ORDER NO. 23-380

ENTERED Oct 20 2023

BEFORE THE PUBLIC UTILITY COMMISSION

OF OREGON

UM 2033

In the Matter of PORTLAND GENERAL ELECTRIC COMPANY, Acceptance of the 2023-2025 Transportation Electrification Plan	ORDER

DISPOSITION: STAFF'S RECOMMENDATION ADOPTED

At its public meeting on October 17, 2023, the Public Utility Commission of Oregon adopted Staff's recommendation in this matter. The Staff Report with the recommendation is attached as Appendix A.

BY THE COMMISSION:

Nolan Moser
Chief Administrative Law Judge

A party may request rehearing or reconsideration of this order under ORS 756.561. A request for rehearing or reconsideration must be filed with the Commission within 60 days of the date of service of this order. The request must comply with the requirements in OAR 860-001-0720. A copy of the request must also be served on each party to the proceedings as provided in OAR 860-001-0180(2). A party may appeal this order by filing a petition for review with the Circuit Court for Marion County in compliance with ORS 183.484.

ITEM NO. RA1

PUBLIC UTILITY COMMISSION OF OREGON
STAFF REPORT
PUBLIC MEETING DATE: October 17, 2023

REGULAR X **CONSENT** ____ **EFFECTIVE DATE** N/A

DATE: September 15, 2023

TO: Public Utility Commission

FROM: Eric Shierman

THROUGH: JP Batmale and Sarah Hall **SIGNED**

SUBJECT: PORTLAND GENERAL ELECTRIC:
(Docket No. UM 2033)
Acceptance of Transportation Electrification Plan.

STAFF RECOMMENDATION:

Accept Portland General Electric's 2023–2025 Transportation Electrification Plan.

DISCUSSION:

Issue

Whether the Public Utility Commission of Oregon (Commission) should accept Portland General Electric's (PGE or the Company) Transportation Electrification (TE) Plan (the Plan).

Applicable Rule or Law

Electric companies must file a TE plan for acceptance by the Commission every three years.[1] The TE Plan and any applications for programs to support TE must be filed in a form and manner prescribed by the Commission.[2]

Division 87 of the Commission's Administrative rules provide the requirements for an electric company TE Plan.[3] The objective of the Division 87 rules is to integrate the

[1] O.R.S. § 757.357(3)(a); OAR 860-087-0020(2)(b).
[2] O.R.S. § 757.357(3)(b).
[3] OAR 860-087-0020.

electric company's TE actions into one document and to act as a summary of the electric company's investments and activities.[4] A TE Plan must include:[5]

a) A description of current market conditions.
b) A summary of programs and future concepts.
c) A discussion of how the TE Plan advances certain performance area categories.
d) Supporting data and analysis.
e) A discussion of potential impact on competitive EV supply equipment market.
f) Ratepayer impact.
g) A TE Budget.
h) Any new Program and Infrastructure Measure applications.

Commission acceptance of the TE Plan grants approval of the TE Budget.[6]

Analysis

In this memo Staff will provide the background and summary of this Plan. Staff will then review the TE Plan and Budget using the new TE investment framework as reflected in Division 87 rules with the interpretive context of the Staff Guidance.[7] The memo will also summarize the ratepayer impact of proposed investments and describe stakeholder comments with the Company's response. The memo concludes with a recommendation for the Commission.

Background
PGE filed its first TE Plan on September 30, 2019. On September 8, 2022, the Commission adopted new Division 87 rules that prescribe the required elements of transportation electrification plans.[8]

PGE sought and received Commission approval to delay filing this Plan. On January 10, 2023, PGE filed a motion seeking a waiver of the Company's February 14, 2023 deadline to file a 2023–2025 TE Plan. PGE filed a draft version of this Plan on June 1, 2023. Staff hosted a workshop on June 15, 2023, in which the Company presented the Plan to stakeholders and answered questions. Staff and numerous parties filed comments on July 13, 2023 including: ChargePoint, EV.Energy, EVGo, SWITCH, Flo, FreeWire Technologies, Xeal Energy, DC-America, EVBox, AmpUp, Tesla, Blink Charging, EV Charging Solutions, Hubject, Wallbox, BorgWarner,

[4] OAR 860-087-0020(1).
[5] OAR 860-087-0020(3)-(4).
[6] OR Laws 2021, ch 95, § 2(3); OAR 860-087-0020(2)(a).
[7] See Docket No. UM 2165, OPUC, Order No. 22-314, August 26, 2022.
[8] See Docket No. AR 654, OPUC, Order No. 22-336, September 8, 2022, p 1.

Noodoe, Chargie, Beam, BP Pulse Fleet, Abb E-Mobility, Rivian, Cascade Policy Institute, EV Charging Coalition, Citizens' Utility Board (CUB), Northwest Energy Coalition (NWEC), and WeaveGrid. The Green Energy Institute (GEI), ChargePoint, EVCA, EVGo, Firewire, MN8 Energy, Enel X Way, and WeaveGrid filed reply comments on July 28, 2023. PGE filed reply comments on August 11, 2023, and a revised TE Plan on August 25, 2023, for Commission acceptance.

Planned TE Programs and Measures
PGE's portfolio consists of 18 TE programs and measures. None of these activities are new and as such this proceeding does not require the approval of program or measure applications.[9] Below, Staff describes each TE activity categorized by program or infrastructure measure and highlights any planned changes. The breadth and duration of PGE's TE activities speak to the growing maturity of the TE market in the Company's service territory. Though EV adoption still has a long way to go before the use of electricity as a motor fuel becomes ubiquitous, PGE has been working in this space for more than a decade as indicated by its TE Plan.

Infrastructure Measures

Electric Avenue is a brand of public charging stations owned by PGE that was first launched in 2011. The original site for this infrastructure measure was built at Portland State University (PSU) as a joint project with the university and the City of Portland.[10] This site had four Level 2 (L2) chargers and three direct current fast chargers (DCFC).[11] After the PSU site was decommissioned, PGE built a new Electric Avenue site at the World Trade Center in 2015. PGE has since expanded Electric Avenue to sites in Hillsboro, the east side of Portland (East Port Plaza), Wilsonville, Beaverton, Milwaukie, and Salem. The Salem site is not currently operational due to construction at the Capitol building.

Oregon Electric Byways is a set of three remaining public charging stations purchased by PGE in 2017 from ECOtality, an early charging firm that went bankrupt. PGE originally purchased ten sites and has since decommissioned seven. Two sites remain operational after receiving an upgrade funded by residential Clean Fuels Program (CFP) credit revenue: Roth's grocery store in Silverton and the IBEW hall by the Portland International Airport. The third site at Lincoln Center, an office building near Washington Square, is not operational due to site host construction.

[9] See OAR 860-087-0020((4).
[10] https://trec.pdx.edu/news/research-explores-impacts-electric-vehicle-charging.
[11] Zimmerman and Bass. *Impacts of Electric Vehicle Charging on Electric Power Distribution Systems* September 2013, p 9.

The **Drive Change Fund** is a grant fund using residential CFP credit revenue that PGE launched in 2019. This program provides up to 100 percent of TE project funding for nonresidential customers, which in several cases has included the purchase of an EV. By funding the vehicle as well, the Drive Change Fund holds the characteristics of both an infrastructure measure and TE program. PGE has funded the electrification projects of 52 different organizations in Oregon through this fund.

The **Electric School Bus Fund** is a grant fund PGE launched in 2019 to disperse residential CFP credits to school districts in support of the procurement of electric buses and installation of charging infrastructure. This program has helped fund 19 electric school buses. Like the Drive Change Fund, the Electric School Bus Fund holds the characteristics of both an infrastructure measure and a TE program.

The **Pole Charging Pilot** is an innovative move PGE has made to develop L2 charging infrastructure mounted on distribution system poles. Launched in 2020, PGE built two chargers in southeast Portland near Division Street. This demonstration project was initially funded through research and development (R&D) funding that has been extended through residential CFP funding. Utilization data from 2022 shows these two sites provide more fuel, per port, than PGE's legacy L2 charging sites.

