

**BEFORE THE PUBLIC UTILITY COMMISSION
OF THE STATE OF OREGON**

**IN THE MATTER OF PORTLAND)
GENERAL ELECTRIC'S)
APPLICATION FOR)
TRANSPORTATION)
ELECTRIFICATION PROGRAMS)**

DOCKET NO. UM 1811

CHARGEPOINT EXHIBIT 100

REPLY TESTIMONY OF DAVID PACKARD

April 24, 2017

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1 **I. INTRODUCTION AND SUMMARY OF RECOMMENDATIONS**

2 **Q: Please state your name.**

3 A: My name is David Packard.

4 **Q: By whom are you employed and in what position?**

5 A: I am the Vice President of Utility Solutions at ChargePoint, Inc.

6 **Q: Have you previously filed testimony before the Oregon Public Utility Commission?**

7 A: No, I have not.

8 **Q: Please describe your qualifications, including your background, experience, and**
9 **expertise.**

10 A: In my current role, I advise a team of Directors who work with electric utilities and other
11 key stakeholders in Europe and North America on electric vehicle market infrastructure
12 engagement and investment, and support the development of policies and programs to
13 accelerate the adoption of EVs and EV charging equipment and services.

14 I have been working in the electric vehicle market since 1993 and have been highly
15 involved in the evolution of standards and policy around EV infrastructure. Prior to joining
16 ChargePoint, I was founder and President of ClipperCreek, a company that designed,
17 developed and manufactured Electric Vehicle Supply Equipment (EVSE). Before
18 ClipperCreek, I was Vice President of EVI, an infrastructure company that served the
19 nascent EV infrastructure market through 2003.

20 I hold a Master of Science in Civil Engineering and a Bachelor of Science degree
21 from the University of Massachusetts. My statement of qualifications is attached as
22 ChargePoint/101 following my reply testimony.

23

1 **Q: Please describe ChargePoint and ChargePoint’s previous involvement in**
2 **transportation electrification efforts in Oregon.**

3 A: ChargePoint designs, develops, and deploys home and commercial Level 2 (“L2”) and DC
4 Fast Charging (“DCFC”) electric vehicle charging stations, software applications, data
5 analytics, and related customer and driver services aimed at creating a robust, scalable, and
6 grid-friendly EV charging ecosystem. Using ChargePoint products and services, our
7 customers operate more than 34,000 Level 2 and DC fast charging locations, including 496
8 in Oregon. These charging locations have enabled more than 23 million charges and more
9 than 545 million electric-fueled miles.

10 ChargePoint was the first company globally to launch and deploy a network in
11 support of EV charging, and is dedicated to providing a constant stream of innovation and
12 advancements. ChargePoint has more than 30 patents awarded to date. ChargePoint was
13 recently awarded Electrek’s Best of CES 2017 award for Best EV accessory. ChargePoint
14 was included on the CNBC Class of 2014 “Disrupter 50” list of innovative companies, an
15 honor shared with Uber, SpaceX, Dropbox, and Airbnb. The United Nations Framework
16 Convention on Climate Change honored ChargePoint with a Momentum for Change award
17 at the annual Conference of Parties (“COP21”) in Paris, France in December of 2015.
18 ChargePoint was one of 16 Lighthouse Activities¹ selected for its innovative and scalable
19 approach to tackling climate change, and one of only two companies highlighted from the
20 United States. ChargePoint received this award for its partnership program with BMW and
21 Volkswagen to create Express Charging Corridors along both coasts of the United States.²

¹ http://unfccc.int/files/press/press_releases_advisories/application/pdf/mfc_press_release-2015_lighthouse_activities.pdf

² <http://www.chargepoint.com/news/2015/0122/>

1 **Q: What is the purpose of your Reply Testimony?**

2 A: The purpose of my testimony is to address the proposal from Portland General Electric
3 (PGE), as presented by witnesses Spak and Goodspeed, to install and own electric vehicle
4 (EV) charging infrastructure using ratepayer funding. This proceeding is of interest to
5 ChargePoint because it will determine the role of a regulated monopoly utility in the
6 competitive EV charging market, including the ability to offer products and services at no
7 cost to charging station site hosts and potentially own and operate equipment on customers'
8 premises.

9 The Commission's decision on this proposed program will significantly impact the
10 future of the EV charging market in Oregon. In our view, PGE's proposal to use ratepayer
11 money to own and operate charging stations could slow rather than accelerate adoption of
12 EVs in the near and long term in Oregon. We feel that PGE could have a much bigger
13 impact on the market and help accelerate growth of EV charging infrastructure if it adopts
14 a different program design.

15 In addition to these concerns, I also briefly explain why ChargePoint opposes the
16 TOU smart charging pilot and the TriMet pilot as proposed, and provide recommendations
17 for how these pilots could be redesigned to be more effective and more likely to achieve
18 PGE's stated goals.

19 **Q: Please summarize your recommendations for the Commission.**

20 A: I recommend that the Commission:

- 21 • Direct PGE to modify its proposal to own and operate its own charging stations and to
22 develop its own proprietary network for its proposed Electric Avenue expansion in a

1 way that will stimulate innovation, competition, and customer choice in the market for
2 EV charging equipment;

- 3 • Encourage PGE to redesign its community charging infrastructure pilot in such a way
4 that PGE would provide rebates or other financial incentives to charging station site
5 hosts to choose the charging equipment that best suits their needs from a list of pre-
6 qualified equipment;
- 7 • Encourage PGE to work with industry on the on-going development of an updated
8 American open-source standard, and not require the OCPP 1.6 standard;
- 9 • Recommend that PGE design an “EV-only” TOU pilot using metering already
10 embedded in smart chargers, rather than a “whole-house” TOU pilot;
- 11 • Recommend that PGE redesign its proposed pilot program with TriMet such that PGE
12 would not own and operate any charging equipment, but would instead provide
13 financial support for TriMet to have the choice in charging equipment and the ability
14 to choose who will own and operate the stations.

