's under or conservative estimation of the expected number of EVs that will enter its service territory heightens the risk that EVs may add substantial cost to the system by requiring additional flexible capacity resulting in a less efficient grid.

E. *Most Charging is Home-Based.*

Because most EV charging occurs at home, the key to managing EVs on a utility system is home charging. This is a key missing element of PacifiCorp's consideration of EVs. CUB discussed this issue extensively in our Reply Testimony to PGE's Transportation Electrification Program Application.[16] We won't repeat our testimony, but the conclusions drawn are important.

1. Time-of-Use ("TOU") Pricing.

To reduce the cost of charging on the electric system, TOU pricing is critical to moving charging from the early evening, on-peak hours when drivers get home from work to the off-peak period.[17] PacifiCorp has some discussion of TOU in its Application, but it primarily relates to charging on its public charging pods, not home charging which is where most EV charging happens and where the SMUD and Excel Energy predict distribution impacts.

2. Managed Charging.

However, when EV penetration reaches about 5% of vehicles,[18] TOU charging can become more expensive because of the significant load that ramps on with the off-peak period. At that penetration level, the utility needs to develop managed or

[16] *See* UM 1811/CUB/100, Jenks.
[17] UM 1811/CUB/100 Jenks 23-24.
[18] UM 1811/CUB/100 Jenks 24.

dispatchable charging which would allow it to dispatch the charging load and help balance the system. Managed charging allows a utility to remotely control vehicle charging by turning it up, down, or even off to better correspond to the needs of the grid.[19] Managed charging in conjunction with TOU pricing enables utilities to distribute charging events across the full span of off-peak hours, or, to time vehicle charging for periods of high renewable energy production.[20] Enabling managed charging is the key to EVs providing benefits as EV adoption becomes significant.[21]

3. Level 2 Home Charging.

TOU and managed charging are significantly more effective in maximizing EV benefits when coupled with Level 2 (240 volt) home charging. Because EVs charge at 2-5 miles per hour at Level 1 charging (120 volt), a typical driver will find that there are not enough off-peak hours to fully charge an EV, especially with the extended ranges and larger batteries of newer EVs.[22]

III. PACIFICORP'S PROPOSED PILOT PROGRAMS

A. *Failure to Address the Impact of EVs.*

Before discussing what PacifiCorp proposes in terms of EV programs, it is important to recognize that it is not proposing any programs that deal with the issue of home charging costs and benefits. PacifiCorp is not proposing any meaningful way to deal with TOU, Managed Charging, and the need for Level 2 charging at home. CUB believes these are key to effectively manage EVs. In addition, focusing on costs and benefits to the electric system allows a utility to design programs that meet a traditional

[19] Utilities and Electric Vehicles: The Case for Managed Charging, Smart Electric Power Alliance (Apr. 2017).
[20] *Id.*
[21] UM 1811/CUB/100 Jenks 24-25.
[22] UM 1811/CUB/100 Jenks 26.

cost effectiveness or prudency test—which is the lens through which the Company's Application should be viewed. As discussed above, widespread EV adoption has the potential to either harm or benefit the grid, to either decrease costs by spreading them more thinly, or to increase costs by on-peak charging events. At present, PAC's Application fails to adequately address and plan for the projected impact of electric vehicles.

B. *Public Charging Pods.*

PacifiCorp is proposing to install, own, and operate up to seven Public Charging Pods in its service territory.[23] While CUB recognizes that there will be a need for more public charging stations with increased EV adoption, there is little support for PacifiCorp's conclusion that seven is the right number.

PacifiCorp proposes a pricing structure that will charge customers by the minute, rather than the kWh, will charge more for on-peak than off-peak, and will charge more for DC Fast Charging than it will for Level 2.[24] CUB is unsure what the impact of charging by the minute rather than energy will be. For a customer who has the option of home charging, it makes it difficult to compare the price. But as a pilot program, this pricing structure is interesting. Between PacifiCorp's and PGE's public charging stations, there will be three pricing structures: (1) PacifiCorp's per minute structure; (2) PGE's month subscription for free off-peak charging; and (3) PGE's traditional rate/kWh. These varying pricing proposals are fitting for pilots and should provide some insight into how pricing of charging affects demand.

