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December 31, 2019

VIA ELECTRONIC FILING
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Public Utility Commission of Oregon
201 High Street S.E., Suite 100
Salem, Oregon 97308-1088

Attention: Filing Center

RE: UM 2033 PGE's Reply Comments - PGE's 2019 Transportation Electrification Plan

Enclosed for filing are Portland General Electric Company's (PGE's) Reply Comments regarding its first Transportation Electrification (TE) Plan submitted in Docket Number UM 2033. PGE appreciates Parties' thorough review and comments on this TE Plan.

Please direct any questions or comments regarding these comments to Aaron Milano at (503) 464-7547 or Kalia Savage at (503) 464-7432. Please direct all formal correspondence and requests to the following email address pge.opuc.filings@pgn.com.

Sincerely,

Karla Wenzel
Manager, Regulatory Policy and Strategy

BEFORE THE PUBLIC UTILITY COMMISSION

OF OREGON

UM 2033

In the Matter of PUBLIC UTILITY COMMISSION OF OREGON Portland General Electric Company's Transportation Electrification Plan.	**REPLY COMMENTS OF PORTLAND GENERAL ELECTRIC COMPANY**

In accordance with the Administrative Law Judge's scheduling memorandum issued October 28, 2019, Portland General Electric Company (PGE or the Company) submits these Reply Comments regarding PGE's Transportation Electrification (TE) Plan (TE Plan or Plan).

PGE filed its TE Plan with the Public Utility Commission of Oregon (Commission or OPUC) on September 30, 2019. PGE appreciates the close reading of this Plan and the comments filed by the following: Alliance for Transportation Electrification (ATE), Alliance of Western Energy Consumers (AWEC), ChargePoint, Climate Solutions and Oregon Environmental Council, Oregon Citizens' Utility Board (CUB), Greenlots, Northwest Energy Coalition (NWEC), Siemens, OPUC Staff (Staff), and Tesla, collectively referred to as Parties. The comments filed by several Parties reflect an urgency to address climate change by electrifying transportation and offer suggestions that will strengthen and improve PGE's TE Plan going forward. Transportation electrification is a key step toward Oregon's decarbonized future. Parties' comments were generally supportive of the Plan and PGE's comprehensive approach to addressing the issues identified in the Oregon Administrative Rules (OARs) for the Plan.

While Staff notes its need for more information to recommend acceptance of the Plan to the OPUC, PGE notes that the Plan closely follows the OAR requirements to meet the rule requirements. However, in these responsive comments, PGE will address Staff questions. In Reply Comments, Parties addressed a wide range of topics, including PGE's role to manage this added electric vehicles (EV) charging load so that it does not exacerbate PGE's peak load conditions. In addition to expressing concerns about managing the current and oncoming EV loads, CUB provided an alternate method for cost effectiveness of TE infrastructure investments (Grid Integration Allowance or GIA); several Parties identified areas where PGE should do more; and Staff identified questions for PGE's response in these Reply Comments.

PGE's Reply Comments are organized starting with General Comments that provide overarching explanations to address some of the Parties' concerns. Then our comments follow the corresponding sections of PGE's TE Plan: Current Market Conditions, PGE's TE Activities, Supporting Data & Analysis Used to Develop the Plan, Electric Company's Impact, System Impacts Resulting from PGE's Portfolio and Actions, and Other Issues. Through this organization, we respond to 1) questions specifically asked that PGE address in Reply Comments; and 2) concerns in Parties' comments that warrant clarification. Lastly, PGE provides an Appendix with monthly load profiles from the Electric Avenue at the World Trade Center (WTC) site.

General Comments

As the Parties recognize, the context for the Plan is the decarbonization of the transportation sector, given that sector's contributions to greenhouse gas emissions. PGE is committed to addressing climate change through the decarbonization of the electricity sector and supporting transportation electrification which will work to decarbonize the transportation sector as well. PGE's Plan was developed to comply with the Chapter 860 Division 87 rules, support Oregon and our customers' decarbonization and electrification goals, and serve as a planning document to inform PGE's current and future TE investments.

PGE notes that the forecasts and strategies discussed in the Plan represent analyses and information available at the time of filing and may change based on market conditions, customer sentiment, or technology evolution. Some comments by Parties request further detail or analysis that is not provided in the Plan—we have included some in these Reply Comments; however, others may be more appropriate for other planning documents (e.g., Distribution Resource Plan, also known as DRP, docketed as UM 2005), program filings, evaluations, or future program reports. PGE anticipates that the DRP process will address certain issues raised by Parties regarding planning for EVs and their impact on the distribution system.

A. Reply to Comments Regarding Current Market Conditions

1. Electric Company's Obligation to Serve EV Load

Given that PGE makes investments to serve customers, and that includes investments to serve customer EV loads, CUB encourages PGE to make prudent investments to support forecasted EV charging loads.[1] We agree with CUB that we have an obligation to serve all load, including EV loads. The legislature, through enacting SB 1547, has declared that electric utilities have a role to play in accelerating electric transportation and efficiently integrating it into our grid. Though the legislature has stated that prudent investments in TE are allowed, additional clarity from the legislature as to what types of investments are allowed/encouraged could provide clearer direction as to how we support TE in the future.

[1] CUB. *Opening Comments*. UM 2033. 6 Dec 2019, page 11.

More specifically, given that the Commission has opined that utility line extension policy applies to distribution upgrades required for a customer to install an EV charger, and there is no clear legislative authority to provide different treatment, PGE is seeking legislative direction that allows such upgrades from the point on PGE's distribution system to the EV charger, even behind the customer meter, to be classified as distribution system equipment.

Regarding the Commission's history, in Order No. 12-013 (Docket UM 1461), the Commission directly addressed whether distribution upgrades necessary to serve Electric Vehicle Supply Equipment (EVSE) infrastructure was part of the necessary role of the utility. The Commission asked Parties whether it would be possible to assign distribution system upgrade costs to serve EVSE to one or a limited number of "last to the system" EV customers; whether these EV customers should be burdened with the full cost of the distribution system upgrades; and if not, what rate alternatives to assigning full cost to EV customers, are available. Then the legislature enacted Senate Bill (SB) 1547 with its TE provisions[2] and SB 1044 setting Oregon EV adoption goals. SB 1547 calls out the need for the utilities to play a role in accelerating TE. The earlier order noted that utility line extension may be adequate to support TE infrastructure investments.

While PGE's line extension policy may be sufficient to support some distribution system upgrades necessary to accommodate EV charging today, it does not generally allow the utility to make necessary customer-side investments required to support EV growth (e.g., make ready and charging equipment). PGE's plan to invest in make ready and certain charging applications, is intended to address this obstacle to ensure charging adequacy and that we serve the new, growing EV load reliably. Instead of having line extension policy govern, PGE will consider such infrastructure investment as an extension of the distribution system investment and a cost responsibility of distribution customers generally. In this regard, PGE appreciates ChargePoint's comments, supporting utility prioritization of make ready costs.[3]

2. Existing State Policies and Programs

Staff questions why House Bill (HB) 2020 was included in Table 1.[4] Its inclusion was in error. While HB 2020 did not become law in the 2019 session, PGE continues to expect future GHG regulations at the state and/or federal level.

3. Market Barriers

CUB recommends that PGE perform a relative ranking analysis of barriers to EV acquisition along with the ranking of the impact on accelerating TE, for a better understanding of PGE's role

[2] The Legislative Assembly found that transportation electrification is necessary to reduce petroleum use, achieve optimum levels of energy efficiency and carbon reduction, meet federal and state air quality standards, meet this state's greenhouse gas emissions reduction goals set forth in ORS 468A.205 and improve the public health and safety.

[3] ChargePoint. *Opening Comments*. UM 2033. 6 Dec 2019, page 3.

[4] OPUC. *Opening Comments*. UM 2033. 6 Dec 2019, page 3.

in removing market barriers for EV adoption.[5] Staff similarly asks for more information on the degree to which PGE can alter the total customer cost of EV ownership, noting PGE's assessment of its impact on ownership as high (as a 5 on a 1 to 5 ranking).[6]

Table 1 below estimates the relative importance of each customer consideration; however, for more precision, additional customer outreach would be required. In addition, the relative importance of customer barriers is likely to change as customers' basic EV needs are met. For example, as new models become available and vehicle prices decline, customers will increasingly need fueling infrastructure and affordable rates. All considerations we have flagged are important and may impact customers differently depending on where they are on their purchasing journey.