15 II. ELECTRIC AVENUE NETWORK EXPANSION

16 **Q: What will you discuss in this section of your testimony?**

17 A: In this section of my testimony, I will discuss PGE’s proposal to expand its existing Electric
18 Avenue Network from its one currently existing station located at its headquarters to six
19 additional stations around its service territory and to integrate existing charging stations
20 that PGE operates into PGE’s proprietary network.³ Rather than empowering charging
21 station site hosts to choose the charging station that best fits their needs, PGE proposes to

³ Testimony of Spak and Goodspeed, p. 14, ll. 5-9.

1 issue an RFP and provide only one option (presumably the cheapest option).⁴ Because
2 PGE's one-size-fits-all offering will stifle – rather than promote – innovation, competition,
3 and customer choice, ChargePoint opposes PGE's proposal to own its own charging station
4 network.

5 **Q: Why does ChargePoint oppose PGE's proposal to expand its Electric Avenue**
6 **Network?**

7 A: ChargePoint agrees with PGE that additional EV charging stations are needed in PGE's
8 service territory but the current program design for PGE's plan will slow rather than
9 expedite the expansion of charging stations in and around Portland. As proposed, PGE's
10 program employs a traditional utility RFP process that will limit customer choice by
11 selecting one technology to be deployed. This prohibits competition in the market since
12 those vendors not chosen to be in the program will now have to compete against technology
13 subsidized with ratepayer funding. This procurement process also increases investment risk
14 for the utility by "locking in" whatever technology is selected in the RFP. Instead, utility
15 programs should qualify and incentivize the capabilities and characteristics of end-use
16 technologies to accelerate access to tools that create grid benefits. Then customers, rather
17 than the utility alone, should choose from a list of qualified technologies rather than being
18 presented with the single winner of the RFP process. This process better replicates a
19 competitive marketplace and enables multiple companies to continue to compete in PGE's
20 service territory.

21 While PGE would benefit from its proposed own-and-operate model for EV
22 chargers, ratepayers and the market would benefit more from a robust and competitive

⁴ *Id.* p. 17, ll. 3-4.

1 market that would provide them with access to the latest advancements in charging
2 technologies and services. Technology is advancing too quickly for utilities to keep up
3 with, and, a utility procurement through an RFP process would lock in a technology
4 available today for a decade or more. Whatever technology is selected through the RFP
5 process will have a product feature set that was selected for the EV driver by the utility
6 (which has very little experience in the EV industry). Locking in a technology that the
7 utility has chosen without regard for EV drivers' needs and preferences increases
8 ratepayers' risk that the investment will be stranded and limits the potential grid benefits
9 of EV charging. In other words, the Electric Avenue program as proposed would have a
10 negative impact on competition, innovation, and customer choice. The program is unlikely
11 to scale effectively and will not contribute to a sustainable EV market in PGE's service
12 territory.

13 PGE states that it will pre-wire the Electric Avenue locations to accommodate the
14 higher power charging capabilities that are anticipated to be available with new vehicle
15 models that have been introduced by auto manufacturers.⁵ However, it states equipment
16 will be "replaced with higher powered equipment as needed over time," which appears to
17 be a total waste of ratepayer funds.⁶ This admission of the expected obsolescence of the
18 equipment PGE is planning to install indicates that ratepayers will bear an unnecessary risk
19 through PGE's investment in these stations. It would be better for ratepayers and better for
20 EV drivers for site hosts, EV service providers, and/or private investors to bear this risk,
21 because they could decide when and if it is financially beneficial to install higher power

⁵ PGE Application for Transportation Electrification Programs (Application), p. 52.

⁶ *Id.*

1 equipment, or to initially install equipment that is future-proofed (and can be upgraded at
2 minimal costs).

3 **Q: Do you believe that the proposed Electric Avenue expansion will stimulate innovation,**
4 **competition, and customer choice with respect to EVSE, as required by SB 1547?**⁷

5 A: No. The entrance of a regulated monopoly into the EV charging market in the manner
6 proposed by PGE would have a chilling effect on innovation. Competitive EVSE providers
7 attempting to sell equipment and services to site hosts for a market-based price would be
8 unable to compete directly with PGE and its ratepayer-funded program, because PGE will
9 be giving away equipment and services at no cost to the site host. Competitive EVSE
10 providers would begin designing their products to meet utility-defined product
11 specifications in the RFP-based program, rather than innovating to meet the needs of
12 private site hosts and EV drivers. Instead of harnessing the innovative capacity of the
13 competitive EVSE market – which is much bigger than PGE’s service territory – Oregon’s
14 EV charging infrastructure will be limited to the imagination of a utility procurement
15 process.

16 Again, utility programs should not pick and choose behind-the-meter end-use
17 technologies through the same RFP processes by which they procure commodities at the
18 lowest possible cost. Charging station equipment and services are not commodities and
19 customers will not benefit from this “race to the bottom” approach. An RFP will effectively
20 prohibit competition in the market and limit the availability of innovative products and thus
21 limit innovation. Charging station site hosts are in the best position to choose the type of

⁷ SB 1547, Section 20(2)(d) and 20(4)(f).

1 charging station that will be located on their property, and PGE should not be making this
2 choice for them, regardless of ownership structure.

3 **Q: Why do you believe that charging station site hosts, rather than PGE, should choose**
4 **the charging station located on their property?**

5 Charging station site hosts have their own unique preferences regarding the hardware and
6 services related to EV charging. The Yale Center for Business and the Environment
7 reviewed a range of EV charging equipment and business models and concluded that “[n]o
8 single technology or business model available today is exactly right for all charging
9 scenarios. There are pros and cons to each alternative, depending on the location and the
10 driver base that the charging station aims to serve.”⁸ The wide range of choices in the
11 market for EV charging goods and services is a strength, indicating that this quickly
12 evolving market is meeting the varied needs of its wide range of consumers.

