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September 4, 2020

VIA ELECTRONIC MAIL

Aida Camacho-Welch, Secretary
Board of Public Utilities
44 South Clinton Ave., 9th Floor
Trenton, New Jersey 08625

Re: BPU Docket No. EO18101111

Dear Secretary Camacho-Welch:

Please find enclosed for filing the Direct Testimony of Joshua J. Cohen on behalf of Zeco Systems Inc. d/b/a Greenlots, with attached exhibits, in BPU Docket No. EO18101111, *In the Matter of the Petition of Public Service Electric and Gas Company for Approval of its Clean Energy Future- Electric Vehicle and Energy Storage ("CEF-EVES") Program on a Regulated Basis*.

Thank you, please confirm receipt and feel free to contact me with any questions or concerns.

Respectfully submitted,

/s/ Nathan Howe

Nathan Howe

Enclosures

Cc: See attached service list

STATE OF NEW JERSEY

BEFORE THE BOARD OF PUBLIC UTILITIES

In the Matter of the Petition of Public Service Electric and Gas Company for Approval of its Clean Energy Future-Electric Vehicle and Energy Storage ("CEF-EVES") Program on a Regulated Basis	))))))	BPU Docket No: EO18101111

CERTIFICATION OF SERVICE

I hereby certify that copies of the foregoing Direct Testimony of Joshua J. Cohen was served via electronic mail on this day, September 4, 2020, to all individuals and entities as provided on the attached service list.

*/s/ Nathan Howe*_____

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Dated: September 4, 2020

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STATE OF NEW JERSEY

BEFORE THE BOARD OF PUBLIC UTILITIES

In the Matter of the Petition of	)	
Public Service Electric and Gas	)	
Company for Approval of its	)	BPU Docket No.
Clean Energy Future-Electric	)	EO18101111
Vehicle and Energy Storage	)	
("CEF-EVES") Program on a	)	
Regulated Basis	)	

DIRECT TESTIMONY OF JOSHUA J. COHEN

ON BEHALF OF

ZECO SYSTEMS INC. D/B/A/ GREENLOTS

September 4, 2020

I. INTRODUCTION

Q. Please state your name, position, and business address.

A. My name is Joshua J. Cohen. I am Director of Policy for Zeco Systems, Inc. d/b/a Greenlots ("Greenlots"). Greenlots' principal place of business is located at 767 S. Alameda Street, Second Floor, Los Angeles, CA, 90021. I currently work remotely at my home office in Maryland.

Q. Please briefly summarize Greenlots.

A. Headquartered in California, Greenlots is a leading provider of electric vehicle ("EV") charging software and services committed to accelerating transportation electrification in New Jersey and beyond. The Greenlots network supports a significant percentage of the DC fast charging infrastructure in North America, and an increasing percentage of the Level 2 infrastructure. Greenlots' smart charging solutions are built around an open standards-based focus on future-proofing while helping site hosts, utilities, and grid operators manage dynamic EV charging loads and respond to local and system conditions. Greenlots is helping accelerate the electric mobility future through the delivery of innovative software and services to empower cities, utilities, automakers, fleets, and many others to deploy EV charging infrastructure at scale. The Greenlots footprint spans 13 countries. Greenlots frequently engages in EV regulatory and stakeholder processes and in the deployment of utility and non-utility EV charging infrastructure and programs across many jurisdictions in North America. In 2019 Greenlots was acquired by Shell New Energies.

Q. Please describe your duties as Director of Policy for Greenlots.

A. I lead policy and regulatory engagement in New Jersey and a number of other states in the eastern U.S. In this capacity I participate in regulatory and legislative proceedings, industry conferences and stakeholder discussions with the goal of advancing outcomes that accelerate EV adoption, grow the market for EV charging, and add value through the application of technology-based managed charging.