Table 1 – Ranking of EV Barriers

Customer Considerations	Utility Ability to Impact (1=low; 5=high)	Relative ranking (1=high impact; 6=low impact)
First Cost	2	2
Model availability	1	1
Model functionality (e.g. vehicle range)		
Awareness	4	3
Total Cost of Ownership (TCO)	5	5
Fueling infrastructure availability	5	4
Equitable access to all segments	3	{spans all}
Dealer sales process	4	6

Regarding Staff's question, the total cost of ownership (TCO) of an EV is a function of vehicle cost, in some cases, the purchase and installation of a home charging station, and operating costs (e.g., fuel costs, maintenance costs, insurance). PGE gave itself the high ranking of 5 as PGE can affect the TCO by:

- Reducing the cost of procuring and installing home charging; this could occur through a smart charging rebate program as discussed in the TE Plan. This is also an area that ChargePoint notes as a barrier as the capital cost of installing EVSE can exceed equipment costs.[7]
- Reducing the cost of fueling through several means:
    - Development of EV charging rates that reduce the cost to fuel a vehicle (at home or otherwise); and
    - Develop or support the development of a charging network to reduce customers' costs to fuel in public.
- Reducing the first cost of a vehicle by:
    - Partnering with dealers or original equipment manufacturers (auto OEMs) to negotiate special deals or pricing for our customers; and

[5] CUB. *Opening Comments.* UM 2033. 6 Dec 2019, page 4.
[6] OPUC. *Opening Comments.* UM 2033. 6 Dec 2019, page 3.
[7] ChargePoint. *Opening Comments.* UM 2033. 6 Dec 2019, page 2.

- Increasing the awareness of incentives (e.g., state and federal incentives) to reduce the first cost of the vehicle.

4. Charging Station Availability and Usage Patterns

The general focus regarding charging station usage patterns was on PGE managing the EV loads so they do not exacerbate PGE's system peak; this means having EV drivers charge off peak. Given that PGE is a dual peaking utility, Staff states that they would "like to better understand how the Company plans to avoid EV charging at other system-critical hours outside 3 p.m. to 8 p.m., especially in the winter."[8]

PGE intends to design programs and rates to get new and current EV drivers to charge at non-critical hours.[9] We will work to ensure that the rate design creates price signals to shift loads off peak. PGE will also work to provide direct load control of EV load. Staff commented on the charging data PGE reported for the Tualatin Call Center workplace EV charging, specifically the peak in the morning hours between 9-10 a.m., aligning with PGE's winter peak period. While this is a small sample set, the on-peak charging data provides good information for better management of workplace charging.

Incenting off-peak charging and collecting data about charging habits is central to PGE's Business Charging proposal (Docket No. UM 2003), which would allow for much broader data collection across a variety of businesses. Further, that program will feed into PGE's commercial demand response (DR) program, Energy Partner, rewarding business customers who shift charging loads off peak.[10]

Staff asks for more context regarding the estimated residential EV load shape—is it merely a picture of the status quo to mitigate against or an expected outcome the Company foresees as a result of planning?[11] Navigant developed the load shape for the Distributed Energy Resource (DER) Study undertaken to inform PGE's 2019 Integrated Resource Plan (IRP). It depicts the light-duty vehicle (LDV) charging load shape in the absence of time-of-use (TOU) pricing or managed charging intervention.[12] PGE agrees with the need to mitigate the potential for coincident peak EV charging. We will create tools that enable us to mitigate the potential for non-coincident peaks and capture other values that the flexibility of EV charging could provide. To support these objectives, our proposed residential charging pilot acquires home charging data and charger control.[13] In addition, we are launching another demonstration in our DER Test Bed

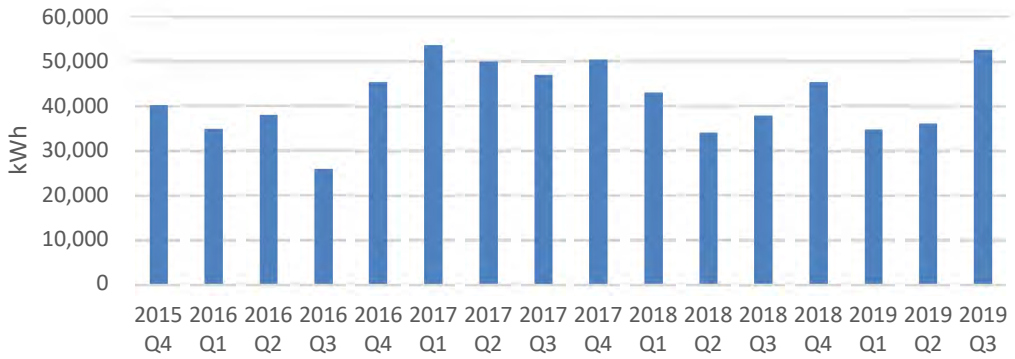
[8] OPUC. *Opening Comments.* UM 2033. 6 Dec 2019, page 4.
[9] Over the long run, PGE sees the management of load through direct load control of chargers. While TOU PGE can see situations in which there are several EVs on a neighborhood feeder.
[10] For more information on this program, see page 17.
[11] OPUC. *Opening Comments.* UM 2033. 6 Dec 2019, page 4.
[12] The 2019 IRP accounts for load flexibility associated with EV charging separately from the native EV load shape, as part of the demand response forecasting also conducted within the Navigant DER Study.
[13] PGE. *Amended Application.* UM 2003. 22 Feb 2019.

pilot (Docket No. UM 1976) to collect data regarding EV driver behavior, including vehicle miles traveled, and charging—both at home and in public.[14] Home charging with a smart charger has the potential to become one of the most flexible demand-side resources on our system; at scale, this means PGE could have considerable flexibility as to how we shape this load.

Regarding Staff comments on the Electric Avenue quarterly data,[15] the kWh shown for Q2 2017 in Figure 10 is substantially lower compared to other quarters because it only represents a partial record of the charging that occurred in that time period (one month of the quarter). This is the time period when the new network charging provider was put into service at Electric Avenue at the Portland WTC. The data included in Figure 10 only included data after the service provider change.

Figure 1, below, shows Electric Avenue total kWh charging data for WTC starting Q4 2015 and includes the remainder of Q3 2019 (at the time of Plan filing, Q3 2019 also only showed charging data through September 8 which was the date the data was pulled). Q2 2017 data below includes data from the prior and the current network.

Figure 1 – WTC Electric Avenue (Additional Historical Data)*



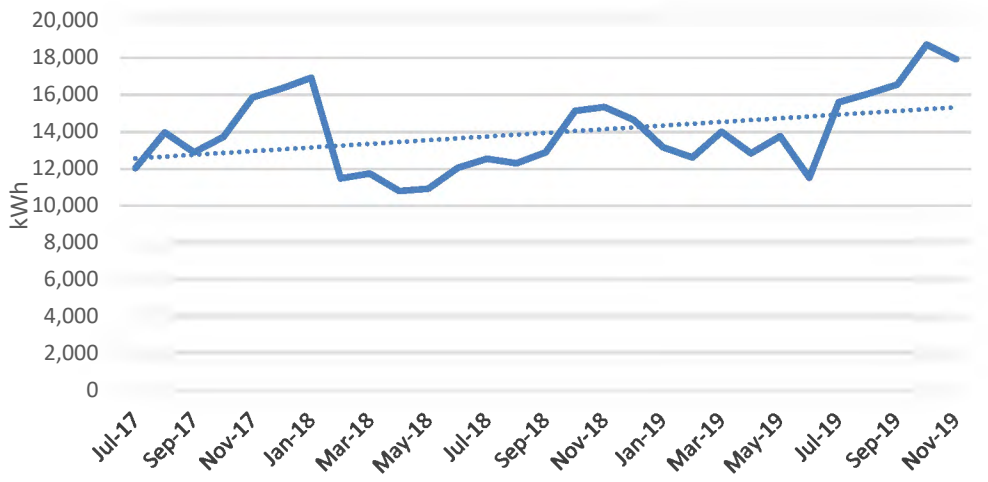
* Note that data prior to Q3 2017 is only available from Advanced Meter Infrastructure (AMI) data and Q3 2017 and after is from network charging session data. PGE chose to incorporate the session charge data in Figure 13 of the TE Plan as it more closely approximates actual customer demand for charging.

PGE is continuously improving its tracking and reporting metrics and welcomes Staff's continued feedback. Staff commented on the "same-store" sales[16] look and the fact that the kWh deliveries look remarkably flat given the growth of EV ownership.[17] PGE agrees this is an important metric to watch. Worth noting, there appears to be a seasonal effect in the data where fall and winter demand are higher than spring and summer. This is likely due to higher losses in the EV battery during colder temperatures. Looking just at month-over-month kWh, shown in **Error! Reference**

[14] PGE. *Clean Fuels Program Plan*. UM 1826. 22 Nov 2019, page 14.
[15] OPUC. *Opening Comments.* UM 2033. 6 Dec 2019. Page 7.
[16] Staff comments address the "same store" concept which focuses on growth in sales and identifying when that growth is attributable to building more stores as compared with growth from increased traffic at the same store.
[17] OPUC *Opening Comments.* UM 2033. 6 Dec 2019, page 7.

source not found., below, deliveries from charging session data, and including October and November, there appears to be growth at WTC even after opening the new sites.

Figure 2 – Monthly kWh Sales WTC Electric Avenue



Note: July 2019 saw a significant prolonged outage for site maintenance.