13 Site hosts can and should be able to tailor options for station fees, driver
14 authentication, accessibility, payment collection and other transaction capabilities,
15 advertising, and managing an array of data (e.g., energy, station usage, and environmental
16 benefits) to best fit their unique needs. Site hosts are also the best suited to make choices
17 about the number of charging stations needed on their site. This is especially true when site
18 hosts participate in the purchase of the charging station, which will help ensure that
19 charging stations are deployed efficiently and in places where they will get the most use.

20 Another critical set of choices that site hosts benefit from are those around pricing
21 and access controls. There is an inherent link between the site itself and the behavior of the

⁸ Yale Center for Business and the Environment, 2015, “Financing Electric Vehicle Markets in New York and Other States” page 6.

1 drivers that park there. When site hosts have the ability to communicate to EV drivers
2 charging on their premise through innovative apps and product offerings, site hosts can
3 best manage their property to ensure higher utilization of the charging assets and support
4 their core businesses. For example, a big-box retailer may want to offer free charging for
5 the first hour to incentive customers to shop at the store, but charge a much higher rate
6 starting at the second hour to motivate customers to move their vehicles and make the
7 charging station available to another customer. Apartment building owners may provide
8 charging as an amenity and will typically charge for the service as they do for a coin
9 operated laundry. Cities and counties may charge cost-recovery fees in order to avoid
10 giving away charging services at taxpayer expense. Some sites offer these services for free,
11 some include them in rent, some charge pay-per-use fees, and some are designed to elicit
12 desired driver behavior and lead to the highest utilization of the charging asset.

13 Charging station site-hosts should be permitted to choose the type of charging
14 station and fee structure that best fits their needs. PGE's proposal severs the link between
15 the site host and the EV driver by eliminating the site host's control over the station affixed
16 to their property.

17 **Q: What does PGE say in its Application and supporting testimony regarding**
18 **innovation, competition, and customer choice?**

19 A: PGE claims that the purpose of expanding the Electric Avenue Network is to "assist PGE
20 in determining how customers use visible public charging, how visible charging
21 infrastructure impacts customer attitudes toward purchasing electric vehicles, and how
22 customer usage patterns can be integrated with [its] distribution system."⁹ Additionally,

⁹ Testimony of Spak and Goodspeed, p. 18, ll. 5-8.

1 PGE states that, “With over 50 DCQCs in the Portland metropolitan statistical area, the
2 expansion of six new community charging stations is not expected to saturate the
3 market.”¹⁰

4 PGE also states that it will develop pricing to “avoid undercutting the market-based
5 pricing offered by other providers.”¹¹ What PGE does not understand is that driver pricing
6 is dynamic and competition in the EVSE market is not just based on pricing to EV drivers.
7 Site hosts should have the option to examine multiple pricing options to support their
8 business and clients (i.e., drivers). It will be unnecessarily burdensome for PGE to file a
9 new tariff every time pricing changes in its sampling of other DCFC locations.

10 **Q: Do you believe that competing on the price charged to drivers is the type of**
11 **competition that the legislature wanted to protect when it required transportation**
12 **electrification programs to stimulate competition in SB 1547?**

13 A: No. The history behind the competition provision in SB 1547, which was initially adopted
14 by the Senate Committee on Business and Transportation as an amendment to HB 4036
15 (A-Engrossed), indicates that legislators and advocates alike viewed the competition
16 requirement as a mechanism to promote a competitive electric vehicle charging market.
17 Testimony in public hearings on HB 4036 prior to adoption of the amendment including
18 the competition provision reveals significant concern among advocates that the legislation,
19 in its original form, would have threatened competition in the sale and operation of electric
20 vehicle charging infrastructure.¹² The history behind HB 4036 suggests that the intent of
21 the competition provision was to safeguard a competitive electric vehicle charging station

¹⁰ *Id.* at p. 18, l. 8 – p. 19, l. 2.

¹¹ *Id.* at p. 19, ll. 4-6.

¹² Meeting materials and exhibits submitted as a part of the public hearing on HB 4036 are available at:
<https://olis.leg.state.or.us/liz/2016R1/Measures/Exhibits/HB4036>

1 marketplace that fosters consumer choice and innovation among multiple providers. There
2 is no indication that the competition provision was intended as a blessing for the utilities
3 to expand their business models and participate in the competitive market themselves.

4 **Q: What effect do you believe an expanded Electric Avenue would have on the market**
5 **for EVSE in PGE's service territory?**

6 A. An expansion of the Electric Avenue Network will have a significant and negative impact
7 on Oregon's competitive EV charging market, especially within the City of Portland. The
8 Portland Metro area currently has about 28 public DCFC charging stations across 13
9 different sites according to the US Department of Energy's Alternative Fueling Station
10 Locator.¹³ PGE has proposed to add six new ratepayer-subsidized Electric Avenue
11 charging sites with four DCFC chargers each, for a total of 24 new DCFCs.¹⁴ If approved,
12 this program would increase the number of charging sites by nearly 50 percent and nearly
13 double the number of DCFCs. The scale of this program could flood the competitive EV
14 charging market, and the impacts of this investment would necessarily spill over beyond
15 the borders of PGE's service territory.

16 **Q. Is there currently a competitive EV charging market in PGE's service territory?**

17 A. Yes. ChargePoint has over 250 charging stations in PGE's service territory. According to
18 the DOE's Alt Fuels Station Locator, there are 9 networks in the area including
19 ChargePoint, AeroVironment, Blink, EVgo, GE WattStation, Greenlots, OpConnect,
20 SemaCharge, and Tesla. Volkswagen has also committed to investing funds into the
21 Portland metropolitan area as part of its National Zero Emission Vehicle Investment

¹³ Available at: <http://www.afdc.energy.gov/locator/stations/>

¹⁴ PGE Application for Transportation Electrification Programs, March 15, 2017, p. 51.