The **Residential EV Charging Pilot** (Schedule 8) provides a rebate for the installation of a home charger and rewards for participation in a demand response (DR) program. Launched in 2020, this measure had 2,200 participants as of March 2023.[12] PGE has expanded participation by developing a vehicle-based means of offering DR to EVs that lack a networked home charger.

The **Nonresidential EV Charging Pilot** (Schedule 52) provides funding for commercial grade charging infrastructure. Launched in 2020, this measure initially provided a per port rebate for nonresidential L2 charging installations through the UM 2003 deferral. PGE has expanded this measure with Monthly Meter Charge (MMC) and residential CFP revenue to include DCFC and fund make-ready infrastructure, which PGE refers to as Business & Multi-Family Make-Ready Solutions. This Plan will retire the original rebates and Schedule 52 will move forward as a make-ready measure.

Emerging Technology is a measure that provides additional R&D for TE technologies with residential CFP credits. Launched in 2021, this was used to extend funding for PGE's first two pole-mounted chargers. Emerging Technology is now focused on funding vehicle to grid (V2G) demonstration projects.

[12] See Docket No. UM 2033, PGE, TE Plan, August 25, 2023, p 8.

Nonresidential Heavy-Duty EV Charging (Schedule 53) provides make-ready funding to manufacturers or operators of heavy-duty EVs through base rates. Launched in 2021, this measure post-dated PGE's investment in a heavy-duty site on Portland's Swan Island, called Electric Island. However, Electric Island became the first program participant in Schedule 53 for a later project phase that is building on-site solar and storage.

Fleet Partner (Schedule 56) provides make-ready funding for PGE customers' fleet electrification through base rates. Launched in 2021, PGE has contracted 12 sites as of March 2023.[13] Finding the measure fully subscribed, PGE is reducing the size of the incentive.

Municipal Charging Collaboration builds L2 chargers on public right-of-way with MMC funding and is the sole means by which the Company plans to build new public charging infrastructure that is owned and operated by PGE. This measure has mostly been an expansion of pole mounted chargers. However, PGE plans to also build pedestal L2 chargers on the curb of multifamily housing, based on stakeholder feedback. PGE is consolidating the operations of the Municipal Charging Collaboration with PGE's legacy chargers from Electric Avenue, Oregon Electric Byways, and the two original pole-mounted chargers. PGE calls this newly consolidated measure **Public Charging**. PGE is looking for a partner to divest some or all these legacy sites as well as find partners to build and operate new Municipal Charging Collaboration sites.

Affordable Housing EV-Ready Funding provides temporary funding for low-income housing projects that were not budgeted by developers to meet new state and local building code requirements for EV make-ready for residents. PGE launched this measure in 2022 using MMC funds and plans to retire it when this original allocation of funds runs out.

TE Programs

In addition to a wide range of infrastructure measures, PGE operates several TE programs, the largest of which is **Education and Outreach**. Launched in 2018 through UM 1811 as a deferral and 2019 through UM 1826 with residential CFP credits, PGE has used many forms of outreach to promote EV adoption in the Company's service area from maintaining EV-promoting booths at public gatherings to hosting ride and drive events that allow prospective EV buyers to test drive many vehicles at a time. The original deferral-funded program also contains **Technical Assistance** to nonresidential customers. In this Plan, PGE primarily funds Education and Outreach with residential

[13] See Docket No. UE 416, PGE, Company response to OPUC DR 272, March 27, 2023, Attachment A.

CFP credits. The administrative costs of many measures also contain their own outreach budgets as an administrative cost.

The Plan includes three additional programs beyond Outreach and Education. They are:

- **Clean Fuels Credit Optimization** (Schedule 328) provides a monetization service to nonresidential customers that own charging infrastructure, allowing these customers to recoup CFP credits. Launched in 2021, the cost of providing this service comes out of Schedule 328 customers' CFP credit revenue.
- **Matching External Funds** uses residential CFP credits to provide matching funds to public agencies, community benefit organizations (CBO), non-profit organizations, educational institutions, and other partners that seek support from grants outside of PGE. PGE launched this program in 2022.
- **Micromobility Approach** is PGE's effort to study the micromobility market, funded by CFP credits. The Company plans to develop a micromobility strategy from this research.

TE Budget
PGE has budgeted approximately $96 million for the three-year TE Budget or an average of $32 million per year for these TE programs and measures.[14] This TE Budget marks an approximately 253 percent increase in annual TE expenditures from 2022.[15]

Table 1: PGE 2023-2025 TE Budget

Activity	2023	2024	2025
Business and Multi-Family Make-ready Solutions	$ 210,100	$1,085,452	$ 1,251,578
Business EV Charging Rebates	$ 460,000	$2,328,728	$ 0
Clean Fuels Program	$11,758,817	$13,714,381	$ 17,856,449
EV Ready Affordable Housing Grants	$ 1,000,000	$ 0	$ 0
Fleet Partner Pilot	$ 5,258,760	$ 6,415,740	$ 6,442,773
Heavy Duty Charging Pilot	$ 1,997,290	$ 1,186,441	$ 436,723
Portfolio Support	$ 1,811,500	$ 387,500	$ 287,500
Public Charging	$ 4,927,903	$ 2,941,812	$ 7,779,689
Residential Smart EV Charging Pilot	$ 2,417,000	$ 1,945,313	$ 2,130,409
Total	**$29,841,370**	**$30,005,365**	**$ 36,185,121**

[14] See Docket No. UM 2033, PGE, TE Plan, August 25, 2023, p 143.
[15] Operating Expenses Comparison ES.xlsx, Sheet titled "UM 2033 IR 38", Cell H 100.

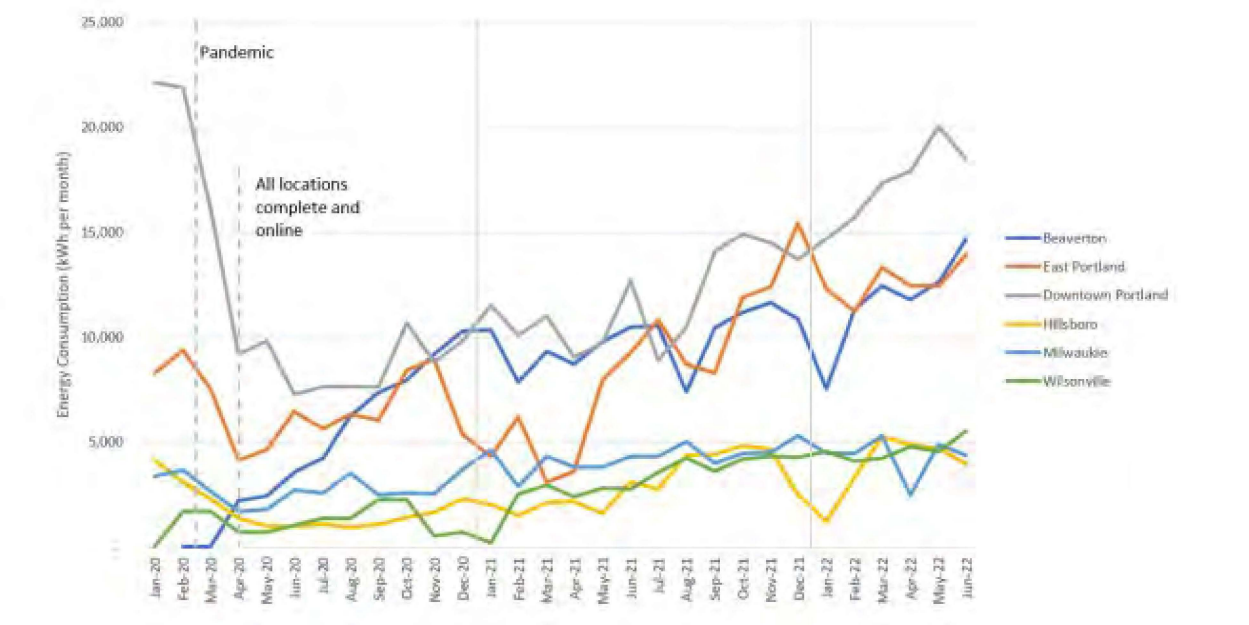
After filing Comments, Staff learned from UE 416 that PGE has not included the administrative cost of TE planning and product design in the draft TE budget. The Division 87 rules require that electric companies include all planned expenditures that support TE in their TE Budgets.[16] After meeting with the Company, PGE explained that it thought these costs cannot be grouped by program. Staff recommends PGE have the flexibility to distribute portfolio-wide planning costs either as a separate category, as PGE did in Table 1 above, creating a portfolio-wide budget item for "Portfolio Support" or PGE can distribute planning costs across programs. Staff clarified its expectation that the TE Budget include planning and product development activities within a holistic budget for Commission approval. PGE updated the TE Budget with a portion of these expenditures.[17] If PGE has underestimated these administrative costs in the 2023–2025 TE Budget, the Company can use the TE Plan update process before actual expenditures exceed what the Commission approves in this proceeding, which is required under OAR 860-087-0020(2)(f).