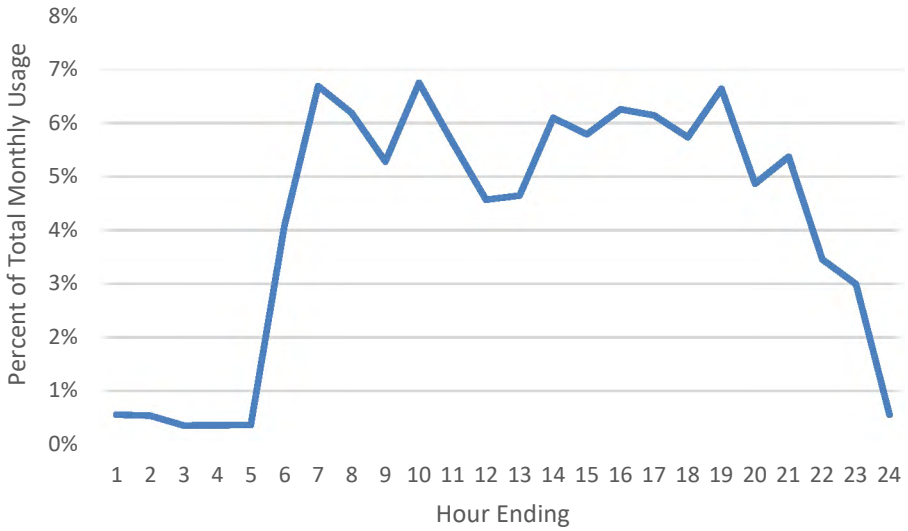
Staff also asked why specific dates were chosen in Figure 13. Further, Staff requests that PGE provide separate peak EV demand day profiles by month and site for Electric Avenue, using kW as the vertical axis.[18] PGE responds that the chosen day in Figure 13 represents the peak-day, hourly demand profile at the Electric Avenue WTC site over the time period analyzed (Q2 2017 to Q3 2019). PGE intended the chart to illustrate EV charging load on a peak day and to highlight that demand can change significantly hour to hour. PGE omitted similar charts for the remainder of the months at WTC but provides them in the Appendix at the end of PGE's Reply Comments. PGE does not have the information for other sites readily available and will incorporate that into future TE Plan updates.

Staff requested that PGE calculate aggregated capacity impacts, for both summer and winter peak, by charging location (e.g., home, workplace, mass transit) for the base case and high case through 2030 in its Reply Comments.[19] PGE appreciates the thoughtfulness of Staff's comment on this matter. Regarding transit and Figure 18, PGE agrees that each on-route charger can require around 400 kW of capacity. Thus, PGE must work with the customer (in this case, TriMet) to manage charging at peak. PGE notes that for each new heavy-duty charging station, PGE plans for the proposed system load and load shape and that in the future. PGE will develop the capability to more systematically conduct planning scenarios for a variety of charging scenarios and speeds (e.g., on-route vs. depot charging). To further clarify, the Figure 18 load shapes for Sunset Transit Center and Merlo Garage are mutually exclusive (and thus each profile sums to 100%). It is

[18] OPUC. *Opening Comments.* UM 2033. 6 Dec 2019, pages 7-8.
[19] OPUC. *Opening Comments.* UM 2033. 6 Dec 2019, page 10.

correct to state that the Merlo Garage depot charging (150 kW charging capacity) peaked at 9 a.m., but since the majority of kWh was delivered at the Sunset Transit location, the combined load shape for the month of August, as depicted in Figure 3, provides a more comprehensive view.

Figure 3 – Combined TriMet Load Profile (August 2019)



PGE agrees that aggregated capacity impacts across charging use cases will be an important element for planning. For purposes of the current Plan, PGE worked with a third-party consultant to forecast EV growth and associated load, which was an input into the IRP and treated at the bulk system level to evaluate its capacity impacts. The IRP limited its treatment of EVs to LDV only, and did not differentiate between home, workplace, or transit that Staff is requesting. PGE notes Staff's interest in this level of detail and will evaluate opportunities for including this more granular view in future planning.

5. Number of EV's in PGE's Service Territory

Staff requests PGE update the number of EVs in PGE service territory in Reply Comments to help stakeholders assess the accuracy of the Navigant forecast.[20] In addition, CUB notes that PGE should be planning for all EVs that come to the service territory.[21]

As of November 1, 2019, Oregon had 28,579 registered EVs. This is the latest information published by the state and does not segment these vehicles by utility.[22] We expect the Oregon Department of Environmental Quality (DEQ) to release utility-specific values in Q1 2020. PGE is actively planning for all EV load, already on our system and forecasted EV growth. Until recently, there was no clear way to estimate locational adoption of EVs. Customers are not

[20] OPUC. *Opening Comments.* UM 2033. 6 Dec 2019, page 10.
[21] CUB. *Opening Comments.* UM 2033. 6 Dec 2019, page 4.
[22] Go Electric Oregon. *50K by 2020.* State of Oregon. Accessed 19 Dec 2019 at: *https*://goelectric.oregon.gov/2020-goal.

required to submit an interconnection form when they buy an EV and charge at home. They can simply plug an EV directly into a 120V outlet with the charger that comes with the vehicle. This is one reason why programs, rates, and infrastructure offerings are critical—to have EV customers self-identify. Programs like the proposed residential smart charging offering will give us details on our customers that have EVs at home; similarly, the business charging offering will inform us of the business customers that have EV chargers. Both insights will inform targeted customer outreach on offerings such as EV rates. Through our proposed residential charging pilot and ongoing research and development (R&D) efforts, PGE expects to improve its capability to identify LDV EVs on the grid and efficiently plan for them.[23]

For medium-duty vehicle (MDV) and heavy-duty vehicle (HDV) EVs, PGE addresses this new load on a case-by-case basis by working directly with customers on their EV and charging needs (e.g., business charging program and fleet planning offering as discussed in the TE Plan).

CUB expresses concern that the TE Plan is much too focused on meeting these EV adoption targets rather than strategies to manage the new load that would be on the utility's system as a result of an increase in TE.[24] Similarly, ChargePoint highlights that PGE "should prioritize effective grid management."[25] While we do have a focus on meeting EV adoption targets (e.g., increasing customer awareness and ensuring charging adequacy), we are also focused on system planning. We can reduce future system cost through continued focus on system management and planning. Planning for and assuring that our system supporting charging infrastructure is robust enough to meet these new demands (while also working to manage the demands of charging on the system) is imperative for safety and reliability—two of the primary statutory requirements of the utility. Some examples of how this is included in the Plan include: Smart Charging, Rate Design, and Fleet Customer Planning. It is important, where possible, that we work to ensure our customer offerings support both EV adoption and efficient grid integration. It is not in customers' best interest to develop grid-centric programs that detract from EV adoption; we must work to find the right balance of both. Where we can develop acceptable customer programs, which help manage EV adoption, we will address safety and reliability without unnecessarily increasing infrastructure costs. Table 65 of the TE Plan helps illustrate how various TE offerings contribute to our ability to effectively integrate EV loads into our system:

[23] It is important to note that AMI data does not inherently isolate individual load (e.g. identify EVs load versus the rest of the home). We may be able to identify new loads through AMI data (when compared to historical averages), however EV loads show up in many ways: 120V charging, 240V charging, away-from-home charging, etc. with each customer having unique charging needs. Without a large sample of baseline EV customers, identifying an EV simply from changes is AMI data is challenging and prone for errors.

[24] CUB. *Opening Comments*. UM 2033. 6 Dec 2019, page 2.

[25] ChargePoint. *Opening Comments.* UM 2033. 6 Dec 2019, page 3.

Table 2 – How PGE's Planned Activities Enable PGE to Address System Impact

Enabling Factor	Rates	Infrastructure	Programs
Insight	• Understanding of how customers respond to price signals	• Knowledge of locations and speeds of all charging in service area • Data from hardware (charger utilization)	• ID which customers have EVs • Understand customer charging habits • Where and when fleet customers expect to need charging
Controllability	n/a	• By supporting hardware deployments, PGE can ensure EVSPs are integrated into DERMS to ensure controllability	• Build EVSP integrations Create control protocols and requirements
Engagement	• How customers respond	• Access to infrastructure allows customers to consider alternative charging speeds or charging locations in responding to grid needs	• Develop best practices on how to engage customers • What price signals customers respond to • Customer experience considerations for scaling engagement in future
Adoption	• Rate design reduces customer friction (and increases likelihood to adopt EV) - Lower TCO - Simpler to understand - Easier to deploy chargers	• Access to infrastructure drives EV adoption	• Programs add to the customer value proposition and reduce the total TCO

It is critical as we scale our TE offerings that our customer engagement not only support EV adoption, but also provide the insights and control we need to create value for the system and all our customers.