1 Plan¹⁵ as required by Appendix C to the 2.0-Liter Partial Consent Decree entered by the
2 U.S. District Court for the Northern District of California on October 25, 2016.

3 **Q. Does ChargePoint have plans to install DC fast chargers in PGE's service territory**
4 **without ratepayer funding?**

5 A. Yes. As a private company, ChargePoint is not able to disclose all of its investment plans.
6 That said, the outcome of this case will determine whether or not we as a company decide
7 to install our fast chargers in PGE's service territory over the next few years. If PGE has
8 the ability to offer site hosts free charging stations, it will have a substantial impact on our
9 consideration to make investments in Oregon and whether we consider other markets that
10 are more competitive.

11 **Q: Isn't increasing the number of charging station sites and the number of available**
12 **DCFCs a good thing?**

13 A: ChargePoint supports increasing the number of charging station sites and the number of
14 DCFCs available in Oregon, but this growth will not be sustainable in PGE's service
15 territory if PGE is using ratepayer money to own and operate its own sites. Site hosts may
16 be reluctant to invest in charging stations to support their own customers' and employees'
17 needs if there is a utility program offering "free" stations. Competitive EVSE providers
18 may then exit the Oregon market, because it is difficult to compete against "free" charging
19 stations from the utility. PGE could more effectively contribute to sustainable growth in
20 the number of charging stations by supporting the robust competitive market for EVSE that
21 already exists in its service territory.

¹⁵ <https://www.epa.gov/sites/production/files/2017-04/documents/nationalzevinvestmentplan.pdf>

1 **Q: What is PGE’s stated justification for owning and operating its own charging stations**
2 **through an expanded Electric Avenue?**

3 A: In its application, PGE states that it is necessary to own and operate the stations because
4 “publicly-available fast charging is a nascent market and the availability and accessibility
5 of charging may be impacted by the stability of the Electric Vehicle Supply Equipment
6 (EVSE) provider.”¹⁶ PGE also indicates that it is necessary for it to own and operate its
7 own charging station network in order to study the effects of EV charging on its system.¹⁷

8 **Q: Is it necessary for PGE to own and operate the Electric Avenue expansion in order**
9 **for its transportation electrification efforts to be successful or to study the effects of**
10 **EV charging on its system?**

11 A: No. PGE seems to believe that because the EVSE industry is somewhat nascent that it is
12 therefore unstable and will not be able to succeed unless the utility itself makes a large
13 purchase of EVSE through an RFP process. On the contrary, it would be preferable for
14 PGE’s ratepayers for PGE not to create a new business model for itself and instead to
15 support the EVSE industry in doing what the industry already does best: deploying EVSE
16 infrastructure.

17 PGE also does not need to own charging stations in order to study the effects of EV
18 charging on its system. PGE’s program could allow site hosts to own and operate the EVSE
19 while working with these site hosts and EVSE network service providers to collect the
20 necessary data on the effects EV charging on its system.

¹⁶ Testimony of Spak and Goodspeed, p. 16, l. 22 – p. 17, l. 2.

¹⁷ See *id.* at p. 18, ll. 5-8.

1 ChargePoint agrees that additional charging stations are critical to accelerating
2 transportation electrification in Oregon, and agrees that more charging stations would be
3 good for PGE's ratepayers. However, that does not mean that PGE, as a regulated utility
4 with access to ratepayer funds, should be allowed to enter the competitive EVSE market
5 and establish a new network by providing charging stations and charging services itself.
6 While PGE undoubtedly has a role to play in accelerating transportation electrification in
7 its service territory, there is absolutely no reason for PGE to own and operate charging
8 stations itself.

9 **Q: What do you see as the appropriate and most effective role for utilities in**
10 **transportation electrification efforts in Oregon?**

11 A: PGE is well-positioned to support transportation electrification efforts within its service
12 territory and will play an essential role in these efforts. Utilities can help to address some
13 of the obstacles currently preventing wider deployment of networked EV charging
14 equipment, especially at multi-unit dwelling (MUD) locations and in underserved
15 communities. For example, the utilities could provide the "make-ready" infrastructure
16 (including any distribution line, transformer, or other "in front of the meter" upgrades
17 necessary to make a site ready for EVSE equipment installation) or rebates at MUD
18 locations and then provide a financial incentive to landlords and/or tenants for the purchase
19 of the EVSE equipment. This approach helps to address the inherent landlord-tenant split
20 incentive barrier, where it may be cost prohibitive for a tenant to install a charger stations
21 at an MUD because the landlord is not willing to cover the installation costs.

22 The Commission should authorize PGE to undertake strategic, risk-averse activities
23 and cost-effective ratepayer-funded utility infrastructure investments that will help

1 accelerate expansion of EV charging and EV adoption in Oregon. In doing this, the
2 utilities' role should be clearly defined and relate to the utilities' core strengths and
3 competencies, such as building distribution facilities. At the same time, the Commission
4 should preclude utilities from engaging in anticompetitive activities and from making
5 unjustified and unnecessary expenditures of ratepayer money. In other words, the
6 Commission should not allow PGE to directly provide services that can be provided more
7 effectively by the existing competitive EVSE market, and at lower risk to ratepayers.

8 Utilities can play a role by providing rebates and other programmatic incentives for
9 qualified EV charging equipment, similar to the way that PGE works with Energy Trust of
10 Oregon to provide rebates and other incentives for energy efficiency. Rebates and technical
11 assistance are an effective way to make it easier and less expensive for homeowners,
12 businesses, property managers, and employers to deploy EV charging equipment. Rebate
13 programs can also be an effective way for utilities to maintain visibility into unplanned EV
14 load growth by having access to the data on the charging infrastructure being deployed
15 within their service territory. I provide more details later in my testimony on the type of
16 rebate program that I believe would best meet the requirements of SB 1547, and be in the
17 best interest of EV drivers, ratepayers, and PGE itself.