Q. Please describe your educational background and professional experience.

A. I have more than twenty years of experience as a leader in policy and communications in both the private and public sectors with a professional focus on electric transportation and clean energy. I hold a Bachelor of Arts in Economics from the University of Maryland College Park, and I am currently pursuing a Master of Science in Energy Policy and Climate from Johns Hopkins University. I joined Greenlots as Director of Policy in July, 2019. Prior to joining Greenlots, I was the founder and principal of Polity Partners Consulting in Annapolis, Maryland, where I focused on clean energy policy advocacy, stakeholder engagement and business development for clients in the electric vehicle charging and renewable energy development industries. I hosted an independent podcast, *More Power to You*, which focused on the policy, political and market developments shaping the clean energy economy. I also have extensive experience working in federal, state, and municipal government. From 2015-2017, I served as Deputy Administrator of the USDA Rural Utility Service which financed billions of dollars annually in energy, broadband, and water and sewer projects in rural communities. From 2013-2015, I was the Chief Administrative Officer at the Maryland Department of General Services where

I supervised legislative affairs, fiscal services, human resources, sustainability, and communications for Maryland's procurement and facilities management agency. Finally, my experience in local government includes a four-year term as Mayor of Annapolis, Maryland from 2009-2013 and service as Vice-Chair of the Baltimore Regional Transportation Board.

Q. What is the purpose of your testimony in this proceeding?

A. The purpose of my testimony is to: (1) discuss the benefits of Public Service Electric & Gas Company ("PSE&G" or "the Company")'s Clean Energy Future-Electric Vehicle and Energy Storage Program ("CEF-EVES Program") as submitted on October 11, 2018; (2) provide facts and information relating to the EV charging landscape and marketplace; and (3) support Greenlots' recommendation that the Board of Public Utilities (the "Board" or "BPU") approve PSE&G's proposed CEF-EVES Program.

Greenlots' testimony focuses solely on the electric vehicle aspects of the filing, and not the energy storage aspects.[1]

Q. Are you sponsoring any attachments in this proceeding?

A. Yes. I am sponsoring the following attachments to my direct testimony:

- Attachment JJC-1 - *Emerging Best Practices for Electric Vehicle Charging Infrastructure* prepared in October 2017 by Dale Hall and Nic Lutsey of the International Council on Clean Transportation

[1] For consistency and ease of use, however, the testimony references the CEF-EVES Program by its full name throughout.

- Attachment JJC-2 - *Electric Vehicles are Driving Electric Rates Down* prepared in February 2019 by Jason Frost, Melissa Whited, and Avi Allison of Synapse Energy Economics, Inc.

- Attachment JJC-3 - *Driving Out Pollution: How Utilities Can Accelerate the Market for Electric Vehicles* prepared in June 2016 by Max Baumhefner, Roland Hwang and Pierre Bull of Natural Resources Defense Council.

- Attachment JJC-4 - *Electric Vehicle Benefits for New Jersey* prepared in April 2019 by the Union of Concerned Scientists

- Attachment JJC-5 – *Electric Vehicles in New Jersey – Costs and Benefits* published on January 26, 2018 for ChargEVC by Gabel Associates, Inc. and Energy Initiatives Group, LLC.

- Attachment JJC-6 – *Clean Air Future: Health and Climate Benefits of Zero Emission Vehicles* prepared in October 2016 by the American Lung Association.

- Attachment JJC-7 – Reply Comments of Greenlots, *In re Investigation into Electric Vehicle Charging Services*, PUCO Case No. 20-434-EL-COI (April 7, 2020).

- Attachment JJC-8 – Staff Briefing Papers, *In re Matter of Otter Tail Power Company's Request for Approval of Electric Vehicle Charging and Infrastructure Programs*, MPUC Docket No. E017/M-20-181 (Aug. 27, 2020).