6. Charging and Vehicle Technology Update

Staff asks about the distribution of fleets, in Table 23, PGE expects in the service area.[26] PGE cannot comment on specific customers' plans for electrifying their fleet. However, we expect that global and national customers, particularly those with sustainability goals, will deploy their early EVs in markets where they have supporting utilities and policies. Given that there is a lack of load profiles from the relatively limited set of deployed MDVs and HDVs on the roads today, PGE is developing projects to better understand the charging load shapes and system design required to support MDV and HDV fleet customers. For example, a group of nine West Coast utilities (including PGE) are performing a study that will inform the development of EV

[26] OPUC. *Opening Comments.* UM 2033. 6 Dec 2019, page 11.

infrastructure for heavy duty transport along the I-5 corridor from San Diego to Seattle.[27,28] The study will be complete in early 2020.

Staff asks when PGE sees vehicle-to-grid (V2G) programs becoming viable in our service territory?[29] PGE responds that currently the technology is not near a mature state. PGE has conducted limited integration testing at one of our fleet sites to test V2G charging. This effort is not at a state where there are any meaningful results to report yet. As the technology matures, we must continue to keep an eye on manufacturer activity in this space, so that we can ensure processes to reduce friction to customer interconnection of this technology.

ATE illustrated how fast the EV market is changing by indicating that Section 1.2 was already outdated in terms of publicly announced investments over the past several months.[30] PGE agrees that this indicates the pace at which TE is moving across the country.

7. Distribution System Impacts and Opportunities for Efficient Grid Management

Staff notes that the TE Plan needs to present the Company's most thorough distribution planning for EVs.[31] The Distribution System Impacts section represents PGE's most thorough effort to-date to conceptualize grid planning with a focus solely on the challenges of EVs and EV charging. As a matter of practice, new EV load is currently addressed case-by-case and uses Power Flow modeling as appropriate (for example, if a customer EV charging installation triggers distribution upgrades). Looking forward, PGE is working to develop better tools and capabilities to conduct broader analyses of distributed energy resources (DERs), including EV charging, on the distribution system. This will address aspects such as load and potential impacts to power quality factors and thermal loadings. For example, PGE has active R&D projects focused on developing planning tools to estimate grid impacts from EVs, with an emphasis on understanding power quality issues associated with high-powered charging (over 50 kW). Updates on progress in this area will be incorporated into future TE Plans[32] and the DRP, where appropriate.

In addition, Staff asks for PGE to explain why the Company, "…did not conduct power flow analyses to determine EV hosting capacity or estimate locational value,"[33] given potential peak

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[27] Walton, Rod. *West Coast utilities launch study for I-5 EV infrastructure to move freight*. Power Engineering. 18 April 2019. Accessed 13 Dec 2019 at: https://www.power-eng.com/2019/04/18/west-coast-utilities-launch-study-for-i-5-ev-infrastructure-to-move-freight/#gref

[28] Griffo, Paul. *West Coast Power Providers Explore EV Charging for Zero-Emission Shipping Along I-5, Connecting Routes*. Business Wire. 18 April 2019. Accessed on 31 Dec 2019 at: https://www.businesswire.com/news/home/20190418005643/en/West-Coast-Power-Providers-Explore-EV-Charging

[29] OPUC. *Opening Comments.* UM 2033. 6 Dec 2019, page 11.

[30] ATE. *Opening Comments.* OPUC Docket 2033. 6 Dec 2019, page 2.

[31] OPUC. *Opening Comments.* UM 2033. 6 Dec 2019, page 11.

[32] Ibid.

[33] PGE. *Transportation Electrification Plan.* 30 Sep 2019, page 75.

load impacts and the fact that locational data is available. Staff asks PGE to identify, in Reply Comments, how to use the existing ratepayer investments, such as AMI meters and customer analytics software, along with other data, including the data PGE has made available on OASIS, to develop estimates of customer EV load impacts in its territory.[34]

PGE has not undertaken the requested analysis as it relies on data analytics and forecasting capabilities that we do not currently have. Through the DRP effort, we are working toward incorporating AMI data into our forecasting and study processes so we can provide better insights into where distribution constraints may exist for future EV growth.

Staff asks for PGE Table 26 (EV Load forecast) information to be provided in MW of expected peak demand. Their concern is that focusing on load in terms of energy may cause stakeholders to underestimate capacity requirements.[35] In addition, with regard to forecasted EVs, Staff asks, by count and by load, the percentage of EVs that are expected to charge their batteries without system optimizing incentives and how that may change over time.[36]

First, PGE responds by providing Table 3, below, which shows the EV Peak Demand Forecast associated with the MWa shown in Table 26 of the Plan.

Table 3 – LDV Peak Demand by Season (MW) based on Navigant DER Study

Seasonal Capacity	2020	2025	2030	2035	2040	2045	2050
Summer MW	24	85	194	322	468	630	779
Winter MW	26	90	205	340	494	665	822

Second, the Table 26 forecast of EV load growth represents an "unmanaged" usage profile for LDV. This forecast was included in the IRP as a component of the long-term load forecast. Navigant separately estimated the DR potential of EVs using Direct Load Control (DLC), which was evaluated in the IRP context and acted to influence or mitigate peak demand impacts by shifting usage from on-peak to off-peak hours.

At this point, the forecast of EV DLC represents our best available information regarding likely market size of EVs and managed charging. However, actual program enrollment will depend on a variety of program design choices (e.g., incentive levels, target segments), regulatory approval, and market acceptance. PGE will continue to update its potential studies as new market information becomes available, both from macro market trends and new information gained from the series of current and future programs described in the Plan.

[34] OPUC. *Opening Comments.* UM 2033. 6 Dec 2019, page 11.
[35] OPUC. *Opening Comments.* UM 2033. 6 Dec 2019, page 12.
[36] Ibid.

Staff asks how PGE plans to recover distribution upgrade costs (e.g., transformers) and whether PGE sees using the same assessment method that forecasted this rate of transformer replacement, for DER planning more broadly.[37] Transformer upgrades (when necessary) will be capitalized and recovered through base rates. PGE estimates an average cost of $3,315 to upgrade a 50kVa transformer to a 75kVA transformer.[38] Similar assumptions may inform DER planning more broadly; however, that will be explored under UM 2005.

B. Reply to Comments Regarding PGE's TE Activities

1. Summary of PGE's TE Programs and Future TE Concepts

Staff asked PGE to include, in Reply Comments, a full list of every PGE TE program, including all planned programs in the coming two years.[39] PGE notes that there are already several areas in the Plan that provide this information:

- Table 29, on page 91, provides the complete list of customer-funded current (Dockets UM 1811 and UM 1938, PGE's first TE Plan that included a transit charging and public charging proposals) and pending (Docket UM 2003, Deferral for EV Charging pilots) activities;
- Clean Fuels activities are described starting on page 107; and
- PGE's future TE Plans are detailed in Section 2.2; however, as the market changes, so will our TE Plan (e.g., forecasts).

Regarding future TE activities, we note that this industry is quickly changing, and we must remain flexible as we develop and launch new customer offerings. PGE will continue to include planned activities in each TE Plan, but we also understand that as market conditions, customers' needs, policy direction, and stakeholders' interests change, we may need to pursue initiatives that are not referenced in this Plan. If conditions warrant PGE pursuing initiatives that were not included in the TE Plan, we will include them in ongoing discussions with stakeholders as appropriate, and in future TE Plans.

2. Total Expenditures for TE Current and Future Activities

Staff requested that PGE provide a table with expenditures by year and program as well as a forecast of EV costs.[40] The UM 1811 stipulation provides the cost caps for the current programs, provided in the Table 4 below, and the expenditure information can be found in the application for deferred accounting (UM 1938).

[37] OPUC. *Opening Comments*. OPUC Docket UM 2033. 6 Dec 2019, page 14.
[38] PGE. *PGE's Initial Application*. OPUC Docket UM 2003. 15 Feb 2019, page 34.
[39] OPUC. *Opening Comments*. OPUC Docket UM 2033. 6 Dec 2019, page 12.
[40] OPUC. *Opening Comments*. OPUC Docket UM 2033. 6 Dec 2019, page 13.

Table 4 – UM 1811 Maximum Allowable Cost ($000's)

	Maximum Allowable Cost		
	O&M	**Overnight Capital Cost**	**Subtotal**
Outreach and Technical Assistance	480	-	480
TriMet Pilot		625	625
Electric Avenue Network*	2,787	2,400	5,187
Residential Home Charger Pilot	-	-	-
Pilot Evaluation	580	-	580
Total	**3,847**	**3,025**	**6,872**

* If federal tax credits are available, allowable decrease based on federal tax credits received.

Future TE activity forecasted costs have not been determined. Since the TE Plan is a planning document, used to inform future investment, PGE provided the cost of energy and capacity to serve all new TE associated load (see Table 61 of the Plan). As we prepare and submit proposals for specific TE activity, we will also provide detailed costs for those activities.