18 Utilities do not need to and should not be permitted to leverage ratepayer funds to
19 take over the role currently played by competitive businesses selling EV charging
20 equipment and services. Utilities likewise should not undermine the role of site hosts by
21 dictating the terms under which site hosts will offer EV charging services. Site hosts can
22 and should be allowed to make these investment decisions on their own. A competitive EV
23 charging market is the best means of achieving Oregon's aspirations for economic growth,

1 jobs, technology leadership, sustainable transportation, and address the challenge of
2 climate change through transportation electrification.

3 Utilities also have a role in supporting customer education for those considering
4 EV choices or purchasing EV charging stations. We would recommend that these efforts
5 leverage ratepayers' dollars in way that supports market competition and promotes
6 customer choice. Utilities should be allowed to make use of their relationship with their
7 customers to provide general information and to direct interested customers to more
8 detailed resources. Utilities can serve as a potential trusted resource to their customers and
9 they should remain vendor- and technology-neutral in all recommendations. Utilities are
10 experts in electricity, and they should leverage the expertise of the existing competitive
11 industry in the EV and EVSE marketplaces.

12 **Q: Are there any advantages to having PGE own and operate the proposed Electric**
13 **Avenue expansion from a driver's perspective?**

14 . A: No. PGE's proposal eliminates the site host's control of the station and disregards the link
15 between the site and the behavior of the drivers that park there. PGE's proposal also does
16 not take into consideration different charging profiles, driver needs, and site host
17 involvement. Publically accessible charging stations will serve as the "gas station"
18 equivalent for EV drivers, and therefore site hosts should have the option to control pricing
19 for the drivers based on the profile of drivers and length of charging sessions needed at that
20 site. A one-size-fits-all model for technology features and pricing is not the best approach
21 for ensuring site host participation in this program. Additionally, commuters and visitors
22 need to be able to take advantage of EV charging in PGE's territory without being
23 negatively impacted by a fixed per-use charge just because they are not customers of PGE.

1 **Q: Would PGE be more likely to achieve its goals for the proposed Electric Avenue**
2 **expansion and the goals of transportation electrification generally if it owned and**
3 **operated charging stations?**

4 A: No, there is no reason to think that PGE's proposed own-and-operate model for the Electric
5 Avenue expansion will be more effective at accelerating transportation electrification than
6 another model, such as the rebate model I suggested earlier. In fact, given that this would
7 largely be a new business venture for PGE (other than its one existing station at its
8 headquarters, where drivers can charge for free), I would consider PGE's proposed own-
9 and-operate model to be a risky use of ratepayer funds. PGE is very good at providing the
10 utility services that only it can provide within its service territory, but there is no reason to
11 think it will be good at building and managing a network of EV charging stations. PGE and
12 its ratepayers would be much better served by relying on the already existing expertise of
13 competitive EVSE providers, who have experience working around the country.

14 **Q: If PGE did not own or operate its own charging stations, is there a danger that**
15 **charging station operators would start gouging drivers?**

16 A: No. There seems to be a concern that, unless EV charging services are rate-regulated – in
17 the way that electric and gas utility service is rate regulated – or provided by a rate-
18 regulated utility, competitive providers will start gouging customers. However, this
19 concern overlooks the fact that, even though EV charging involves the delivery of
20 electricity to a vehicle, EV charging is not a utility service. EV charging is a service offered
21 by a variety of competitive providers and site hosts who, as discussed earlier, need
22 flexibility to best determine the charging needs of the EV drivers most likely to visit a
23 particular charging location.

1 EV charging is also much more than just delivering electricity to a vehicle; it
2 involves software and smartphone applications to help drivers find charging stations,
3 inform drivers when a charging station is available, help drivers plan long-distance road
4 trips, and countless other value-adds that competitive EVSE providers are continually
5 innovating. If EV charging is treated as nothing more than a utility service, as PGE seems
6 to want to do through its Electric Avenue proposal, PGE's customers will lose out on these
7 innovations and valuable services.

8 PGE states that "Our vision is that if a customer needs to charge her car to reach
9 her destination, she ought to be able to dependably go to an Electric Avenue site to 'fuel
10 up.'"¹⁸ As seen by the congestion at many Tesla Superchargers,¹⁹ installing more stations
11 funded by rate payers is not the way to solve this problem. Working with suppliers who
12 have developed driver applications to allow drivers to see what stations are available, and
13 to reserve a time to charge their vehicle, is a much more effective way to ensure drivers
14 that they will be able to charge their vehicle when needed. The competitive EVSE industry
15 is already providing these types of valuable solutions, whereas PGE does not even seem to
16 understand what problems need to be solved.

17 **Q: Doesn't SB 1547 specifically allow PGE to invest directly in EV charging and related**
18 **infrastructure?**

19 **A:** Yes, I am not an attorney, but my understanding of SB 1547 is that it contemplates that a
20 utility's proposal for a transportation electrification program "may include prudent
21 investments in or customer rebates for electric vehicle charging and related

¹⁸ Application, p. 51.

¹⁹ http://www.greencarreports.com/news/1101675_tesla-supercharger-congestion-worsens-in-peak-travel-periods

1 infrastructure.”²⁰ However, just because PGE has a right to propose its own-and-operate
2 model does not mean that the proposal is prudent or in the best interest of ratepayers. As I
3 have discussed extensively in this testimony, PGE’s own-and-operate proposal for Electric
4 Avenue also will not “stimulate innovation, competition and customer choice in electric
5 vehicle charging and related infrastructure and services,” which it is required to do under
6 SB 1547.²¹ In my opinion, it would be much easier for PGE to demonstrate that that a
7 rebate program is prudent and in the best interest of its ratepayers, and therefore eligible
8 for cost-recovery.