Q. Are you sponsoring any work papers in this proceeding?

A. No.

Q. Were all of the attachments prepared or assembled by you or under your direction?

A. Yes.

II. PSE&G'S CEF-EVES PROGRAM AND THE EV CHARGING LANDSCAPE

Q. Please summarize PSE&G's proposed CEF-EVES Program.

A. PSE&G's proposed CEF-EVES Program comprises four offerings designed to take a portfolio approach to accelerate electrification across multiple customer segments and use cases:

1. Residential Smart Charging (Offering 1): $93 million

- PSE&G will pay for equipment and installation for company-qualified, customer-selected smart charging stations, with the incentive capped at $2,000 total per installation. PSE&G has a goal of 37,000 installations over the six-year program.

2. Mixed-Use Level 2 Charging (Offering 2): $39 million

- PSE&G will pay for make-ready and offer rebates for smart Level 2 ("L2") units that are pre-qualified by PSE&G and selected by the customer. PSE&G intends to offer 2,200 rebates for smart L2 charging stations at 600 locations, with rebates capped as follows:
    - Multi-family: 80%
    - Local government: 60%
    - Other public entity: 40%
    - Other private entity: 20%.

3. Public DC Fast Charging (Offering 3): $45 million

- PSE&G is proposing a public fast charging program with an estimated 450 Direct Current Fast Charging ("DCFC") units at 150 locations.
- PSE&G is proposing two ownership models: third-party ownership of fast charging stations that are pre-qualified by PSE&G and selected by the third party; and, for locations where the private market is not stepping in, the Company will own and operate. Under both models, PSE&G proposes to install and own the make-ready up to the charging stub which will include a new, separately metered service connection.
- For the third-party ownership model, PSE&G will rebate 80% of the installation and charging station cost for public entities and 40% of the cost for non-public entities.
- PSE&G proposes to offer third-party hosts a monthly rebate for five years to cover the difference between the effective fast charging cost per kWh of electricity and PSE&G's target rate determined by multiple factors including "market dynamics affecting local customer electric rates and local DC Fast Charging economics."[2]
- PSE&G will also select five sites to deploy integrated energy storage, with a primary goal of enabling fast charging in locations where adequate utility service is not feasible.

4. Vehicle Innovation (Offering 4): $45 million
   - PSE&G is proposing to provide grants to school districts for 102 electric school buses, make ready and charging equipment. Each grant will be $300,000 per bus.

[2] CEF-EVES Program at P. 23.

- PSE&G is also proposing $2 million annually for competitively solicited, innovative, and customized medium and heavy-duty electrification projects, likely at ports and airports.

The CEF-EVES Program also includes cross-subprogram investment of $22 million that covers IT, education and outreach across all four offerings.

Q. Does Greenlots support PSE&G's proposed CEF-EVES Program?

A. Greenlots strongly supports the portfolio of EV offerings in PSE&G's CEF-EVES Program and recommends approval, although Greenlots believes that increasing the overall size and scale of the program will amplify the many benefits described below in this testimony and by other parties, and increase the likelihood of New Jersey achieving its electrification targets. More specifically, Greenlots further recommends modifying Offering 3 to allow, and indeed, encourage Company ownership of DCFC units throughout the duration of the Program, rather than limiting Company ownership as proposed in the initial filing. With this recommended change, Greenlots considers the proposed CEF-EVES Program offerings to be needed, prudent and targeted utility investment that will have a significant beneficial impact in accelerating both the adoption of electric vehicles and the market for EV charging infrastructure products and services, applying downward pressure to rates for all utility customers, and more broadly supporting the growth and modernization of New Jersey's economy. The offerings are effectively designed to support consumers in realizing the benefits of EVs, efficiently integrate EV load into the grid, and reduce persistent barriers to EV adoption.

Additionally, the Board should approve PSE&G'S CEF-EVES Program because it is in the public interest, will meet a need regarding the advancement of EVs in New Jersey that is not being met by the private EV charging market, will support the development of the private EV charging market – including products and services, will meaningfully increase charging options for EV drivers, will support load management strategies, and will be used and useful.