3. Lessons Learned

With regard to the existing TE pilots, Staff requested that PGE include: 1) a list of the issues regarding reliability of bus charging infrastructure, identifying those that have been resolved; and 2) a list of the challenges in Electric Avenues to which PGE refers and identify the ones that have been resolved.[41]

Regarding the issues around bus charging, Table 5 provides a list of known issues, which have all been resolved.

[41] Ibid.

Table 5 – List of Known Bus Charging Issues

Issue	**Details**	**Status**
120V depot charger circuit breaker tripping	Unclear instruction on breaker sizing and circuit configuration	Resolved
Communications and interoperability	Bus and charging station required additional integration work to establish communications	Resolved
Sequential charging	Bus and charging station required additional integration work to establish consistent sequential overnight charging	Resolved
Sequential cabin conditioning	Bus and charging station required additional integration work to establish consistent sequential cabin conditioning	Resolved
Nuisance emergency stop activations	Public and drivers activated emergency stop at Sunset TC when not needed	Resolved (button reset and signage & shield installed)
Backend software service reliability	Back-end software service platform went offline on several occasions	Substantially resolved (platform outages rare and typically resolved quickly)
Alignment errors	Misalignment of bus and charger at Sunset TC	Substantially resolved
Vandalism and wear	Occasional graffiti on machines; cable connectors damaged from wear	Ongoing (replacements / repairs made as necessary)

Regarding the challenges around the Electric Avenue network, Table 6 provides a list of known challenges.

Table 6 – List of Known Challenges with Electric Avenue

Issue	Details	Status
DC fast charger build quality	Back-lit logo at top of station has aesthetic issues; gasket between touchscreen and station failed on some machines; intermittent touchscreen failures; door status switches, power supplies, electronic failures (i.e., fuses, breakers, contactors, circuit boards, etc.).	Partially resolved (screen gaskets repaired; back-lit logo and touchscreen issues require additional work, other issues resolved as issues arise).
Commissioning	Equipment required multiple rounds of testing and commissioning for initial configuration	Resolved
DC fast charger session initiation	DC fast chargers failed to consistently initiate sessions	Partially resolved (failure rate significantly decreased, additional improvement ongoing)
Payment processing issues	Level 2 station credit card readers failed to work; all stations had issues with monthly subscription plan; mobile application did not function correctly	Resolved
Back-end software service reliability	Back-end software service platform went offline on several occasions	Substantially resolved (platform outages rare and typically resolved quickly)
Vandalism and wear	Touchscreens and cable connectors damaged from wear or vandalism; occasional graffiti on machines	Ongoing (replacements / repairs made as necessary)

4. Charging Infrastructure

Climate Solutions and the Oregon Environmental Council recommend that the Plan more clearly present the opportunity for PGE investment in charging infrastructure both for public transit agencies like TriMet and school districts.[42] PGE appreciates the recommendation, which is aligned with planned current and future activities described in Section 2.2.3.2.3 of the Plan. PGE continues to work with the community to support local community plans to decarbonize the transportation sector. PGE will incorporate lessons learned regarding the specific needs of public transit agencies and school districts to inform future iterations of the TE Plan.

Regarding public charging infrastructure, CUB states that most charging happens at home, so there should be less focus on charging in public. In addition, they also state that because of the low utilization rates, it is difficult to determine how the revenues from public charging will offset the costs of public charging.[43]

[42] Climate Solutions and Oregon Environmental Council. *Opening Comments*. UM 2033. 6 Dec 2019, page 3.
[43] CUB. *Opening Comments*. UM 2033. 6 Dec 2019, page 5.

PGE agrees with CUB that most charging currently occurs at home and we should take a holistic/system view on evaluating charging stations. Our needs assessment supports that public charging is necessary to serve many customers who: 1) do not have access to home charging (i.e., they do not currently appear in the data because they do not have EVs due to their lack of charging ability); 2) are using their EV to do more than just a simple out and back commute (e.g., running errands, travelling); and 3) have other high vehicle-miles-travelled use case (e.g., transportation network companies).

ChargePoint also states that, "to ensure EVSEs serve all customers, we encourage PGE to prioritize fast chargers that have multiple connectors to ensure multiple types of vehicles are able to use them." PGE agrees and is working to ensure all Electric Avenues can serve all customers and working to ensure that Clean Fuels Programs (CFP) are supporting the upgrade and replacement of chargers so that they are able to serve all customers.

5. Supporting Data

Staff requests that Table 60 include demand charge relief, particularly raising PGE's Rate Schedule 38's 200 kW capacity limit[44]. They also state that PGE should clarify whether this revenue forecast assumes TOU to be optional or mandatory.[45]

PGE responds that for LDVs, the assumptions for Table 60 were as follows:

- 75% were to be on PGE's Rate Schedule 7 Basic Service price plan (non-TOU);
- 10% would be on Schedule 7 TOU (which was not mandatory);
- 10% were to be using workplace charging and would likely be on Schedule 38; and
- 5% were to be using public charging (non-electric avenue) which would likely be owned by a company and metered through Schedule 38.

MDVs are assumed to use Schedule 38 and HDVs are assumed to use Schedule 85. We have not performed any analyses at this time on the potential impacts of modifying Schedule 38.

6. Demand Response

For Energy Partner's winter capacity that was provided in PGE's Smart Grid Report[46], Staff asks for the estimated cost per MW behind each year of that forecast. In addition, they ask for PGE to provide more details on this DR program, including its cost, how it operates, and if it has been identified as part of the portfolio of DR pilots and programs run by PGE.[47]

[44] PGE. *Transportation Electrification Plan*. OPUC Docket UM 2033. 1 Oct 2019, page 122.
[45] OPUC. *Opening Comments*. OPUC Docket UM 2033. 6 Dec 2019, page 14.
[46] PGE. *2019 Smart Grid Report.* OPUC Docket UM 1657. 31 May 2019, page 43.
[47] OPUC. *Opening Comments.* OPUC Docket UM 2033. 6 Dec 2019, page 16.

PGE appreciates the comment but is unclear how this connects to the TE Plan. The TE Plan includes the DR potential identified for EV charging DLC in the IRP, but we do not have operational data for EV charging DR programs because we are not offering any today.

Regarding Staff's questions on the Energy Partner Program, the Energy Partner pilot is part of PGE's DR portfolio run by PGE and is docketed in UM 1514 where detailed pilot information can be found. It is operated under two Rate Schedules: 25 (nonresidential DLC pilot) and 26 (nonresidential demand response pilot).

7. Future TE Action

Staff requested that PGE describe in more detail how we foresee the Clean Fuels and TE plans converging.[48] Other stakeholders emphasized that these should not converge. PGE responds though we do not plan on making any changes in the near term, it is possible that our utility programs and CFP may begin to converge at some point in the future, if such convergence supports a more efficient or effective path towards realizing the State's decarbonization and electrification goals. We have not designed what that could look like but should have an open mind about how our offerings evolve so that they create the most value for our customers. Any such changes would be discussed with stakeholders and consider the CFP principles adopted by the Commission in UM 1826.

C. Reply to Comments Regarding Supporting Data & Analysis Used to Develop the Plan

1. Review of Cost and Benefits and Level of TE Investment

Staff states that it appears PGE expects its expenditures on TE will not meet the "total resource [cost] test" otherwise known generally at the TRC.[49] PGE responds that we do not make this connection in the TE Plan as TRC was not contemplated in the Plan. However, in the UM 1811 filing in February 2019, PGE proposed the Transportation Electrification Assessment Methodology (TEAM) which is a variation of the commonly used Ratepayer Impact Measure Test (RIM). RIM is a common cost effectiveness test and part of the total resource cost test. Pursuant to the UM 1811 settlement, PGE worked with Pacific Power to develop a cost effectiveness methodology, TEAM. TEAM compares the costs and benefits from the perspective of customer costs and includes the impact of environmental and societal costs that are monetizable such as the CFP credits. The TEAM cost test also includes an energy price forecast inclusive of the projected cost of carbon.

CUB provides an alternative approach (i.e., GIA) to cost/benefit and PGE appreciates what this allowance attempts to do. Such an allowance could be a useful way to spread the costs of integrating EV loads among customers in each rate class. Attachment A shows a cumulative GIA

[48] OPUC. *Opening Comments.* OPUC Docket UM 2033. 6 Dec 2019, page 13.
[49] OPUC. *Opening Comments*. OPUC Docket UM 2033. 6 Dec 2019, page 14.

of $50 million by 2025 and $110 million by 2030 based on a residential allowance of $491 per vehicle.[50] If customer rates reflected the cost of the GIA allowance when the vehicle was purchased, it could provide a source of funds for future activities (e.g., infrastructure deployments, distribution system upgrades, programs) that may be needed after the cumulative effect of years of new EV loads. Climate Solutions and Oregon Environmental Council state that PGE should propose, in this TE Plan, to invest at least $50M per year over the next three years to achieve the utility and legislature's goals.[51] We agree that significant investment is required to support our customers' transition to EVs, and we look forward to working with stakeholders to better understand CUB's proposal and determine a reasonable level of investment.