9 **Q: Please describe in more detail the type of rebate program that you believe that PGE**
10 **should offer instead of its proposed Electric Avenue own-and-operate model.**

11 A: PGE should consider an alternative program design in which PGE would provide a direct
12 financial incentive to site hosts for the purchase and installation of the qualified EVSE
13 equipment of their choice. PGE can qualify equipment to meet functional capabilities and
14 provide a list of qualified charging stations to its customers and potential site hosts to
15 simplify the learning curve associated with buying, and refueling, an EV. A rebate reduces
16 the cost barrier to EV adoption, allows the charging station site host to determine which
17 equipment and services best meet their needs, and builds a sustainable EVSE marketplace.

18 ChargePoint recommends that PGE develop a rebate program that provides a
19 simple financial transaction that is easy to implement and creates value to the utility by
20 providing visibility into unplanned EV load growth. This proposal would lower the total
21 cost of ownership of an EV, creating an incentive for utility customers and helping

²⁰ SB 1547, Section 20(3).

²¹ SB 1547, Section 20(4)(f).

1 accelerate adoption. This rebate structure could very effectively be expanded and tailored
2 to incentivize increased deployment of workplace charging, which is the other primary
3 location for EV drivers to charge their vehicles, and expand grid benefits while limiting
4 the costs and risks associated with PGE owning and operating charging stations. Also, a
5 rebate program will promote – rather than stifle – innovation, competition, and customer
6 choice in the EV charging market.

7 **Q: Do you expect that a rebate program would have as big of an impact on accelerating**
8 **transportation electrification as PGE’s proposed Electric Avenue expansion?**

9 A: I believe that a rebate program, using the same amount of money that PGE plans to spend,
10 would lead to significantly more charging stations than PGE’s proposed six Electric
11 Avenue stations. By leveraging private capital from site hosts to share the costs of each
12 station that is installed, a rebate program would have significantly greater reach than the
13 Electric Avenue proposal. In ChargePoint’s experience, having site hosts share the costs of
14 a charging station is important to ensure that the charging stations meet the needs of drivers
15 that visit the location where the stations are installed, and that the stations are sited in an
16 optimal location. When site hosts have “skin in the game,” charging stations tend to be
17 more fully utilized and offer the most value to drivers and site hosts.

18 **Q: How would PGE recover its costs for a public charging pilot if it did not own the**
19 **charging stations itself?**

20 A: PGE’s Electric Avenue proposal is not a cost-based program. By that, I mean that the
21 revenues that PGE projects it will receive from EV drivers for charging services will not

1 cover all of PGE's costs of providing the program.²² Program costs that are not recovered
2 from EV drivers will be recovered from ratepayers. In other words, ratepayers would
3 subsidize a major portion of the costs of Electric Avenue as proposed. As I discussed
4 earlier, these funds may be at risk if the Electric Avenue program is not successful.

5 Since PGE will not be covering the costs of its Electric Avenue expansion using
6 program revenues anyway, there is no financial justification for PGE owning the charging
7 stations in the first place. Rather than using these ratepayer subsidies to invest in hardware
8 that PGE will own, it would be more effective and less risky for these funds to be used for
9 rebates for site hosts to install the charging equipment of their choice, as I have described.
10 It would also be much easier and more straightforward for the Commission to approve PGE
11 to recover any money spent on qualified rebates, rather than allow PGE to invest in its own
12 hardware and make a prudence determination later on.

13 **Q: SB 1547 says that a utility may earn “a return of and a return on an investment”**
14 **made by a utility as a part of its transportation electrification programs. If PGE were**
15 **only providing rebates to site hosts, how would it earn “a return of and a return on”**
16 **its program expenditures?²³**

17 A: PGE could recover the costs of providing rebates and administering the rebate program
18 through a deferral, which is what PGE has proposed in its application. Essentially, the
19 Commission would be making a prudence determination in advance by approving PGE to
20 provide rebates of a specified amount to customers and site hosts for qualified charging
21 equipment. PGE would begin recovering its costs through rates later, after a rate case.

²² Application, p. 60 (“We estimate the total cost of the pilot to be \$4.1M and expect it to generate \$3.5M in revenues from subscriptions and usage charges (10-yr NPV)”).

²³ SB 1547, Section 20(5)(a)(A).

1 The Commission could also approve PGE to earn its authorized rate of return on
2 the value of the rebates that it has provided to customers, similar to the way in which it
3 earns a return on investments in rate base. Again, I am not an attorney, but SB 1547 seems
4 to contemplate a utility earning a return on its transportation electrification programs “in a
5 manner that is similar to the recovery of distribution system investments.”²⁴ I see no reason
6 why PGE should not be incentivized to offer a robust rebate program by earning a
7 reasonable return on the value of these rebates.

8 In addition, as I discussed earlier, PGE has an important role to play in any
9 transportation electrification program by providing the make-ready infrastructure that is
10 often needed to install a new charging station. Providing the make-ready is an activity
11 within the core competencies of a utility and is very similar to other investments that PGE
12 makes in its distribution system. As with other distribution system investments, PGE
13 should be allowed to earn a reasonable return on its investments in the make-ready
14 infrastructure that will be crucial to any successful transportation electrification program.

15 ChargePoint believes that PGE should be incentivized to offer a robust
16 transportation electrification program and rewarded through a return on investment if the
17 program is successful. As I have just discussed, PGE does not need to own and operate its
18 own network of charging stations in order to earn a return on its investments in
19 transportation electrification efforts. A rebate program such as I have described would be
20 in the best interest of EV drivers and PGE’s ratepayers, and could also be structured to be
21 in PGE’s best interests from an investment perspective, as well.

²⁴ *Id.* at 20(5)(a)(B).

