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. <u>INTRODUCTION AND SUMMARY OF RECOMMENDATIONS</u>
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		

1Q:Please describe ChargePoint and ChargePoint's previous involvement in2transportation electrification efforts in Oregon.

A: ChargePoint designs, develops, and deploys home and commercial Level 2 ("L2") and DC Fast Charging ("DCFC") electric vehicle charging stations, software applications, data analytics, and related customer and driver services aimed at creating a robust, scalable, and grid-friendly EV charging ecosystem. Using ChargePoint products and services, our customers operate more than 34,000 Level 2 and DC fast charging locations, including 496 in Oregon. These charging locations have enabled more than 23 million charges and more 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. ChargePoint was one of 16 Lighthouse Activities¹ selected for its innovative and scalable 18 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 Volkswagen to create Express Charging Corridors along both coasts of the United States.² 21

¹ <u>http://unfccc.int/files/press/press releases advisories/application/pdf/mfc press release-</u>

²⁰¹⁵ lighthouse activities.pdf

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

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Q: What is the purpose of your Reply Testimony?

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

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

19 Q: Please summarize your recommendations for the Commission.

20 A: I recommend that the Commission:

Direct PGE to modify its proposal to own and operate its own charging stations and to
 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. <u>ELECTRIC AVENUE NETWORK EXPANSION</u>
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.

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

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While PGE would benefit from its proposed own-and-operate model for EV 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 models that have been introduced by auto manufacturers.⁵ However, it states equipment 15 16 will be "replaced with higher powered equipment as needed over time," which appears to be a total waste of ratepayer funds.⁶ This admission of the expected obsolescence of the 17 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

⁶ Id.

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

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

Q: Do you believe that the proposed Electric Avenue expansion will stimulate innovation, 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.

Again, utility programs should not pick and choose behind-the-meter end-use technologies through the same RFP processes by which they procure commodities at the lowest possible cost. Charging station equipment and services are not commodities and customers will not benefit from this "race to the bottom" approach. An RFP will effectively prohibit competition in the market and limit the availability of innovative products and thus 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).

charging station that will be located on their property, and PGE should not be making this
 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 services related to EV charging. The Yale Center for Business and the Environment 6 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 driver base that the charging station aims to serve."⁸ The wide range of choices in the 10 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.

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

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Another critical set of choices that site hosts benefit from are those around pricing 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 charging on their premise through innovative apps and product offerings, site hosts can 2 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 starting at the second hour to motivate customers to move their vehicles and make the 6 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.

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

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

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

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

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

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

10Q:Do you believe that competing on the price charged to drivers is the type of11competition that the legislature wanted to protect when it required transportation12electrification 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 vehicle charging infrastructure.¹² The history behind HB 4036 suggests that the intent of 20 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, 11. 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

marketplace that fosters consumer choice and innovation among multiple providers. There
is no indication that the competition provision was intended as a blessing for the utilities
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 Locator.¹³ PGE has proposed to add six new ratepayer-subsidized Electric Avenue 10 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

Portland metropolitan area as part of its National Zero Emission Vehicle Investment

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

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

1		Plan ¹⁵ 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
01		already, avists in its service territory

 $^{^{15}\} https://www.epa.gov/sites/production/files/2017-04/documents/nationalzevinvestmentplan.pdf$

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Q:

through an expanded Electric Avenue?

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

What is PGE's stated justification for owning and operating its own charging stations

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.

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

ChargePoint agrees that additional charging stations are critical to accelerating 1 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. While PGE undoubtedly has a role to play in accelerating transportation electrification in 6 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 the 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 accelerate expansion of EV charging and EV adoption in Oregon. In doing this, the utilities' role should be clearly defined and relate to the utilities' core strengths and competencies, such as building distribution facilities. At the same time, the Commission should preclude utilities from engaging in anticompetitive activities and from making unjustified and unnecessary expenditures of ratepayer money. In other words, the Commission should not allow PGE to directly provide services that can be provided more 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.

Utilities do not need to and should not be permitted to leverage ratepayer funds to take over the role currently played by competitive businesses selling EV charging equipment and services. Utilities likewise should not undermine the role of site hosts by dictating the terms under which site hosts will offer EV charging services. Site hosts can and should be allowed to make these investment decisions on their own. A competitive EV charging market is the best means of achieving Oregon's aspirations for economic growth, 1 2 jobs, technology leadership, sustainable transportation, and address the challenge of 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 promotoes 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 they should remain vendor- and technology-neutral in all recommendations. Utilities are 9 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?

No. PGE's proposal eliminates the site host's control of the station and disregards the link 14 . A: 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.

1Q:Would PGE be more likely to achieve its goals for the proposed Electric Avenue2expansion and the goals of transportation electrification generally if it owned and3operated 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 another model, such as the rebate model I suggested earlier. In fact, given that this would 6 largely be a new business venture for PGE (other than its one existing station at its 7 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 rateregulated utility, competitive providers will start gouging customers. However, this 18 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.

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

8 PGE states that "Our vision is that if a customer needs to charge her car to reach her destination, she ought to be able to dependably go to an Electric Avenue site to 'fuel 9 up.¹¹⁸ As seen by the congestion at many Tesla Superchargers,¹⁹ installing more stations 10 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?