2. Attribution

Both CUB and NWEC do not support an approach guided by attribution. CUB states that justifying a program to move EVs to grid-connected charging based on attribution of PGE's influence on EV adoption will fail because the vast majority of EVs will be purchased independent of PGE's actions.[52] NW Energy Coalition also advises against using attribution to PGE due to the methodology challenges (i.e., "impossible counterfactuals").[53] PGE agrees that there are many factors that go into a customers' vehicle purchasing decision and that attribution is not an appropriate mechanism for evaluating utility TE investment. PGE appreciates the feedback regarding this issue—this is consistent with what we have heard from other stakeholders at previous cost/benefit workshops and is consistent with how other utility programs are being evaluated across the country. Basing investment on attribution is not worthwhile given the difficulty in establishing a methodology to prove causation. However, in evaluation of its pilots, PGE is, and will continue to, survey the community to determine the extent to which they have been exposed to PGE program activities that could have influenced EV adoption such as: educational materials/campaigns, auto dealership partnerships/incentives, ride and drive opportunities, and improved access to fast charging (i.e., Electric Avenues). PGE acknowledges the many challenges and imprecision with customer self-reporting on customer behavior influences and does not intend to calculate "formal" attribution metrics. [54]

In the TE Plan, PGE acknowledged that a forecast of distribution system upgrades for new EV load is a critical exercise to be undertaken. The foundation for conducting this work will be accomplished in the DRP process which will evaluate the impact on its system of various types of resources and loads, including EVs. When this analysis is finished, we will have a clearer

[50] Based on forecast on 99,000 EVs in 2025 and 225,000 EVs in 2030
[51] Climate Solutions and Oregon Environmental Council. *Opening Comments* UM 2033. 6 Dec 2019, page 3.
[52] CUB. *Opening Comments*. UM 2033. 6 Dec 2019. Page 9.
[53] NWEC. *Opening Comments*. UM 2003. 6 Dec 2019, Page 4.
[54] In its UM 1811 stipulation PGE is required to hold workshops with Staff and intervenors to develop attribution methods for TE and is encouraged to work with Pacific Power to co-develop these. The TEAM method development came out of this effort. The workshops did not produce any attribution methods. https://apps.puc.state.or.us/orders/2019ords/19-385.pdf

picture of the impact of EV utilization and EV charging infrastructure on the system. PGE is committed to serving customers, maintaining high reliability, and to making planful investments.

D. Reply to Comments Regarding the Electric Company's Impact

Staff requests an explanation of the Company's understanding of when it is inappropriate to use ratepayer funds for investments in charging stations.[55] PGE responds that the OAR Staff references (OAR 860-087-0020, specifically rules (3)(e)) is discussed in Section 4 of the TE Plan on the potential impact of the utility. PGE has a critical role to play in supporting the rapid, safe, affordable, equitable and clean deployment of EVs in Oregon. Depending on the investment opportunity, PGE will make that business decision at that time.

Staff refers to Commissioner Tawney's questions during PGE's November 21, 2019 presentation of this Plan and invited the Company to more thoroughly answer Commissioner Tawney's question. Specifically, what criteria does PGE expect to use to evaluate when it is encroaching upon that "breathing space"?[56]

The "breathing space" question is a good one and it is difficult to respond with criteria as there are many unknowns; it will depend on current market conditions, market barriers to customer adoption, advancements in technology, and the pace of TE's acceleration in Oregon relative to the goals set in SB 1044 (2019 legislative session).

Identifying when the utility involvement is crucial to accelerate TE and when it might be encroaching on the "breathing space" of a competitive provider will likely require continuous review of the TE landscape. Under all circumstances, PGE needs to be prepared to efficiently interconnect and manage all new EV and EVSE loads into our system. For example, for the TE Plan, we conducted a charging needs assessment that estimated locational deployment of Level 2 and Direct Current Quick Charging (DCQC) within PGE's service territory (described in more detail in Section 1.5 of the Plan) required to meet a certain charging density and, to Commissioner Tawney's point, serve all EV traffic within PGE's service territory whether it originated from within or was transient load. To estimate the remaining charging needs, Navigant began with populating their model with all existing chargers, including those from third parties that might cross jurisdictional boundaries, as identified in the U.S. Department of Energy's (DOE's) Alternative Fuels Data Center. The analysis solved for optimal placement along travel routes to ensure a charging option within every 2.5-mile radius of traffic density nodes. We intend to regularly revisit this study to refine our estimates on charging needs in our service area. It is extremely important that we work to ensure there is adequate charging infrastructure to support customers' vehicle fueling needs. If our state falls behind our customers' needs for infrastructure,

[55] OPUC. *Opening Comments.* OPUC Docket UM 2033. 6 Dec 2019, page 15.
[56] OPUC. *Opening Comments.* OPUC Docket 2033. 6 Dec 2019, page 15.

we risk creating a poor customer experience that will negatively impact customers' consideration of EVs in the future.

This type of planning encompasses charging providers who may span boundaries of the utility. Provided support from the OPUC, PGE will continue to make investments and plan activities to provide the right amount of infrastructure support to EV drivers after reviewing the entire charging landscape and evolving customer needs. PGE is in a unique position to partner and collaborate with other utilities and municipalities as illustrated by our involvement in the West Coast Clean Transit Corridor Initiative to better understand the long-haul trucking sector so we can establish a collective understanding of what barriers and opportunities exist for electrifying long-haul trucking along the I-5 corridor from San Diego to Seattle.

In addition, PGE is conducting R&D in partnership with a DOE national lab to integrate transportation data flows and distribution grid planning into a single large co-optimization problem. By joining efforts with such national experts and their growing cohort of stakeholders from across industries, PGE hopes to advance the conversation about how to optimally plan for this newly emergent load in a manner that meets the needs of electricity providers and transportation stakeholders who have a very different set of constraints and needs. Similarly, PGE notes that ChargePoint acknowledges support and coordination is needed by multiple partners and uses the example of using roaming agreements between networks.[57]

PGE agrees that we will continue to monitor as the industry develops and will keep Parties informed as it engages with the community in a macro-vision of the customer experience in TE. However, in the short-term, there is a lot of work that still needs to be done, which is reflective in the listed future TE activities, which is where PGE is focusing its planning for now.

E. Reply to Comments Regarding System Impacts Resulting from PGE's Portfolio of Actions

Staff states that they are unclear how and when PGE's portfolio of actions will create 100 MW of distributed flexibility and that we should provide the numbers behind its expectation of when and how this can be achieved. In addition, they state OAR 860-087-0020(3)(f) requires that anticipated impacts of increased electrification of transportation be included in TE Plans. To fulfill OAR 860-087-0020(3)(f)[58], PGE should explain the cost risk associated with peak load impact in MW calculations, ranging from the Navigant Study's 99,216 LDV base case and 236,427 LDV high case of expected adoption in PGE's service territory by 2025, with and without mandatory TOU.[59]

Currently, PGE's potential study for flexible load from EVs is largely limited to DLC of LDV charging. Table 64 in the Plan provides the potential of EV DLC by winter and summer MW of

[57] ChargePoint. *Opening Comments.* UM 2033. 6 Dec 2019, page 3.
[58] Requires that anticipated impacts of increased electrification of transportation be included in TE Plans.
[59] OPUC. *Opening Comments.* UM 2033. 6 Dec 2019, page 16.

controllable capacity. The potential for summer and winter MW of EV DLC both exceed 100 MW between 2040 and 2045, and so this represents a long-term resource potential.

However, it is important to note that these figures are not program-specific forecasts and, therefore, do not include detailed program costs and other market factors that would go into a formal program proposal. As we mention in the Plan in Section 5.1, the EV DLC is a rough approximation of the type of load shaping that can be achieved through managed charging, though it is not exclusive nor exhaustive of the programs PGE intends to pursue in a portfolio of actions over time. At this stage, it would be premature to try and put more certainty on a figure that far in the future. Another important consideration is that MDV and HDV batteries may turn out to be a significant source of flexibility in terms of managed charging and potentially V2G applications, but our current forecast did not consider this due to the early stage of the market. PGE is actively researching this possibility and will update in future TE Plans accordingly.

F. Response to Comments Regarding Other Issues

Climate Solutions and Oregon Environmental Council raise concerns that the Plan does not sufficiently address consumer awareness.[60] PGE agrees that consumer awareness is important in accelerating TE. We address awareness throughout the Plan, including Section 1.2, where we discuss it as a market barrier and Section 3.5 where we identify it as part of our customer and EV user engagement strategy, and highlight that it is one of a few areas that utilities can influence (ranking it 4 out of 5).[61] In addition, as we indicate in the Plan, there are three areas where PGE can influence barriers: rates, infrastructure, and programs. Programs discussed in the TE Plan inherently include a considerable amount of customer outreach and efforts to increase program awareness (see Section 2.2).