Q. Please discuss the benefits associated with transportation electrification.

A. Transportation electrification represents likely the single greatest opportunity to increase and optimize the utilization of the electric grid to the benefit of all ratepayers, while also reducing emissions and air pollution and delivering significant economic development and cost savings benefits to the state.

More EVs charging on the grid increases electric load, which in turn spreads out fixed system costs across greater usage of electricity, thereby applying downward pressure to rates for all ratepayers, not just EV drivers. A recent analysis by Synapse Energy Economics examined costs and benefits associated with utility support of transportation electrification from 2012 through 2017 by two large investor-owned utilities, Pacific Gas & Electric and Southern California Edison. The study found that those two utilities' transportation electrification programs realized in excess of $500 million in direct revenues, not including broader societal benefits, far in excess of the total costs associated with the programs. *See* Attachment JJC-2 at 4; *see also* Attachment JJC-3 at

6, 9, 13 for further analysis on how widespread EV charging can benefit all utility customers.

It is widely understood that electrification of transportation reduces emissions and improves health outcomes. The Union of Concerned Scientists (UCS), a non-profit and non-partisan research organization, compared emissions from gas-powered vehicles and electric vehicles in New Jersey by examining several factors such as upstream emissions, electricity generation and transmission loss. Even after factoring in the aggregated emissions that go into producing the electricity an EV consumes, UCS found that a typical EV in New Jersey emits less than one-third the carbon dioxide than a new gas-powered vehicle — 1.5 metric tons of CO_2 compared to 4.9 metric tons. *See* Attachment JJC-4 at 2. This gap will only increase as New Jersey's coming offshore wind developments and other carbon-free generation facilities come online.

These reductions in pollution and emissions translate to significant health and climate-related benefits for New Jersey. The American Lung Association quantified the monetary impact of transitioning New Jersey's fleet to primarily zero-emission vehicles by 2050, and projected the net benefits to be $4.1 billion annually. Attachment JJC-6 at 14.

The cost savings are significant as well. UCS found that an EV driver in New Jersey who charges up at home pays the equivalent of $1.37 per gallon, compared to an average statewide fuel price of $2.54 per gallon as of 2019. *Id.* Moreover, rural drivers stand to gain the most – more than $575 annually compared to operating a gas vehicle. *Id.; see also* Attachment JJC-1 at 10-11, 13-14. These savings that result from income not spent on fueling internal combustion engines "represent enhanced disposable income that will

have a multiplier effect on the economy when spent on other goods and services." Attachment JJC-5 at 57.

The economic value of the clean energy economy is already widely understood in New Jersey. Indeed, the Board has taken strong action previously to establish regulatory frameworks that support the growth of the solar industry and—more recently—the offshore wind industry. Similar actions by the Board can position New Jersey to prepare and transition its transportation economy for the 21st century and enable the state's workers to both support and benefit from electrification.

While most research about the economic and job-related benefits of TE are national in their scope, Advanced Energy Economy recently published an in-depth analysis of the TE supply chain potential next door to New Jersey in Pennsylvania. The study identified hundreds of businesses that could immediately be retooled to supply the EV market, and hundreds more that could transition with relatively minimal time and investment. Importantly, however, the study also found that "to spur the transition to EVs and start putting [people] to work, regulatory and legislative action is needed to encourage EV deployment in the state and address one of the major barriers to EV adoption: a lack of available charging infrastructure."[3]

Greenlots strongly encourages the Board to recognize that these many benefits of transportation electrification – grid optimization, downward pressure to rates, emissions and pollution reduction, and jobs and economic development – will not happen

[3] Advanced Energy Economy (June 8, 2020), A Supply Chain is Growing for Electric Transportation. Here's What It Could Do for One State, available at: https://blog.aee.net/a-supply-chain-is-growing-for-electric-transportation.-heres-what-it-could-do-for-one-state.

automatically, however. These benefits will require thoughtful and deliberate planning and programs to realize, especially if the state seeks to maximize the value of this opportunity for New Jerseyans. PSE&G's CEF-EVES Program, by addressing significant barriers to widespread transportation electrification in New Jersey, including a lack of accessible charging infrastructure, high upfront infrastructure costs and a lack of consumer awareness, is therefore both appropriate and necessary.