EV Market in PGE's Service Territory
Oregon Administrative Rules require electric companies to report on the current condition of the transportation electrification market in the electric company's Oregon service territory.[18] In the following discussion, Staff highlights key planning topics that impact rates, resource planning, and distribution system planning. These topics are charging behavior, EV adoption, and charging infrastructure need.

The Company provides less empirical data of EV market activity in its service territory than in the 2019 TE Plan. One helpful data visual PGE did provide in this Plan is a graph showing the post-COVID recovery of energy sales at Electric Avenue.

[16] See OAR 860-087-0010(6); OAR 860-087-20(3)(g).
[17] See Docket No. UM 2033, PGE, Response to OPUC IR 61, September 11, 2023, p 1.
[18] OAR 860-087-0020(3)(a).

Figure 1: Energy Deliveries to Electric Avenue, Chart 6 from PGE's 2023-2025 TE Plan



The best proxy for recovery is the gray line, representing the World Trade Center site. The other sites had been recently built, so the post-COVID growth might conflate growth in market share from a newly constructed site. Figure 1 is missing data from the Salem Electric Avenue Site, which has not been operational while the Capital Building has been under renovation. PGE's 2023–2025 TE Plan does not state that the Salem Electric Avenue site is not currently used and useful.

While Figure 1 shows total energy deliveries, it does not show the percentage utilization of the sites' nameplate capacity. This is an important metric to monitor because it can be a key input to assessing charging infrastructure need and benefit/cost analysis. Assuming too high a capacity utilization for charging sites will underestimate infrastructure need and overestimate per site revenue. Unlike Pacific Power, PGE did not identify the highest observed site utilization observed in calendar year. PGE does have the data to find this benchmark.

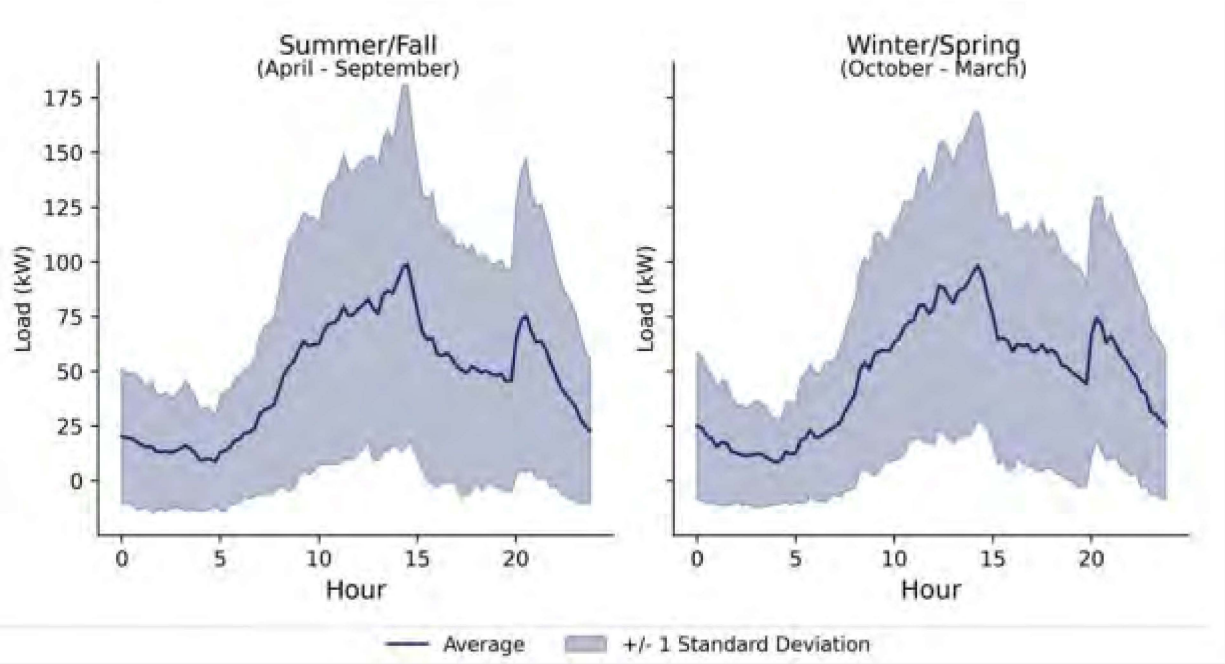
Using data from PGE's response to OPUC IR 36, the highest capacity utilization at a charging station with DCFC chargers in PGE's service territory in 2022 was 19.6 percent.[19] The average is 4.1 percent. To put this into perspective, the Oregon Department of Transportation's (ODOT) Transportation Electrification Need Analysis (TEINA) model assumes an average capacity utilization of more than 20 percent. This

[19] PGE Public Charging Customer CONF ES.xlsx.

data point provides an empirical perspective on the use of charging stations in PGE's service territory that suggests the current presence of excess capacity for fast charging.

Also, unlike Pacific Power, PGE did not present data on the load shapes of public charging. In contrast to the 2019 TE Plan, PGE did not present Electric Avenue's load shape. Load shapes provide an important insight into the marginal cost of providing service to a customer. PGE did present Electric Avenue's recent load shape in a 2023 UM 1938 compliance filing.[20] Figure 2, below, shows a 2 pm peak and that Electric Avenue customers are impacted by Schedule 50's 19 cents per kWh peak pricing from 3–8 pm. Schedule 50 is the rate EV operators pay at PGE-owned charging sites.

Figure 2: Electric Avenue Load Shape, PGE's Figure 20 From the Company's 2023 Evaluation of UM 1811 Pilots



This load shape also shows a needle peak in some high-risk hours for PGE's system. According to PGE's 2023 Integrated Resource Plan (IRP), PGE faces higher system risk from the two hours between 8 pm to 10 pm than the two hours between 3 pm to 5 pm.[21]

[20] See Docket No. UM 1938, PGE, Evaluation of Portland General Electric's Transportation Electrification Pilot Programs, April 20, 2023, p 42.
[21] See Docket No. LC 80, PGE, 2023 IRP, March 31, 2023, p 125.

Figure 3: Capacity Need Heatmap, Figure 44 from PGE's 2023 IRP

Therefore, any shift of charging from 3 pm to 8 pm at Electric Avenue is harmful rather than helpful to PGE's load-resource-balance. The mismatch of system risk and peak hours is even more pronounced in Schedule 38, the rate used by many public charging station customers of PGE. Schedule 38's peak hours are 7 am to 8 pm. This may be shifting more EV charging from low-risk mid-day hours to the high-risk hour at 8 pm.