1 **Q: What is your opinion of PGE's proposal to use the OCPP 1.6 standard?**

2 A: ChargePoint understands the need for open communication protocols. However, we would
3 recommend that PGE's proposal not mandate the use the OCPP 1.6 standard. There are
4 several reasons why it is not in the best interest of PGE, EVSE vendors, drivers, or site
5 hosts to mandate that specific standard for EV equipment through its program. OCPP is a
6 European standard developed to provide interoperability of networks and hardware in
7 Europe. However, OCPP is not a standard accepted in the U.S. by the industry or developed
8 by a U.S. standards development organization. OCPP has not evolved over the last few
9 years, leaving new advancements in technology and driver interaction outside of the
10 standard. For example, there is a lack of support for load management and demand
11 response capabilities within the OCPP 1.6 standard. Competing standards are being
12 developed in the U.S., under traditional U.S. standards organizations, and PGE should
13 work with the industry on the development of this open standard.

14 Since there are now several ongoing efforts in regards to development of an open
15 standard, it would seem best to seek or require an open standard for communication
16 between charging stations and their management system rather than allow PGE to choose
17 a winner, which is premature this point in time. A critical requirement is for any standard
18 in this area to be developed in an ANSI-recognized Standards Development Organization
19 (SDO), since only such an SDO can ensure the openness, lack of dominance, balance, IP
20 protection, and coordination and harmonization that vendors need to participant and deliver
21 the needed open standards.

22

23

1 **Q: What do you recommend?**

2 A: I recommend that the Commission direct PGE to modify its proposal to expand its Electric
3 Avenue program because the program as currently designed would not stimulate
4 innovation, competition, or customer choice. In fact, I expect that this proposed program
5 would reduce innovation and hamper the competitive EVSE market, to the detriment of
6 PGE's ratepayers and EV drivers. Since PGE would be procuring all of the charging
7 stations from a single provider through an RFP without regard to the needs of the drivers
8 that might visit those stations, the Electric Avenue expansion will undoubtedly reduce,
9 rather than promote, customer choice.

10 I recommend that the Commission provide guidance to PGE for a transportation
11 electrification that would actually promote innovation, competition, and customer choice,
12 such as the charging station rebate model that I described above. The Commission should
13 find that a utility own-and-operate model for EV charging stations is also an unnecessarily
14 risky use of ratepayer funds and an inappropriate encroachment of the monopoly utility
15 business into a competitive market.

16 The Commission should instruct PGE that any transportation electrification
17 program must meet all of the statutory criteria of SB 1547, and encourage PGE to file a
18 new application for a transportation electrification program that meets these criteria and is
19 consistent with its role as a monopoly utility.

20 **III. SMART CHARGING AND TOU RATES PILOTS**

21 **Q: What will you address in this section of your testimony?**

22 A: In this section of my testimony, I will discuss PGE's proposal to create a research and
23 development pilot that will focus on demand response opportunities associated with

1 residential charging so that PGE can explore customer impacts and achievable curtailment
2 from residential charging.

3 **Q: Based on your experience, what do you believe is the most effective way to structure**
4 **a residential TOU rate for EV drivers?**

5 A. Incentivizing charging behavior to take place during off-peak periods through TOU rates
6 can lead to increased utilization of utility assets and avoid the need for additional capacity
7 and grid infrastructure. The TOU rate proposed by PGE would affect the whole house and
8 is one means of incentivizing charging behavior. However, the disadvantage of a “whole-
9 house” TOU rate is that it requires a customer to manage all of the loads on their premises,
10 thereby significantly reducing the number of willing participants. With a whole-house
11 TOU rate, it is also difficult or impossible for the utility to isolate the effect of the TOU
12 rate on EV charging, since customers who can do so will likely manage other loads in
13 response to the TOU rates.

14 EV loads by themselves are often the largest in the premises; however, they are also
15 one of the most flexible in terms of the ability to time-shift and could benefit from a
16 targeted TOU rate to effectively incentivize behavior. “EV-only” TOU rates can be a more
17 precise means of incentivizing charging behaviors than a whole-house TOU rate, and are
18 similarly effective at incentivizing behavior once adopted.

19 **Q: Please explain how PGE could design an EV-only residential TOU rate pilot.**

20 A: The successful implementation of an EV-only TOU rate hinges on being able to accurately
21 measure the energy usage that is solely attributable to charging an EV. This can be achieved
22 through the installation of an additional utility meter, but the upfront costs of secondary
23 meters can be a significant barrier to enrolling customers. However, the additional costs

1 and barriers associated with EV-only TOU rates can be avoided and overcome by
2 leveraging the embedded metrology within connected EV charging stations.

3 ChargePoint recommends that PGE consider pursuing a pilot to test deployment of
4 smart L2 charging stations with embedded metering capabilities. This residential smart
5 charging pilot could confirm the accuracy of the embedded metering and explore different
6 methods to educate and engage with customers. The pilot could also consider testing
7 managed charging or demand response capabilities. PGE should consider how the
8 embedded metrology within connected EV charging stations can allow for residential
9 customers in Oregon to have access to an EV-only TOU rate while avoiding the additional
10 cost of deploying new meters at every charging station.

11 IV. TRIMET PILOT

12 **Q: What will you address in this section of your testimony?**

13 A: In this section of my testimony, I will discuss PGE's proposal to install, own, and manage
14 six electric bus charging stations (five 100-kW depot chargers and one 300-kW en-route
15 charger) for use as part of a mass transit electrification pilot with TriMet.

16 **Q: Do you believe the proposed Electric Mass Transit 2.0 pilot with Tri-Met will
17 stimulate innovation, competition, and customer choice?**

18 A: No. As with the proposed Electric Avenue Network expansion, PGE is proposing to own
19 and operate the charging stations, which will stifle the competitive market for EVSE
20 vendors in Oregon.