Q. Why is PSE&G's proposed CEF-EVES Program important for New Jersey?

A. PSE&G's proposed offerings represent a well-designed portfolio of targeted offerings to accelerate transportation electrification, gain learnings to further inform PSE&G's and other utilities' future offerings, and leverage the Company's core competencies and ability to help support and grow the market to the benefit of all utility customers. In fact, Greenlots finds that the major shortcoming of the proposed CEF-EVES Program is that PSE&G limits its ability to own and operate public DCFC units, which will limit and delay the full potential benefit this Program has to offer. Greenlots' comments address this more fully below.

The CEF-EVES Program is particularly beneficial for New Jersey in light of the state's bold goals for electrification. Specifically, S.2252 (January 9, 2020) – the electric vehicle bill enacted by the legislature and signed into law by Governor Murphy earlier this year – and the Board's Energy Master Plan together chart an ambitious path forward for the state to electrify its transportation sector. Some of the key goals and, notably, statutory commitments contained in these documents include:

- EVs: a commitment to at least 330,000 light-duty EVs on the road by the end of 2025; at least 2 million EVs by end of 2035; and EVs comprising 85% of registered vehicles by 2040; and
- Public charging: 400 DC fast charging stations at 200 locations, and 1,000 Level 2 charging stations by 2025 including a multi-family requirement

The state's EV commitment is an enormous twelve-fold increase from the 26,580 EVs that had been sold in New Jersey by the end of 2018. *See* Attachment JJC-4. The state's public charging commitment is similarly bold for a state that, as of November 2019 ranked 35th in the number of public charging stations per capita.[4] Indeed, as of the date this testimony was submitted, New Jersey had only 64 public, non-proprietary DC fast charging stations, which are the more costly and challenging stations to deploy.[5]

Greenlots commends New Jersey for its bold electrification goals which, while ambitious, are achievable if the state leverages electric utility filings such as the CEF-EVES Program. Indeed, Greenlots views the Program as critically important to help the state achieve its goals and realize the many benefits that electrification has to offer.

[4] Internal calculations based on https://autoalliance.org/in-your-state/NJ/ and Atlas EV Hub. Retrieved November 25, 2019 from https://www.atlasevhub.com/materials/market-data.

[5] *See* U.s. Department of Energy; Energy Efficiency & Renewable Energy; Alternative Fuels Data Center – Electric Vehicle Charging Station Locations, available at https://afdc.energy.gov/fuels/electricity_locations.html#/analyze ?fuel=ELEC&region=US-NJ&ev_levels=dc_fast&ev_connectors=J1772COMBO&ev_connectors=CHADEMO.

Q. Please discuss how market barriers to the adoption of EVs and the development of EV charging infrastructure and stations warrants investment by the local electric utility.

A. As noted above, New Jersey lags behind its counter-parts both nationally and in the Mid-Atlantic when it comes to availability of public charging infrastructure. This relative lack of public charging infrastructure in New Jersey makes it quite clear that the private market has failed to adequately support the current EV market, let alone what will be needed to support and maximize future growth and associated benefits. Indeed, one of the most significant and challenging barriers to increased EV adoption is the lack of adequate charging stations, particularly public charging. *See* Attachment JJC-5 at 34, 36; *see also* Attachment JJC-3 at 7-8. It is critical to understand this fundamental link between charging station visibility, availability, and EV adoption, as it can both confine and slow EV adoption when scarce, or act as a market and EV adoption accelerator when prominently and readily available.