Understanding the hours that PGE's system experiences the highest risk also highlights the importance of accurately modeling the load shape of residential charging. In the Plan, PGE presents the load shape of residential charging that the Company uses in AdopDER, PGE's distributed energy resources model.[22]

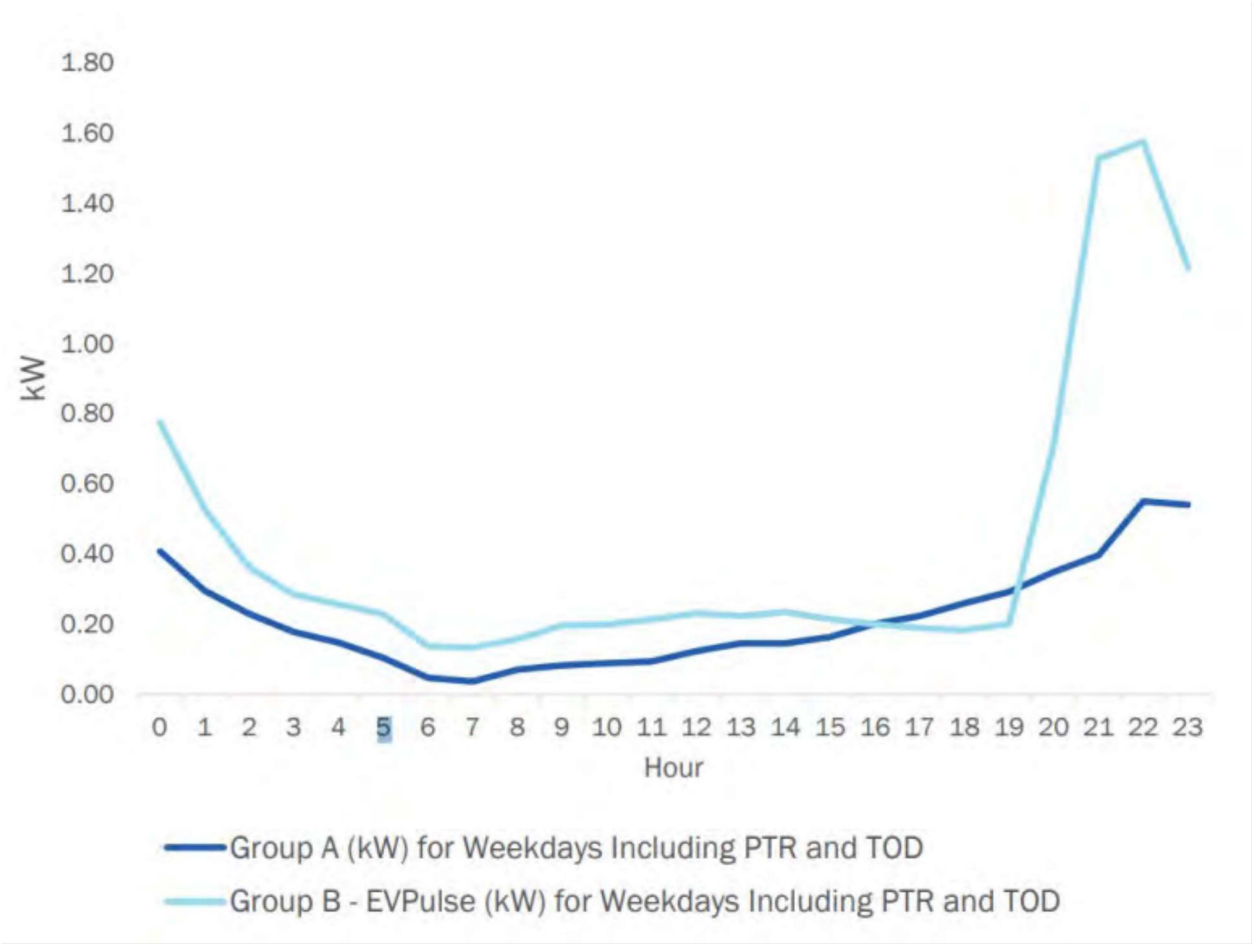
[22] See Docket No. UM 2033, PGE, Draft TE Plan, June 1, 2023, p 55.

Figure 4: Residential Load Shape: Chart 4 from PGE's Draft TE Plan

Because this load shape came from generic data provided by the Environmental Protection Agency, in Comments, Staff recommended PGE present the load shape of residential charging that is observed in the Company's service territory. In the final TE Plan, PGE produced an observed load shape of residential charging from home chargers (Group A) and EVPulse (Group B), a vehicle-based telemetry.[23]

[23] See Docket No. UM 2033, PGE, TE Plan, August 25, 2023, p.

Figure 5: Observed Residential Load Shape, Figure 24 in the Plan



This utility-specific data shows significant difference from the EPA's load shape. Group A is noticeably flatter while Group B's steeper kurtosis during peak hours implies a higher marginal cost to serve. This could be the difference between Tesla drivers and non-Tesla drivers. Understanding the difference between these two data sets, identifying which is more representative of residential charging in PGE's service territory, and updating the load shape assumption of residential charging in AdopDER will be an important learning from PGE's TE pilots to improve the Company's resource and distribution system planning.

While the accuracy of the assumed load shape of public and private EV charging in PGE's service territory may have a significant impact on how PGE models peak charging, the hours that the Company assumes to hold system risk are also an important driver of reasonable resource and distribution system planning. In the Plan,

PGE revealed that the hours assumed to be peak hours in AdopDER diverge even farther from the Company's IRP modeling than the peak hours in Schedule 50 and Schedule 38. As shown in Figure 6 below, AdopDER expects only four days in August will have peak hours.[24] So, when AdopDER calculates the coincident peak of EV charging, it treats most early evening hours in August as off-peak, possessing low system risk, which likely underestimates the coincident peak of EV charging. AdopDER also treats known off-peak hours past midnight as high-risk hours, further degrading the model's calculation of the capacity need of EVs.

Figure 6: System Critical Hours in AdopDER, Table 86 in the Plan

Month	Peak Hours
January	2026-01-02 07:00:00-08:00
January	2026-01-02 16:00:00-08:00
January	2026-01-07 16:00:00-08:00
January	2026-01-08 16:00:00-08:00
January	2026-01-09 16:00:00-08:00
January	2026-01-21 07:00:00-08:00
January	2026-01-21 16:00:00-08:00
January	2026-01-22 16:00:00-08:00
January	2026-01-23 07:00:00-08:00
January	2026-01-23 16:00:00-08:00
July	2026-07-21 17:00:00-07:00
August	2026-08-05 17:00:00-07:00
August	2026-08-10 17:00:00-07:00
August	2026-08-12 17:00:00-07:00
August	2026-08-26 17:00:00-07:00
December	2026-12-31 16:00:00-08:00

PGE tells Staff AdopDER endogenously "takes the logic of the [Loss of Load Probability] (LOLP) approach, and simulates dispatch events / peak events as occurring on the top load days, which are derived in the model based on the weather-normalized

[24] See Docket No. UM 2033, PGE, TE Plan, August 25, 2023, Table 86, p 291.

load forecast module which simulates load patterns."[25] These hours do not appear to Staff to reflect the logic of PGE's IRP. This raises questions about the reliability of AdopDER's estimate of EV capacity need and the usefulness of AdopDER information in other planning dockets.

Beyond usage data, another form of data PGE has from program-enabled ports is session data, which shows when unique EVs charge. Unlike Pacific Power, PGE's TE Plan chargers cannot be fully compared with Electric Avenue.

EV Adoption
PGE uses AdopDER to model the Company's EV adoption forecast. In this proceeding, Staff has had less access to the AdopDER model than we anticipated. For that reason, our review of the reasonableness of PGE's EV adoption forecast has been limited. In UM 2197, the scope of Staff's review of AdopDER for PGE's Distribution System Plan (DSP) Part II filing was narrowed to confirming that the code and data were transparent. We thought PGE's responses to OPUC IRs 8 and 9 in that docket provided a level of access that could replicate an AdopDER run. Staff planned to review the reasonableness of AdopDER when reviewing the TE Plan and the 2023 IRP.