21 **Q: Why do you believe that it is not appropriate for PGE to own and operate the bus
22 chargers to be used by TriMet as a part of this pilot proposal?**

1 A: While supporting the electrification of the city's public transportation fleet is admirable,
2 especially considering the positive impact on disadvantaged communities, we see no
3 reason why PGE needs burden its ratepayers with the risk of owning and operating the
4 equipment used to charge these buses. As an alternative to the proposal, we would suggest
5 that PGE fund the installation of the equipment and own and operate all of the utility
6 infrastructure, and ensure that TriMet has the ability choose the charging equipment and
7 network service provider, and decide whether they themselves or a third party would own
8 and operate these stations in a way that is best suited to charge the buses it is purchasing.
9 While this will leave PGE ratepayers some risk that TriMet might abandon its electric
10 buses, it eliminates the risk to the ratepayers of changing technology and/or standards
11 selected by TriMet or its vehicle supplier.

12 PGE may choose to offset some of TriMet's acquisition costs with a nominal rebate,
13 so the overall financials of the program would not change, but PGE should leave the
14 technology risk exposure to TriMet and its vehicle supplier.

15 **Q: What do you recommend?**

16 A: I recommend that the Commission direct PGE to redesign the TriMet pilot such that PGE
17 will only own and operate utility infrastructure and TriMet would own and operate the
18 actual charging stations that are installed through the program. TriMet should be allowed
19 to select the type of chargers that are installed, with PGE providing financial support that
20 can be recovered from ratepayers.

21

22

23

1 **V. CONCLUSION AND RECOMMENDATIONS**

2 **Q: Please summarize your recommendations to the Commission.**

3 A: I recommend that the Commission:

- 4 • Direct PGE to modify its proposal to own and operate its own charging stations and to
- 5 develop its own proprietary network for its proposed Electric Avenue expansion in a
- 6 way that will stimulate innovation, competition, and customer choice in the market for
- 7 EV charging equipment;
- 8 • Encourage PGE to redesign its community charging infrastructure pilot in such a way
- 9 that PGE would provide rebates or other financial incentives to charging station site
- 10 hosts to choose the charging equipment that best suits their needs from a list of pre-
- 11 qualified equipment;
- 12 • Encourage PGE to work with industry on the on-going development of an updated
- 13 American open-source standard, and not require the OCPP 1.6 standard;
- 14 • Recommend that PGE design an “EV-only” TOU pilot using metering already
- 15 embedded in smart chargers, rather than a “whole-house” TOU pilot;
- 16 • Recommend that PGE redesign its proposed pilot program with TriMet such that PGE
- 17 would not own and operate any charging equipment, but would instead provide
- 18 financial support for TriMet to have the choice in charging equipment and the ability
- 19 to choose who will own and operate the stations.

20 **Q: Does this conclude your Reply Testimony?**

21 A: Yes.

DAVID L. PACKARD
406 Seagrove St.
St. Marys, GA 31558
(912) 258-5665
Dave.Packard@ChargePoint.com

PLUG-IN VEHICLE INFRASTRUCTURE EXECUTIVE

Creative senior professional with outstanding industry experience and success in establishing relationships with utility, automaker and municipality stakeholders in the plug-in vehicle marketplace. Experience in recognizing and establishing success based channels and maximizing company exposure. Demonstrated track record of launching new companies and new products with exceptional sales growth and profitability. Strong technical / engineering background.

PROFESSIONAL EXPERIENCE

Vice President, Utility Solutions **ChargePoint, Inc.** **2014-present**
Campbell, CA

Developed a team of industry experts to work with utilities in North America and Europe to develop utility programs enabling the expansion of the electric vehicle market. Worked in conjunction with policy and legislative efforts to ensure subsequent utility investment worked with industry participants to complement the competitive market in developing scalable growth.

President, Founder **ClipperCreek, Inc.** **2006 - 2013**
Auburn, CA

Grew ClipperCreek into the EV Infrastructure market leader by working with regional representatives and distributors to grow market awareness and acceptance. Shaped product development to match the needs of the industry and the stakeholders including automakers and utilities. Drove profitable sales since the company's inception through multiple channels to provide balanced, stable revenues.

- Managed utility relationships and established 4 smart grid pilots to be conducted in 2013 and 2014;
- Established a successful partnership with Delphi to jointly supply automakers with EVSEs (the partnership currently supplies GM and BMW);
- Developed a nationwide network of industry expert representatives who established confidence and recognition in the ClipperCreek brand;
- Used Representative network to raise product awareness and drive sales online;
- Wrote and managed grants from The California Air Resources Board and the California Energy Commission;
- Along with the manufacturers representatives established a network of 25 industry specific and general distributors throughout North America;
- Worked directly with auto dealerships for both direct and referral sales;
- Managed development of marketing collateral including; product brochures, social media and industry show image.

- VP Sales and Marketing Electric Vehicle Infrastructure Inc 1998 – 2005**
Auburn, CA
Full responsibility of Sales and Marketing of the company: Developed a nationwide distributorship made up of some of the countries largest utilities for sales and service of EVI's products. Developed product specifications for a complete line of EV charging safety devices.
- VP Sales and Marketing Advanced Charger Technology 1994 –1998**
Norcross, GA
ACT develops and markets battery-charging products for wireless products.
- Account Manager Parametric Technology Corporation 1993 - 1994**
Waltham, MA
A CAD/CAM company which develops and markets the software product Pro/ENGINEER.
- Vice President American Educators Financial Corporation 1989 - 1993**
Troy, AL
Managed assets for a secondary market life insurer.
- Regional President Patten Corporation 1987 - 1989**
North Adams, MA
A NYSE land development company with 43 offices located across the United States.
- Senior Structures Engineer Lockheed Corporation 1982 - 1987**
Burbank, CA
Defense Contractor for development of the Trident Missile System.
- Education UNIVERSITY OF MASSACHUSETTS 1976 - 1983**
Amherst, MA

Master of Science, Civil Engineering, 1983
Bachelor of Science, Mechanical Engineering, 1980

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OTHER

Board Member: St. Marys, GA Downtown Development Authority, Design Guidelines:
Board Member: Habitat for Humanity of Camden County,
Elder: First Presbyterian Church of St. Marys, GA,