Many consumers disqualify EVs from their purchasing/leasing considerations due to the lack of charging infrastructure and the resulting concern commonly referred to as "range anxiety." *See* Attachment JJC-3 at 7-8. This specific concern and the lack of public charging infrastructure is consistently cited by drivers as a primary barrier to EV adoption. *Id.* While the market is now seeing more EVs with longer ranges, many currently deployed EVs have batteries that can only support local driving, compounding this issue. Even as EVs with 200+ mile ranges become standard, this will put increased pressure on DCFC infrastructure both along corridors and in urban areas. While the

business models for deployment and operation of both L2 and DCFC stations are challenging, the latter has particularly high costs to develop and is arguably the most challenging business model.

With the lens pulled out, this lack of charging infrastructure which in turn hinders EV adoption is a classic market failure that warrants public investment and the involvement of regulated utilities. Unfortunately, a sustainable, competitive market in the deployment of public charging infrastructure remains aspirational at this time, and it is unlikely to arise prior to the adoption of a critical mass of electric vehicles. This is primarily due to a lack of a sustainable private market business model for the ownership and operation of public charging stations based on revenues from charging activities. While some property owners who install charging stations may do so as an amenity to attract customers whose primary expenditure is not the charging session but rather the purchas of in a convenient store, for example, even the increase in gross receipts attributable to non-charging related activies remains largely inadequate to cover the costs of installation and operation of the charging infrastructure and stations. This has thus far resulted in a fundamentally inadequate amount of private investment in such charging infrastructure. The unfortunate result is that fundamental economics simply don’t support sufficient private investment to adequately grow the infrastructure market to support current and future drivers and their adoption decisions.

While there is market competition between a relatively small but expanding field of sellers of EV charging products and services to motivated investors/site hosts in some

market segments, such as residential and business Level 2 charging, those motivated buyers are relatively few and far between. Those that are participating in the market are often at a small scale that lacks the value of wholesale-level procurment, and for public charging there is not a competitive market for offering these services directly to drivers. This void persists despite significant private investment in technology companies engaged in supporting transportation electrification. Per basic economic theory, no number of competitive suppliers/producers results in a competitive market in the absence of a sufficiently large number of consumers or motivated buyers. So, while there may not be a sufficient volume of EV drivers on the road today to meet this condition, utility investment in charging infrastructure will directly help accelerate EV adoption and, by extension, the health and growth of the market.

As Greenlots noted in its Comments on the Straw Proposal, the electric utility is uniquely positioned to advance the market past these barriers and accelerate the market across a number of key customer segments, supporting competition, improving the environment for private investment, and – notably – serving as a market transformer.[6] In this manner, Greenlots agrees with the inclusive and flexible role the Washington Utilities and Transportation Commission ("UTC") envisions for utilities, as expressed in its seminal Policy Statement. This view is so salient because it is firmly rooted in a clear understanding of the state of the EV market which even today remains an emerging technology. In its Policy Statement, the UTC wrote:

[6] *See* Comments by Greenlots, *In re Straw Proposal on Electric Vehicle Infrastructure Build Out*, BPU Docket No. QO20050357, at pp. 2-6 (submitted Jun. 17, 2020) ("Greenlots Straw Proposal Comments").

> "Market transformation is the process of getting these new products to a wider audience, removing market barriers, and exploiting opportunities to make the new market mainstream. For energy efficiency technologies, this is done through programs promoting the product and voluntary efficiency standards. The ultimate goal of market transformation is for the product to become accepted by the general public and adopted into codes and standards.
>
> The challenge facing the expansion of EVs is similar to the challenge facing energy efficiency technologies before market transformation…there are three main barriers to additional adoption of EVs: price, range and charging availability, and low consumer awareness. *Charging availability and consumer awareness, in particular, are barriers that electric utilities are naturally positioned to address.*" (emphasis added)[7]