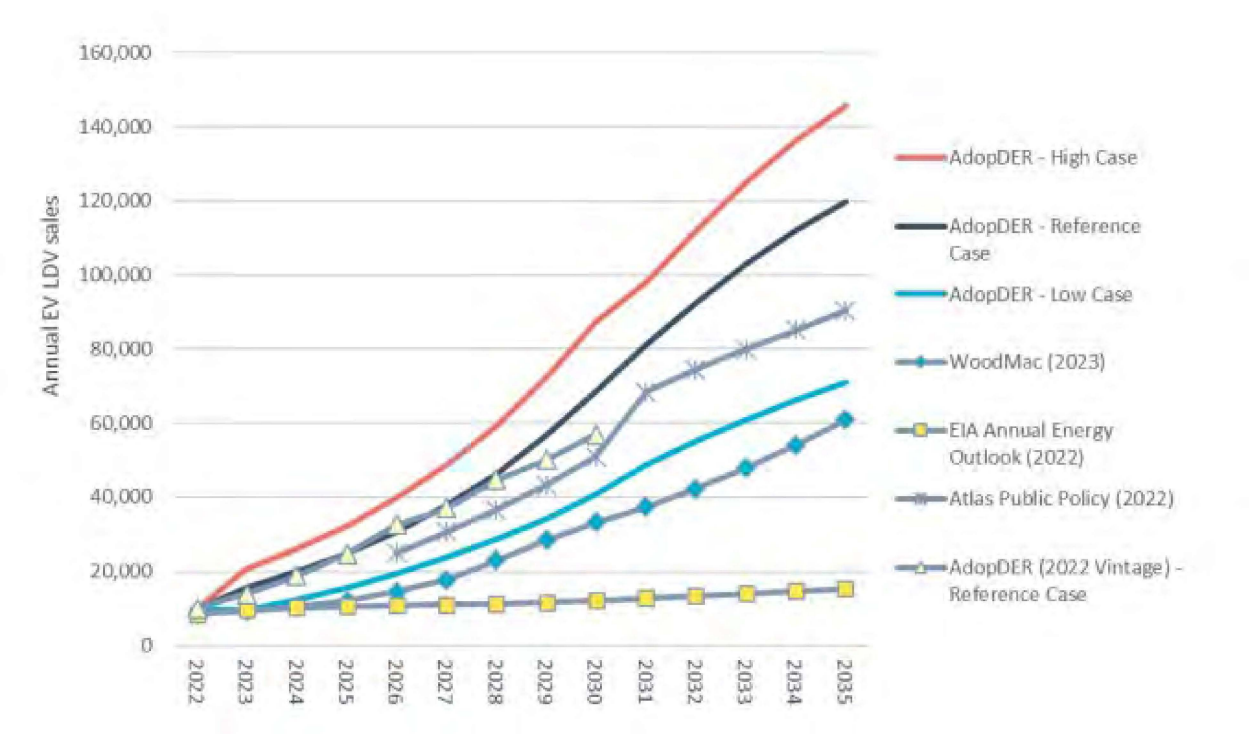
In reviewing the other two electric companies' EV adoption forecasts, Staff has been able to use the discovery from their DSP dockets. We could not do that for PGE, because the Company used a new vintage of AdopDER for this Plan. When requesting the new version, PGE was unable to produce all the code and data. AdopDER is too central to PGE's TE, resource, and distribution system planning, to be a black box. Staff has developed an arrangement with PGE for a more transparent review. PGE has offered to host on-site access to AdopDER. PGE's explanation is that the data size is too large to transfer.

Most of the EV adoption forecast are inputs to AdopDER that can be reviewed separately. PGE has contracted with the Brattle Group to use a proprietary panel data regression. Staff will have access to the regression methods, regression output, and future values that are plugged into the independent variables. Staff finds this to be a workable arrangement.

[25] Email from PGE to Staff, September 11, 2023.

Another means of assessing a forecast is to compare the results in the context of other forecasts. PGE's reference forecast of LDV electrification predicts a higher rate of growth than either that of Wood Mackenzie or the Energy Information Administration (EIA).[26]

Figure 7: LDV EV Adoption, Figure 10 in PGE's TE Plan



Another comparison is with the EV adoption forecast of the 2019 TE Plan. PGE used a Bass Diffusion Model that substantially overestimated EV adoption, when 2022 actuals are compared with that prior forecast. PGE's prior vintage of AdopDER presented with the Company's DSP Part II filing last year was much closer, even slightly underestimating the final 2022 count. This leads Staff to believe the accuracy of PGE's forecasting of LDV EV adoption has improved from the 2019 TE Plan.

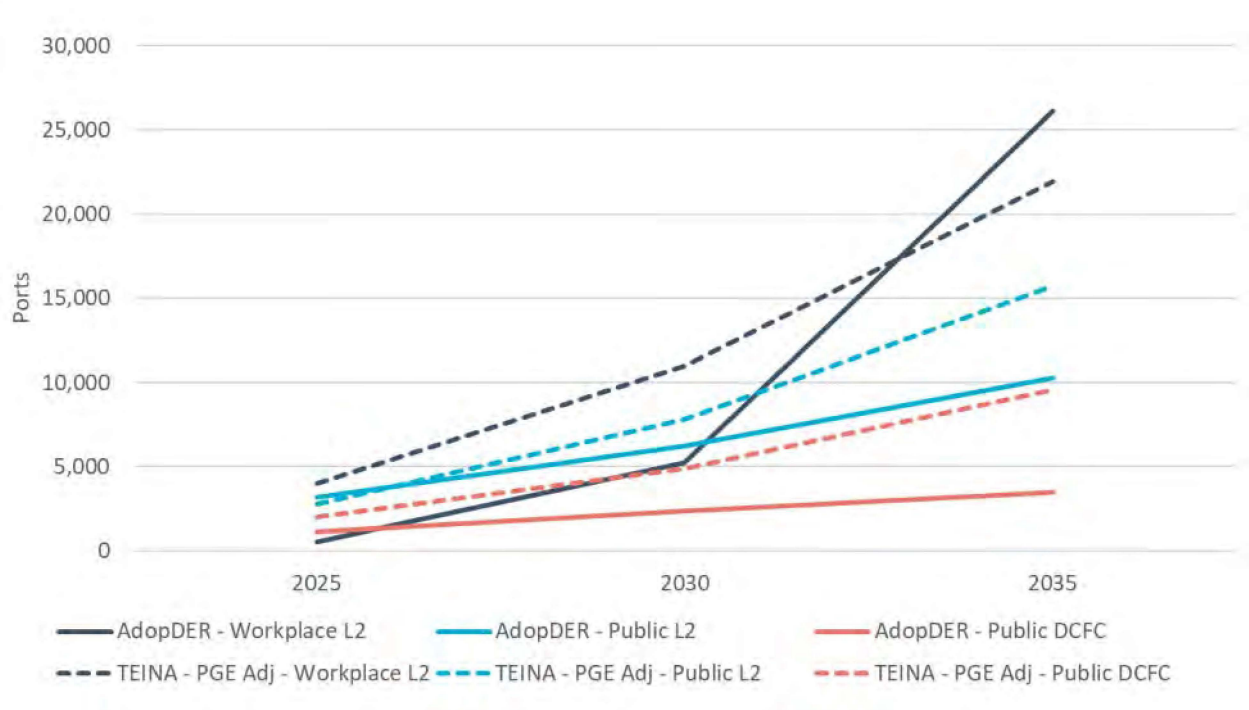
In contrast to the LDV forecast, PGE's adoption forecast of medium-duty vehicles (MDV) and heavy-duty vehicles (HDV), or (MHD), is not based on a regression analysis of market data. Instead, PGE uses regulatory targets from California's Advanced Clean Trucks rule which Oregon has adopted. This is blended with a bottom-up analysis of likely conversions by PGE's "Customer teams, Key Account manager, and TE outreach

[26] See Docket No. UM 2033, PGE, TE Plan, August 25, 2023, p 50.

leads."[27] Staff has not reviewed the bottom-up portion of PGE's forecast. PGE finds the Company's forecast to fall within a range of HDV and MDV forecasts produced by Brattle.[28] Staff finds the Brattle forecast of heavier EVs opaquer than the LDV regression analysis. Staff will track the performance of this forecast and will be looking for how the fundamentally uneconomic nature of MHD electrification to so many use cases is assumed to be overcome and how regulations that mandate ZEV sales by manufactures prevent fleets from procuring used diesel trucks. Staff agrees with PGE that the MHD segment of the EV market is relatively difficult to forecast, and we plan to explore the empirical basis of MHD electrification forecasting in other related dockets and the next TE Plan.