A: Yes, I am not an attorney, but my understanding of SB 1547 is that it contemplates that a
 utility's proposal for a transportation electrification program "may include prudent
 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.
10 11	A:	should offer instead of its proposed Electric Avenue own-and-operate model.PGE should consider an alternative program design in which PGE would provide a direct
10 11 12	A:	should offer instead of its proposed Electric Avenue own-and-operate model.PGE should consider an alternative program design in which PGE would provide a directfinancial incentive to site hosts for the purchase and installation of the qualified EVSE
10 11 12 13	A:	 should offer instead of its proposed Electric Avenue own-and-operate model. PGE should consider an alternative program design in which PGE would provide a direct financial incentive to site hosts for the purchase and installation of the qualified EVSE equipment of their choice. PGE can qualify equipment to meet functional capabilities and
10 11 12 13 14	A:	 should offer instead of its proposed Electric Avenue own-and-operate model. PGE should consider an alternative program design in which PGE would provide a direct financial incentive to site hosts for the purchase and installation of the qualified EVSE equipment of their choice. PGE can qualify equipment to meet functional capabilities and provide a list of qualified charging stations to its customers and potential site hosts to
10 11 12 13 14 15	A:	should offer instead of its proposed Electric Avenue own-and-operate model. PGE should consider an alternative program design in which PGE would provide a direct financial incentive to site hosts for the purchase and installation of the qualified EVSE equipment of their choice. PGE can qualify equipment to meet functional capabilities and provide a list of qualified charging stations to its customers and potential site hosts to simplify the learning curve associated with buying, and refueling, an EV. A rebate reduces
10 11 12 13 14 15 16	A:	should offer instead of its proposed Electric Avenue own-and-operate model. PGE should consider an alternative program design in which PGE would provide a direct financial incentive to site hosts for the purchase and installation of the qualified EVSE equipment of their choice. PGE can qualify equipment to meet functional capabilities and provide a list of qualified charging stations to its customers and potential site hosts to simplify the learning curve associated with buying, and refueling, an EV. A rebate reduces the cost barrier to EV adoption, allows the charging station site host to determine which
10 11 12 13 14 15 16 17	A:	should offer instead of its proposed Electric Avenue own-and-operate model. PGE should consider an alternative program design in which PGE would provide a direct financial incentive to site hosts for the purchase and installation of the qualified EVSE equipment of their choice. PGE can qualify equipment to meet functional capabilities and provide a list of qualified charging stations to its customers and potential site hosts to simplify the learning curve associated with buying, and refueling, an EV. A rebate reduces the cost barrier to EV adoption, allows the charging station site host to determine which 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 providing visibility into unplanned EV load growth. This proposal would lower the total 20 cost of ownership of an EV, creating an incentive for utility customers and helping 21

²⁰ SB 1547, Section 20(3). ²¹ SB 1547, Section 20(4)(f).

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

Q: Do you expect that a rebate program would have as big of an impact on accelerating 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 prudency determination later on.

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

A: PGE could recover the costs of providing rebates and administering the rebate program through a deferral, which is what PGE has proposed in its application. Essentially, the Commission would be making a prudency determination in advance by approving PGE to provide rebates of a specified amount to customers and site hosts for qualified charging 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.

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

22

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.

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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 innovation, competition, or customer choice. In fact, I expect that this proposed program 4 5 would reduce innovation and hamper the competitive EVSE market, to the detriment of PGE's ratepayers and EV drivers. Since PGE would be procuring all of the charging 6 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

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

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

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

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	0:	What will you address in this section of your testimony?
13	Δ ·	In this section of my testimony I will discuss PGE's proposal to install own and manage
1.	11.	in this section of my testimony, I will discuss I GE is proposal to instant, 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?

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1 While supporting the electrification of the city's public transportation fleet is admirable, A: 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.

PGE may choose to offset some of TriMet's acquisition costs with a nominal rebate,
so the overall financials of the program would not change, but PGE should leave the
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.

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1		V. <u>CONCLUSION AND RECOMMENDATIONS</u>
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.

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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
Full responsibility of Sales and distributorship made up of so products. Developed product	nd Marketing of the company: Developed a nationwing of the countries largest utilities for sales and ser to be countries largest utilities for sales and ser ct specifications for a complete line of EV charging sa	ide vice of EVI's afety devices.
VP Sales and Marketing Norcross, GA	Advanced Charger Technology	1994 –1998
ACT develops and markets I	battery-charging products for wireless products.	
Account Manager Waltham, MA	Parametric Technology Corporation	1993 - 1994
A CAD/CAM company which	n develops and markets the software product Pro/EN	GINEER.
Vice PresidentAmTroy, AL	erican Educators Financial Corporation	1989 - 1993
Managed assets for a secon	dary market life insurer.	
Regional President North Adams, MA	Patten Corporation	1987 - 1989
A NYSE land development of	company with 43 offices located across the United St	ates.
Senior Structures Enginee Burbank, CA	r Lockheed Corporation	1982 - 1987
Defense Contractor for deve	lopment of the Trident Missile System.	
Education Amherst, MA	UNIVERSITY OF MASSACHUSETTS	1976 - 1983
Master of Science, Civil Eng Bachelor of Science, Mecha	ineering, 1983 nical Engineering, 1980	

PUBLISHED PAPER

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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,