Indeed, when considering the right role for the utility in a broader market context, it is necessary to differentiate between a mature, profitable private market and a nascent, largely pre-profit market that is still in the "emerging technology" stage described by the UTC. Regulatory guiderails that may be appropriate and warranted for a mature market may be inappropriate, and indeed, detrimental for a nascent market. New Jersey's market, which the Straw Proposal recognizes as "in the early days of EV adoption," cannot

[7] Policy and Interpretive Statement Concerning Commission Regulation of Electric Vehicle Charging Services, *In re Rules in WAC 480-100 Rulemaking to Consider Policy Issues Related to Electric Vehicle Supply Equipment*, WUTC Docket UE-160799, at 29-30 (Issued June 14, 2017) ("UTC Policy Statement"), *available at* https://www.utc.wa.gov/docs/Pages/ElectricVehicleSupplyEquipment,DocketUT-160799.aspx.

realistically be viewed as competitive, if by 'competitive' one means 'profitable.'[8] Despite the enormous value that transportation electrification writ large offers to the grid and ratepayers, as a stand-alone commercial enterprise it remains generally unprofitable to deploy, own and operate EV infrastructure and charging stations today.

Q. Is Greenlots concerned that PSE&G's proposed ownership of charging infrastructure will hinder the development of the private market?

A. No. PSE&G has designed its Public DC Fast Charging offering to include utility ownership of make-ready up to and including the charging stub, and, under certain circumstances, a Utility Ownership Model for the charging station itself. This represents a modest, market-seeding, foundational network of public fast charging infrastructure that comprises a small percentage of what will be required in the coming years in a market segment not adequately served by the private market. Importantly, PSE&G has designed this offering to leverage some of the core competencies of the utility with respect to ownership and maintenance of widely-dispersed, long-lived electricity-dispensing and metering equipment, and ensuring the safety and reliability of those assets, providing a key value and market-supporting function that is otherwise in short supply. Indeed, Greenlots' concern is not that the Company's proposed ownership of infrastructure will hinder the development of the private market, but rather the Program is too restrictive when it comes to allowing Company ownership.

[8] Final Straw Proposal, *In re Straw Proposal on Electric Vehicle Infrastructure Build Out*, BPU Docket No. QO20050357, at p. 12 (issued May 18, 2020).

Q. Please explain why utility ownership of charging infrastructure, including charging stations, will help support the private, competitive market.

A. It is important to note that the EV charging industry encompasses companies with a diversity of business models, products and services. This is not a one-dimensional market. Some companies own and operate the charging stations; others sell stations and/or software to site hosts which then own and operate them; and others may do some aspects of both. Utility procurement, ownership and operation of charging infrastructure and stations is vital to support competition in the industry and grow the market.

Although it has been almost a decade since the first Nissan Leafs and Chevy Volts rolled off assembly lines and into dealer showrooms, much of the relatively modest amount of charging infrastructure deployed today is often not consistently reliable or available. Utility programs by and large can extend the same type of reliability to EV charging infrastructure that customers expect for all other utility services. The cost associated with keeping equipment up and running and repairing or replacing it quickly, if and when it encounters an issue, is an often undervalued aspect of the EV charging equipment and services market. While early adopters of EVs may tolerate reliability limitations, I do not believe the coming market of mass adopters will. Moreover, as the demands on EVSE deployments increase with more EV drivers on the road, many of the factors that lead to poor reliability may compound. This therefore represents a key barrier to widespread transportation electrification. To achieve the level of reliability drivers currently experience from traditional fueling stations, much more needs to be done. Utility ownership offers opportunity for electric vehicle service providers to benefit from a more

accurately valued maintenance service that will not only improve reliability of EVSE within the utility program, but will likely extend beyond the bounds of the program to benefit EV charging equipment and service providers in the market as a whole.

On a broader level, utility procurement and ownership of charging infrastructure, including charging stations, should also not be confused for anti-competitive behavior. Rather, I expect that by growing the installed fleet of charging stations, utility investment and ownership will help spark EV purchasing decisions, accelerate adoption and grow the total customer base. This will advance the market closer to an inflection point where asset utilization rates of charging stations can attract greater private investment to sustain a healthy, competitive future market.