Charging Infrastructure Need
PGE performed an infrastructure need analysis using both TEINA and AdopDER. This produced different results.[29] Figure 8 shows that TEINA forecasts a higher infrastructure need than AdopDER.

Figure 8: Comparison of TEINA and AdopDER results, Chart 5 from PGE's TE Plan



[27] See Docket No. UM 2033, PGE, TE Plan, August 25, 2023, p 292.
[28] Ibid.
[29] Ibid, p 60.

PGE does not know why these results diverge. This is important, because, either AdopDER is underestimating the need for chargers in PGE's service territory or TEINA produces an overestimation. Staff has discussed AdopDER's equivalent to key TEINA inputs. One of the biggest drivers is assumed charger utilization. AdopDER's assumptions are substantially lower than TEINA's, which should lead to greater resource need. This anomaly makes the divergence of TEINA and AdopDER results even more difficult to understand. Staff will need to examine this modeling in more detail.

PGE's forecast of infrastructure need by port has not been compared at the census tract level, a key equity metric from Order No. 22-314 that Idaho Power and Pacific Power performed. Unlike the two other electric companies, PGE has not surveyed charging infrastructure by location. This is important because some census tracts, even those populated by underserved communities, may have a more adequate infrastructure buildout than others. Staff will take this topic up in UM 2165.

Staff's review of the Plan's coverage of the current TE market condition in the Company's territory reveals that PGE's empirical understanding of its own EV market remains limited, despite possessing more real-world charging data and other market information than any other utility in Oregon. This collection of data was the Commission's basis for approving PGE's pilots in lieu of evidence that PGE's proposals might become cost-effective. Staff sees stronger analysis of this data important for future use in rate design, EV program development, resource planning, and distribution system planning.

In discussing this with PGE, the Company has explained that the robust data analysis Staff is looking for does not appear to impact Staff's recommendation to the Commission on the TE Budget. PGE's position misses that OAR 860-087-0020(3)(a) contains reporting requirements of the TE market for the purpose of providing this knowledge, on the record, to the public.

This knowledge is a public good for policymakers. Staff regularly works in coordination with other state agencies, which are hungry for the latest learnings from Oregon's electric companies. Staff is regularly asked to peer review TE-related writing by the Oregon Department of Energy (ODOE). Staff contributes to ODOT's infrastructure planning. Staff coordinates with the Oregon Department of Environmental Quality (DEQ) on both the administration of Oregon's CFP and regulating emissions. Staff receives requests from the legislature for expert feedback on proposed legislation. An important part of the policy justification of electric companies' TE activities is the public good from disseminating this TE data.

Additionally, Staff highlights two data-related needs to inform rate design for TE planning right now. The first, in this proceeding, relates to the programmatic rate under Schedule 50. The Company reports it does not know the magnitude of the loss in which PGE sells charging services. PGE also does not know the disparate impact Schedule 50's low price may have on wealthy EV owners at the expense of low-income ratepayers. A second TE rate issue is in UE 416, PGE's rate case, where PGE does not know the marginal cost impact of raising Schedule 38's capacity cap above 200 kW for EV charging. Schedule 38 is a nonresidential time of use rate that charging businesses use. A goal in the Company's 2019 TE Plan was to change this rate design, but PGE has since filed two rate cases and not proposed this change.[30] As in intervenor to UE 416, Walmart has proposed a higher capacity for Schedule 38.[31] PGE opposed the proposal in Reply Testimony due to a lack of information about the cost impacts.[32] Staff will work with PGE to support the Company's TE planning for future ratemaking, resource, and distribution system questions that are likely to arise as resource adequacy makes EV grid integration more salient and PGE's revenue requirement steadily increases.

Benefit/Cost Analysis
Staff has reviewed PGE's analysis of the benefits and costs of the Plan. PGE's analysis finds the TE portfolio has a benefit/cost ratio (BCR) of 0.68 under a Ratepayer Impact Measure (RIM) test. Under the Total Resource Cost (TRC) test, which aggregates the net benefit of program participants with ratepayers, the Company finds the portfolio has a BCR of 1.54. Under the Societal Cost Test (SCT), PGE's analysis finds the portfolio has a BCR of 1.79.[33]

Staff finds PGE performed a standard benefit/cost analysis, meeting the requirements of OAR 860-087-0020(3)(g). In Comments, Staff noted some issues in the Company's analysis. Given the absence of an established standard, that discussion was only meant to contribute to the conversation that will develop more specific guidance before the Company files its next TE Plan.

Portfolio Performance Areas
Under Division 87 rules, an electric company's TE Plan is required to provide a discussion of how programs and infrastructure measures holistically advance portfolio performance categories that include, but are not limited to:

(A) Environmental benefits including greenhouse gas emissions impacts;

[30] See Docket No. UM 2033, PGE, TE Plan, September 30, 2019, p 123.
[31] See Docket No. UE 416, Walmart, Opening Testimony, June 13, 2023, Chriss/14-15.
[32] See Docket No. UE 416, PGE, Reply Testimony, July 21, 2023, Macfarlane – Pleasant / 33-34.
[33] See Docket No. UM 2056, Pacific Power, Draft TE Plan, February 14, 2023, p 62.

(B) Electric vehicle adoption;
(C) Underserved community inclusion and engagement;
(D) Equity of program offerings to meet underserved communities;
(E) Distribution system impacts and grid integration benefits;
(F) Program participation and adoption;
(G) Infrastructure performance including charging adequacy which considers, but is not limited to reliability, affordability, and accessibility;[34]

Additionally, in Order No. 22-314 the Commission adopted a set of metrics developed by utilities and stakeholders that provide a minimum scope to this holistic discussion. The Company's TE Plan addresses the performance areas and metrics as shown.

Table 2: TE Portfolio Performance Areas

Portfolio Performance Area	Metric	How Addressed in PGE's 2023-2025 TE Plan
Environmental Benefits including Greenhouse Gas Emissions Impacts	Greenhouse gas (GHG) emission and other air pollution reductions estimated from all EVs registered in a utility service area	PGE shows the expected net reduction in GHG emissions. EVs fueling on PGE's system have lower GHG emissions per mile.
Electric Vehicle Adoption	Qualitative description of the TE Plan's expected impact on EV adoption	The Company is uncertain of the Plan's impact on EV adoption.
Underserved Community Inclusion and Engagement	Outreach, capacity building to, and participation of underserved communities, low-income service providers, community-based and community service organizations, non-profit organizations, small businesses (particularly minority and women owned businesses), and Tribes in the development and implementation of a utility TE portfolio	To inform the current Plan, the Company led six workshops and focus groups, surveys of community-based organizations, and direct outreach to members of underserved communities guided by a third-party equity consultant. PGE implemented numerous changes because of stakeholder feedback. For long-term engagement, PGE implemented capacity building workshops called Community Learning Labs to bring stakeholders of all backgrounds up to speed on

[34] OAR 860-087-0020(3)(c).