The TE Plan is a platform to discuss strategic direction and not detail communication/customer engagement plans for each program. Those details would be included in a go-to-market plan for each individual program. Additionally, as PGE has stated since embarking on TE activity, EV charging infrastructure raises awareness as a visible sign of user support and infrastructure awareness. PGE uses charging sites as a medium to educate customers about their transportation options and how electrifying their transportation can save them money and address climate change.

Summary of Other Parties Comments

To the Parties concerns that were not directly addressed above, PGE summarizes below:

[60] Climate Solutions and Oregon Environmental Council. *Opening Comments.* UM 2033. 6 Dec 2019, page 2.
[61] PGE. *TE Plan*, UM 2033. 30 Sep 2019, pages 26-30, 153.

- **ATE** emphasizes the speed and scale of the transformation of the transportation sector and encourage PGE and the OPUC to rapidly adopt lessons learned to move from pilot to program and scaling TE to a mass market. [62]

- **ChargePoint** includes several recommendations that PGE should consider:

    - Reduce the barrier of up-front capital cost by supporting the deployment of make-ready infrastructure, including for MDV/HDV applications. ChargePoint does not oppose utility ownership of charging equipment but emphasizes that such an offering should have parity with site host ownership. PGE agrees that capital cost to deploying infrastructure is a major barrier to ensuring charging adequacy for our EV customers and that reasonable infrastructure solutions can be a solution to accelerate the deployment of smart charging and the adoption of electric transportation.

    - Provide clear and concise information about electric rate options, particularly for any special EV charging rates. ChargePoint emphasizes reducing impact of demand charges on customer bills.[63] PGE agrees that innovative rates are necessary to support EV adoption and efficient grid integration.

    - Low- and moderate-income customers should be prioritized in customer outreach. PGE agrees that special consideration is necessary for this segment. We anticipate including this consideration in future program designs.

- **Greenlots** includes several recommendations for PGE:

    - Increase focus on MDVs and HDVs, citing California utilities' investments of over $1 billion. Further, PGE should consider utility ownership of charging station at multi-family dwellings to reduce barriers to adoption. PGE agrees that we should more fully consider MDV, HDV, and Multi-family charging options.

    - Accelerate our pace: pilots should move to programs faster and that longer-term considerations are necessary today. We agree with Greenlots that we need to move faster to support this market.

- **AWEC** indicates that PGE's TE Plan complies with the OPUC rule outlined in OAR 860-087-0200(2)(a), and that the Plan should be accepted by the OPUC. PGE agrees.

- **Tesla** provided the following considerations:

[62] ATE. *Opening Comments.* UM 2033. 6 Dec 2019, page 3.
[63] ChargePoint. *Opening Comments.* UM 2033. 6 Dec 2019, page 4.

- Tesla disagrees with PGE that public chargers can serve all vehicles because a charger would "serve a certain subset of EVs since there is no fast charger that works for all EVs." Tesla encourages co-locating chargers with different plugs as an alternative. Though we appreciate Tesla's consideration, we do believe that our chargers can serve all vehicles (through the CCS, CHAdeMO, and CHAdeMO-to-Tesla adapter). We are also encouraged by EVGo's recent announcement to include Tesla charging ports on their stations and look forward to working with our suppliers to see if similar opportunities exist for our stations.[64] Absent OEMs converging on a single charging standard design, we must have multiple charging ports on all quick charging units. Though co-locating is a strategy worth pursuing, doing so does risk overbuilding capacity and underserving customers.

- Tesla support for fleet/business customers is extremely beneficial and PGE's exploration of an MDV/HDV sandbox to better understand the MDV/HDV electrification space. PGE agrees.

- Consider new rates to reduce barriers to operating EV charging infrastructure. PGE agrees.

- "Given the cost incurred upfront to develop make-ready infrastructure and the potential returns via increased electricity sales that can benefit all ratepayers, utilities have a natural role to play in supporting this build out." PGE agrees.

Concluding Comments

PGE appreciates Staff and stakeholders' thoughtful comments and suggestions on our TE Plan. As this Plan was our first, we believe that stakeholders' inputs are critical to ensuring this planning process is useful in future years. Though we now have the Plan as a guide for how we will engage TE in the future, we emphasize the need to be flexible as the market and customer conditions change requiring that strategies and tactics evolve.

[64] EVANNEX. *First Look At EVgo Fast Charging With New Built-In Tesla Connector.* 28 Dec 2019. Accessed 31 Dec 2019 at: https://insideevs.com/news/390154/video-evgo-fast-charger-integrated-tesla-connector/

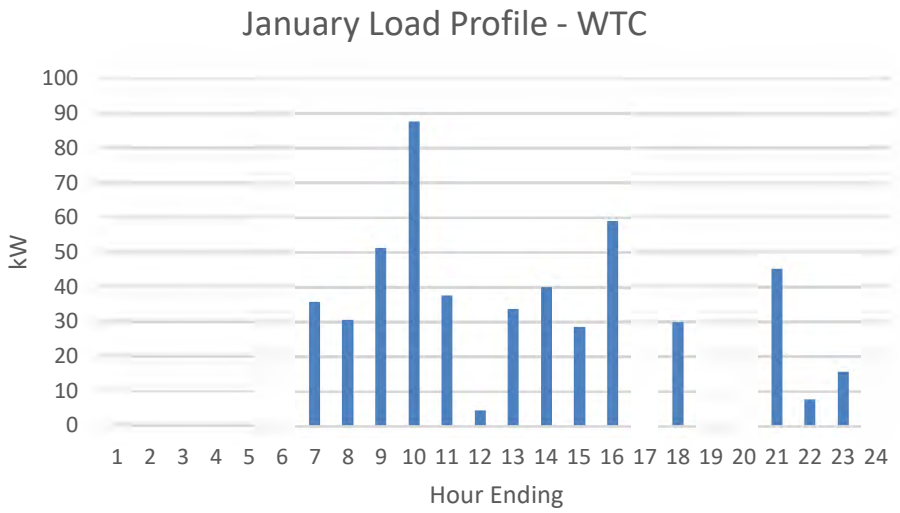
We believe the Plan complies with the Chapter 860 Division 87 rules, in support of Oregon and our customers' decarbonization and electrification goals. We look forward to working with stakeholders further on transitioning from Plan to execution and operation of TE programs, infrastructure deployments, and rate development.

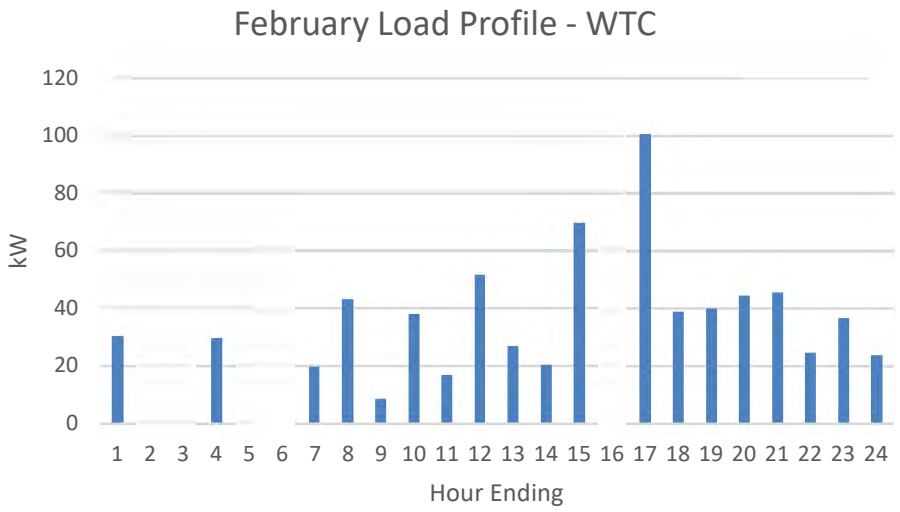
Respectfully Submitted

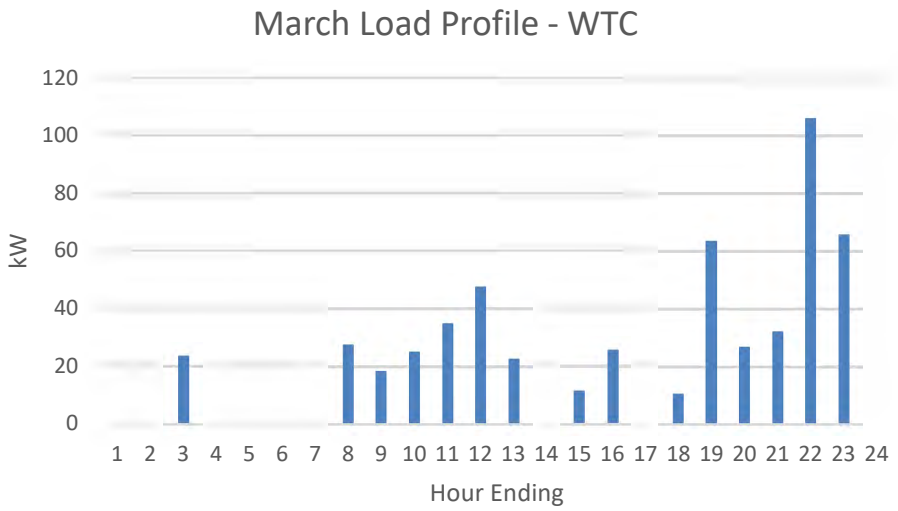
Karla Wenzel
Manager, Regulatory Policy and Strategy