///

[23] UM 1810/ PAC/100/Morris/19.
[24] UM 1810/ PAC/200/Meredith/3-4.

C. *Outreach and Education.*

PacifiCorp proposes four elements to an Outreach and Education Pilot: customer communications, self-service resources and tools, technical assistance, and community events. CUB has two concerns with this pilot.

First, CUB is concerned that some of this represents the on-going role of an electric utility. Customers communicate with their utility on a variety of issues. Providing communications and technical assistance about EVs is no different than providing technical assistance and communications about heat pumps, commercial lighting, or net metering. PacifiCorp should identify what elements of the Outreach and Education Pilot truly represent a pilot program, and which elements reflect the on-going expectation of a utility. The on-going elements should be funded by base rates rather than included in a pilot.

Second, CUB is concerned about the role of the utility. Sponsoring ride and drives and community events are not typically utility roles. CUB is concerned that the utility is getting outside of the role of a utility, while at the same time not addressing the key issue that a utility should be addressing: grid impacts.

D. *Demonstration and Development.*

The Company is proposing a pilot that will provide grants to non-residential customers to support "the development of creative, customer-driven electric transportation projects in its Oregon service area."[25]

In its application, PacifiCorp lists the Application Criteria,[26] but in testimony refers to "[o]nce the evaluation criteria is established.[27]" CUB generally approves of the

[25] UM 1810/PAC/100/Morris/22.
[26] PacifiCorp's Application, page 84.

criteria listed in the application; however, CUB is concerned with the non-residential limitation on these programs. As discussed above, CUB is concerned that PacifiCorp is ignoring the real costs or benefits that home charging can place on its electric grid. Having a grant program which by design excludes addressing this problem is problematic.

IV. CONCLUSION

CUB believes that the pilot programs proposed by PacifiCorp are generally reasonable but are incomplete. The Company underestimates the likely EV penetration in its service territory and fails to address the potential harm or benefit that could occur. This is significant, because a utility that is unprepared for EVs is more likely to have EVs harm its system. In addition, CUB is concerned that the Company Education and Outreach pilot does not distinguish between the ongoing, expected role of a utility that responds to its customers, and a defined and limited pilot program.

[27] UM 1810/ PAC/100/Morris/25.

WITNESS QUALIFICATION STATEMENT

NAME: Bob Jenks

EMPLOYER: Oregon Citizens' Utility Board

TITLE: Executive Director

ADDRESS: 610 SW Broadway, Suite 400
Portland, OR 97205

EDUCATION: Bachelor of Science, Economics
Willamette University, Salem, OR

EXPERIENCE: Provided testimony or comments in a variety of OPUC dockets, including UE 88, UE 92, UM 903, UM 918, UE 102, UP 168, UT 125, UT 141, UE 115, UE 116, UE 137, UE 139, UE 161, UE 165, UE 167, UE 170, UE 172, UE 173, UE 207, UE 208, UE 210, UE 233, UE 246, UE 283, UG 152, UM 995, UM 1050, UM 1071, UM 1147, UM 1121, UM 1206, UM 1209, UM 1355, UM 1635, UM 1633, and UM 1654. Participated in the development of a variety of Least Cost Plans and PUC Settlement Conferences. Provided testimony to Oregon Legislative Committees on consumer issues relating to energy and telecommunications. Lobbied the Oregon Congressional delegation on behalf of CUB and the National Association of State Utility Consumer Advocates.

Between 1982 and 1991, worked for the Oregon State Public Interest Research Group, the Massachusetts Public Interest Research Group, and the Fund for Public Interest Research on a variety of public policy issues.

MEMBERSHIP: National Association of State Utility Consumer Advocates
Board of Directors, OSPIRG Citizen Lobby
Telecommunications Policy Committee, Consumer Federation of America
Electricity Policy Committee, Consumer Federation of America
Board of Directors (Public Interest Representative), NEEA