Portfolio Performance Area	Metric	How Addressed in PGE's 2023-2025 TE Plan
		TE issues.[35] The Company plans to convene a TE community working group semi-annually, compensate participants, and apply equitable mobility best practices.
Equity of program offerings to meet underserved communities	Percent of program-enabled ports by use case located within and/or providing direct benefits and services to underserved communities or communities identified using a Commission-approved tool	Fifty-four percent of program-enabled ports are located within or provide direct benefits and services to underserved communities.[36]
	For transit agencies who have participated in a utility EV program during the portfolio period, the transit agencies' annual service hours, number of routes, and number of routes serving underserved communities, to the extent this information is provided to the utility.	Not applicable – PGE expects no transit agency program participants in 2023-2025.

[35] See Docket No. UM 2033, PGE, TE Plan, August 25, 2023, p 83.
[36] Ibid, p 15.

Portfolio Performance Area	Metric	How Addressed in PGE's 2023-2025 TE Plan
	Types of electric transportation technology supported by a utility portfolio as a percent of total investments, organized into categories such as micromobility, passenger vehicles, light-duty fleet vehicles, medium- and heavy-duty fleet vehicles, school buses, and transit buses	• Residential 70% • Multi-Family 1% • Workplace 12% • Corridor Public 1% • Non-corridor Public 6% • LDV fleet 7% • MHD fleet 4%[37]
Distribution system impacts and grid integration benefits	Percent of program-enabled charging load that occurs off-peak, by use case	• Residential 63% • Multi-Family 44% • Workplace 85% • Corridor Public 79% • Non-corridor Public 0% • LDV fleet 57% • MHD fleet 63%[38] For these calculations, PGE used the weekday hours of 5 pm to 9 pm. Any criteria that find 5 pm to 6 pm a system critical hour should include 9 pm to 10 pm as well.
	Total EV load enrolled in managed charging, and potential for managed charging. Estimated percent of EV load enrolled in managed charging	• 2022 0.66 MW • 2023 1.39 MW • 2024 2.39 MW • 2025 3.49 MW[39]
Program Participation and Adoption	Number of program-enabled ports by use case	• Residential 4,088 • LDV Fleet 415 • MHD Fleet 242 • Corridor 37 • Public 340 • Multi-family 73 • Workplace 683[40]

[37] See Docket No. UM 2033, PGE, TE Plan, August 25, 2023, Table 30, p 136.
[38] Ibid, pp 135-136.
[39] Ibid, Table 47, p 174.
[40] Ibid, Table 30, p 136.

Portfolio Performance Area	Metric	How Addressed in PGE's 2023-2025 TE Plan
	Percent of total public ports by use case within utility service territory that are program-enabled.	• Workplace L2 17% • Public L2 14% • DCFC 5%[41]
	Number of participants in utility programs, broken down by program and underserved community status	• Business & Multi-Family Make Ready Solutions 60% • Business EV Charging Rebates 38% • CFP Administration 50% • CFP Education and Outreach 50% • CFP Grants and Infrastructure 80% • EV Ready Affordable Housing Grants 100% • Fleet Partner Pilot 20% • Heavy Duty Charging Pilot 50% • Portfolio Support 50% • Public Charging 75% • Residential Smart Charging Pilot 50%[42]
Infrastructure performance including charging adequacy, reliability, affordability, and accessibility	Price ($/kWh) to charge at program-enabled ports by use case	The Company did not perform this analysis.
	Uptime at utility-owned and supported ports by use case	PGE only has data for utility-owned sites. The Company should require this data from customers as a condition for program participation. The uptime for Electric Avenue in 2022 was: • Beaverton 73.3% • Eastport Plaza 80.0% • Hillsboro 80.0%

[41] See Docket No. UM 2033, PGE, TE Plan, August 25, 2023, p 281.
[42] Ibid, Table 26, p 130.

Portfolio Performance Area	Metric	How Addressed in PGE's 2023-2025 TE Plan
		• Milwaukie 91.8% • Wilsonville 88.2% • Downtown Portland 78.9% • Salem 0%[43] PGE does not have the same data for Oregon Electric Byways, pole-chargers, Schedule 52 participants, or CFP program participants.[44]

Ratepayer Impact
PGE performed an analysis of this Plan's impact on rates. PGE finds the impact will be 0.08 percent for all rates in 2024, 0.13 percent in 2025, and will have a disproportionately lower impact on large industrial customers.

[43] See Docket No. UM 2033, PGE, TE Plan, August 25, 2023, p 74.
[44] See Docket No. UM 2033, PGE, Response to OPUC IR 60, September 11, 2023, pp 1-2.

Figure 9: Ratepayer Impact, Table 45 in the Plan

Category	Schedule	2023 Rate Impact	2024 Rate Impact	2025 Rate Impact
Residential	7	0.11%	0.20%	0.23%
Small Non-residential	32	0.10%	0.18%	0.21%
Large Non-residential Time of Day	38	0.15%	0.26%	0.30%
Large Non-residential Capacity Tier	83	0.01%	0.02%	0.03%
Large Non-residential Capacity Tier	85	0.02%	0.03%	0.03%
Large Non- residential Capacity Tier	89	0.02%	0.04%	0.05%
Large Non- residential Capacity Tier	90	0.01%	0.02%	0.02%
Total Impact, All Schedules			0.08%	0.13%

Summary of Select Stakeholder Feedback
Several stakeholders filed written comments on the Company's draft Plan. Staff summarizes them by topic.

Multi-Family Charging: CUB, NWEC, and GEI expressed concerns that PGE's proposal to provide incentives for installation of electric vehicle supply equipment (EVSE) at multifamily housing without utility ownership may leave residents vulnerable to higher and unregulated charging costs. CUB and NWEC asked PGE to revise the Company's multi-family program structure, so the Commission retains rate-setting authority over the price-to-charge at program-enabled multi-family sites. GEI wants to see PGE report on the $/kWh at sites that have already received support from PGE before making a recommendation. EVGo and ChargePoint expressed support for PGE's Business and Multi-Family Make-Ready offering.

Switch recommends more utility expenditures on multi-family housing in terms of goals and rebates. Switch believes PGE's target for multi-family ports is too low. Switch argues that PGE's rebates for multi-family housing should be more generous.

In the final Plan, PGE changes the Company's approach to multifamily housing. The Company shifts funds from Business and Multi-family Solutions to the Municipal Charging Collaboration, planning to build PGE-owned curbside L2 chargers co-located at or near other programs' multi-family sites. PGE also changes the incentive for

Business and Multifamily Solutions, providing an additional incentive of $1,300 after five years for program participants that keep their prices within 10 percent of Schedule 50 prices. Staff supports this compromise.

Schedule 50: Stakeholders have disagreed on how PGE's Schedule 50 is priced. Schedule 50 is the tariff that sets the price to fuel an EV at PGE-owned public charging sites. ChargePoint, EV.Energy, EVGo, SWITCH, Flo, FreeWire Technologies, Xeal Energy, DC-America, EVBox, AmpUp, Tesla, Blink Charging, EV Charging Solutions, Hubject, Wallbox, BorgWarner, Noodoe, Chargie, Beam, BP Pulse Fleet, Abb E-Mobility, and Rivian want to see Schedule 50 set to the middle of the range of market prices. CUB, NWEC, and GEI want Schedule 50 to provide parity with PGE's residential rate.

In the final Plan, PGE proposes to align Schedule 50's L2 prices with the Company's residential rate and the DCFC rate to the mid-market based on the charger's speed. Staff supports this compromise. Also, when PGE files for a tariff change, the Company's filing should align the peak hours with the high-risk hours from PGE's 2023 IRP. The filing should also show the marginal cost to provide this service, an estimate of the revenue maximizing rate that Schedule 50 could collect, and a revenue forecast derived from PGE's rate proposal.

Technical Standards: ChargePoint, EV.Energy, EVGo, SWITCH, Flo, FreeWire Technologies, Xeal Energy, DC-America, EVBox, AmpUp, Tesla, Blink Charging, EV Charging Solutions, Hubject, Wallbox, BorgWarner, Noodoe, Chargie, Beam, BP Pulse Fleet, Abb E-Mobility, and Rivian would like PGE's technical standards to be aligned with the national standards the federal government is establishing through the National Electric Vehicle Infrastructure (NEVI) Program rulemaking process, which is setting standards to receive federal infrastructure funding. EV advocates have long sought higher standards for utility-supported infrastructure. The biggest issue of contention stakeholders have debated has been requiring a credit card payment processor.