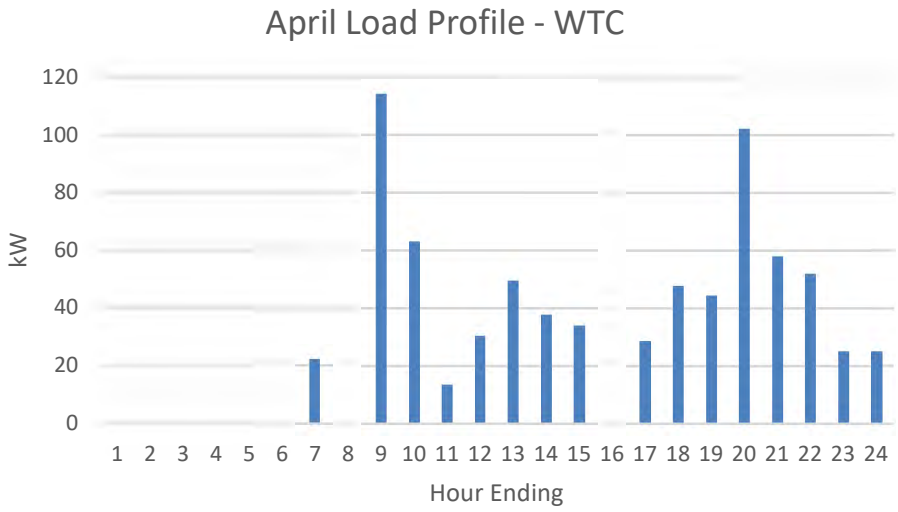
Appendix

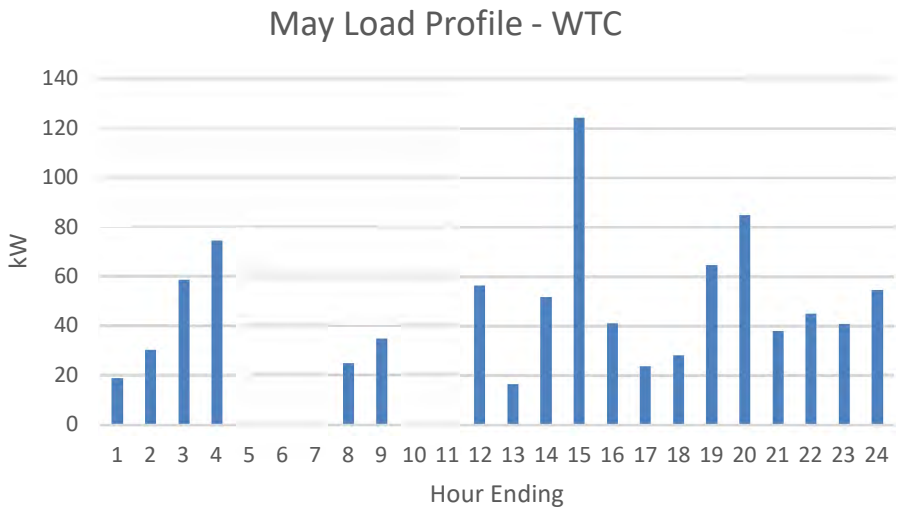
The below charts show the load profile for the peak day of each month of 2019.

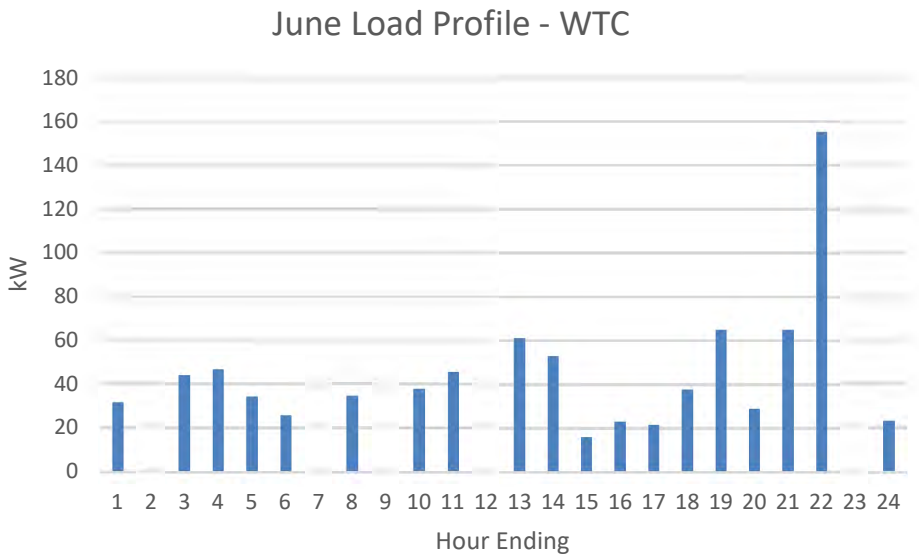


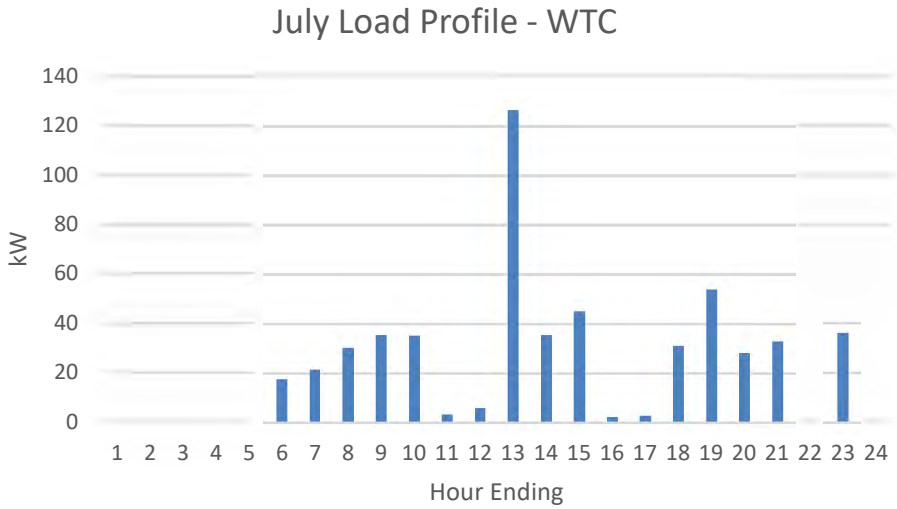


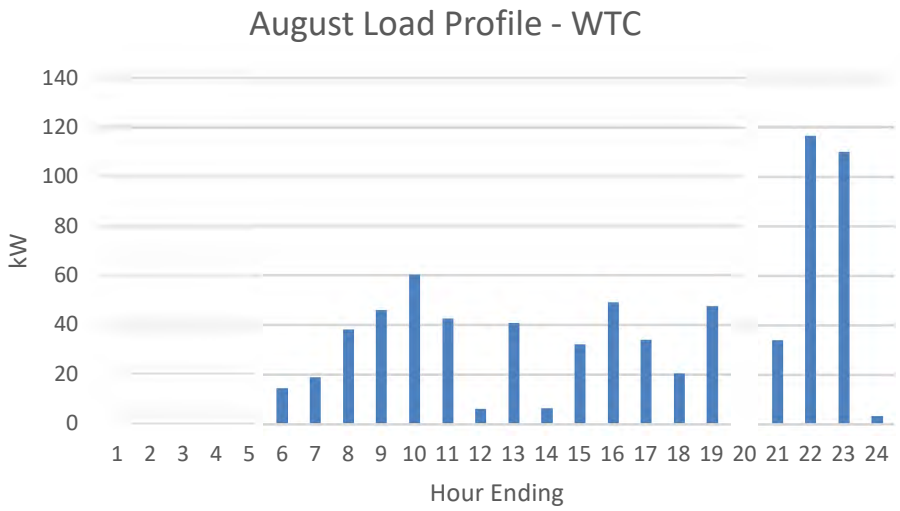

March Load Profile - WTC
120
100
80
60
40
20
0
kW
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Hour Ending


April Load Profile - WTC
120
100
80
60
40
20
0
kW
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Hour Ending


May Load Profile - WTC
140
120
100
80
60
40
20
0
kW
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Hour Ending


June Load Profile - WTC
kW
180
160
140
120
100
80
60
40
20
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Hour Ending


July Load Profile - WTC
kW
140
120
100
80
60
40
20
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Hour Ending


August Load Profile - WTC
140
120
100
80
60
40
20
0
kW
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Hour Ending