PGE chose to incorporate the payment processor requirement and require a CHAdeMO port, a legacy standard to support used Nissan Leaves. PGE chose higher standards than NEVI. Staff does not recommend the Commission oppose this. The arguments that charging firms make about the importance of embracing NEVI standards are valid, for the public sector. Staff finds that it makes sense for the Commission to embrace the federal standards in terms of what the Commission expects of Oregon electric companies. Staff's approach to Federal standards is that they should generally be seen as minimum requirements, allowing for private parties to choose additional requirements. PGE has chosen a higher standard for ratepayer-funded projects, and

Staff supports giving PGE the flexibility to make that choice if the chosen requirements are consistent with NEVI standards.

EVGo makes an argument about PGE being below NEVI standards for not requiring a minimum charging capacity of 150 kW. Staff does not interpret the NEVI standard for corridor chargers as a restriction on lower capacity ports in other use cases.

Commercial EV Rate: ChargePoint, EV.Energy, EVGo, SWITCH, Flo, FreeWire Technologies, Xeal Energy, DC-America, EVBox, AmpUp, Tesla, Blink Charging, EV Charging Solutions, Hubject, Wallbox, BorgWarner, Noodoe, Chargie, Beam, BP Pulse Fleet, Abb E-Mobility, and Rivian recommend PGE develop a commercial EV rate for high capacity DCFC chargers. EVGo, specifically, supports PGE's Schedule 38, which uses a time of use design in lieu of a demand charge to recover marginal capacity costs. However, Schedule 38 is capped at 200 kW. EVGo would like to see a similar rate for sites with a higher demand capacity.

In the final TE Plan, PGE responds by stating: "PGE is in the process of researching, investigating, and planning for the development of a new commercial EV charging rate." Staff noted previously that this issue is being taken up in PGE's rate case. Walmart, an intervenor in UE 416 proposes to lift Schedule 38's 200 kW cap. Staff thinks the Company should work to establish this rate in its current rate case proceeding. PGE has enough separately metered charging sites in the Company's service territory to derive the marginal cost of these customers from interval data. PGE's response to OPUC IR 36 provides data for 38 sites. That is likely a reasonable sample of a broader population of charging sites that PGE has not surveyed.

Benefit/Cost Analysis: The Cascade Policy Institute points to benefit/cost analysis as an international best practice and recommends PGE's TE Budget be subject to this budget constraint. Staff clarifies that this is a temporary arrangement as separately approved pilots are transitions into a unified portfolio. After public review of this first iteration of TE Plans under the new Division 87 rules is completed, Staff will work with UM 2165 parties to establish a jurisdictional specific test to compare the costs and benefits of the electric companies' 2026–2028 TE Plans.

Public DCFC: ChargePoint, EV.Energy, EVGo, SWITCH, Flo, FreeWire Technologies, Xeal Energy, DC-America, EVBox, AmpUp, Tesla, Blink Charging, EV Charging Solutions, Hubject, Wallbox, BorgWarner, Noodoe, Chargie, Beam, BP Pulse Fleet, Abb E-Mobility, and Rivian observe that PGE does not have a measure to support public DCFC construction like the generosity of Fleet Partner for private charging, finding Schedule 52's rebates too low relative to the cost of building modern chargers. EVGo

recommends PGE offer a measure that would fund at least 200 ports that average 150 kW of demand capacity. EVGo estimates this will cost $10.5 million.

Expanded Vehicle-Based Telematics: EV.Energy recommends PGE expand vehicle based telematics beyond Tesla and broaden the how this connection to the vehicle is used an interfaces with customers. PGE remains open to exploring "additional venues of managed charging through telematics and EVSE."[45]

Evidence-based Charging Assumptions: GEI challenges PGE's statement that, "the EV is now and is expected to continue to be the largest load in a customer's home."[46] GEI points to studies suggesting that is not true, that the fuel requirements of EVs bring smaller energy consumption than electric furnaces and are more comparable to a water heater. GEI notes PGE has the data to empirically base these assumptions, concluding "Given that the TEP states numerous times that the company designed its described programs to gather information and data to inform future actions, PGE should leverage and utilize its existing data more effectively."[47] Staff agrees.

In addition to this observation about the use of data, GEI recommends PGE present the average observed load from EV charging compared to other electric household appliances. In the Plan, PGE replied that the Company's evaluation of Residential Smart EV Charging is still underway and made a commitment to do this in "future program and tariff design discussions with stakeholders."[48] Staff supports GEI's request and notes when the Commission approved PGE's application for this measure, PGE committed to provide an interim assessment in the fall of 2021.[49] As that deadline approached, PGE asked Staff for an extension. Staff agreed to extend the publication of the interim evaluation of PGE's Schedule 8 to PGE's next TE Plan. PGE has failed to follow through either on the terms of Commission approval of this measure or Staff's agreement to delay the initial assessment. Staff finds that, at the time PGE filed a draft TE Plan this year, PGE had sufficient data by the end of 2022 to provide important insights, such as the average fuel requirements of home charging. Filing this Plan without such important information was a lost opportunity to share market insight with the public while a diverse set of stakeholders committed to participate in this process. Staff looks forward to working with PGE to ensure the next TE Plan includes robust data analysis.

[45] See Docket No. UM 2033, PGE, TE Plan, August 25, 2023, p 283.
[46] Ibid, p 13.
[47] See Docket No. UM 2033, Green Energy Institute, Reply Comments, July 25, 2023, p 2.
[48] See Docket No. UM 2033, PGE, TE Plan, August 25, 2023, p 271.
[49] See Docket No. ADV 1151, PGE, Advice No. 20-18, July 15, 2020, Attachment A, p 40.

Energy Efficiency (EE): NWEC and GEI recommend PGE provide more information about how EE compliments EV load. In the Plan, PGE responds by stating that the Company will continue to explore additional managed charging. PGE also pointed out that TE is itself more energy efficient than internal combustion engines. Staff knows this is true for LDVs running on gasoline. Staff is not certain the same EE opportunity comes with HDV. An obvious EE measure for EVs themselves is to improve fuel efficiency. Micromobility, which is even more energy efficient per mile than driving LDV EVs is perhaps the best example of an EE measure for EVs. Electrified micromobility, such as electric bicycles, might reduce the use of LDVs in general, reducing load and charging infrastructure need. Ultimately, EE is a demand-side resource that complements TE by helping PGE meet the Company's load/resource balance.

Micromobility Safety: GEI is concerned about the safety of e-bikes due to fires and wants PGE to provide more information on how the Company will ensure that Oregon CFP funds safe micromobility products. In the Plan, PGE makes a commitment to safety as a foundational value in the Company's approach to micromobility. Staff supports this commitment to safety and notes that fire risk applies to all motor vehicles that use a lithium-ion battery in the powertrain.

Staff thanks the many stakeholders who contributed to the public review of PGE's TE Plan. Their time and effort improved the robustness of this ongoing planning process.

Reasons for Staff Recommendation
Staff recommends acceptance of the Plan because PGE has met most of the requirements of OAR 860-087-020. Staff also finds the proposed TE Budget reasonable under the new TE investment framework.

Conclusion

The TE planning process is a significant endeavor in this state and Staff recognizes PGE's important efforts in this Plan. Staff is cognizant of the hard work that goes into formulating a TE Plan in Oregon's jurisdiction. Staff is also thankful of the time stakeholders have contributed to filing written comments.

Staff recommends the Commission accept PGE's TE Plan. The Plan meets most of the requirements of OAR 860-087-020. Staff finds the proposed TE Budget to be reasonable under the new TE investment framework.

PROPOSED COMMISSION MOTION:

Accept Portland General Electric's 2023–2025 Transportation Electrification Plan.

RA1 – UM 2033