Greenlots addressed this notion of competition in a recent investigation before the Public Utilities Commission of Ohio ("PUCO"):

> "Currently, competition exists in a largely pre-profit market, but that competition is largely competition for market share, competition to offer leading technology and services, and competition for site hosts and locations. It is not competition in the sense that EV charging companies are competing for a share of the net profits. In this current EV charging ecosystem there are very few profitable actors: installers, some value-added resellers (VARs), some consultants, and – notably – regulated, investor-

owned utilities following regulatory approval, precisely because they can earn a reasonable and just rate of return on their investment."[9]

Greenlots further expanded on this perspective in its Comments on the BPU's EV Infrastructure Ecosystem 2020 Straw Proposal:

> Put simply, the appropriate utility role in a nascent, emerging market may look very different than an appropriate utility role in a mature market. Far from harming the EV charging market in New Jersey, Greenlots firmly believes that utility investment in charging—including ownership of charging stations—will increase EV adoption. This will in turn will increase demand for charging stations and services, thereby supporting the growth and maturation of the private competitive market. In this way, utilities can fulfill their role as market transformers, as envisioned by the Washington UTC.[10]

Utility ownership of charging infrastructure, including charging stations, further provides important opportunities for suppliers in the absence of a critical mass of other motivated buyers across these market segments, incentivizing competition and product innovation through utility procurement programs. Beyond direct utility procurement, other market participants benefit from improved economics associated with investing in charging

[9] *In the Matter of the Commission's Investigation into Electric Vehicle Charging Service in this State*, PUCO Case No. 20-434-EL-COI, Reply Comments of Greenlots (April 7, 2020) at 2-3, provided as Attachment JJC-7.

[10] Greenlots Straw Proposal Comments at p. 5.

infrastructure, as the utility investment accelerates EV adoption, thereby increasing utilization of non-utility infrastructure.

Importantly, for PSE&G's proposed Utility Ownership Model, the Company will bill drivers "according to a flexible pricing structure that is in line with local market fast charging rates." CEF-EVES Program at p. 22. This will ensure that utility-owned stations do not undercut privately-owned stations. I would note, however, that PSE&G and the Board should be cognizant that rates charged to drivers across the state should still provide for an adequate level of fuel cost savings relative to gasoline, as this is a primary motivator for EV purchase decisions. Indeed, utility investment results in increased opportunities for all market participants, importantly positioning utility investment – including utility ownership – as a market catalyst, rather than a market constraint.

Q. In what other ways does utility procurement of charging infrastructure hardware and software promote competition in the private market and benefit customers?

A. There is a prevalent and inaccurate view of the market for EV charging products and services that competition exists only at the retail level, where naturally-occurring market opportunities are limited. In fact, the wholesale-level competition that is tied to utility procurement, which introduces a significant, motivated and sophisticated buyer to a market that generally otherwise lacks one, represents the purest form of competition in today's market, based on product features, price, service, etc. This allows different types of players, regardless of size or market position to compete on a leveled playing field. Additionally, wholesale-level competition that results from utility procurement is

significantly more powerful in driving down program and equipment costs, due to purchasing in bulk rather than via individual retail transactions. A focus only on the retail or third-party market for charging stations historically has led to less sophisticated purchasing and planning decisions by customers with little technical knowledge or meaningful negotiating leverage.

Greenlots notes that these benefits of utility procurement and selection of charging station hardware and software are applicable both to scenarios in which the utility directly owns the charging station and scenarios in which a third-party customer or site host participating in the utility program owns the charging station.

Greenlots encourages stakeholders to look beyond the ideology that there is only one form of market competition, i.e. retail-focused, or place where it can develop. By allowing for both third-party ownership and wholesale competition for utility ownership by PSE&G – particularly if the CEF-EVES Program is modified to enable utility ownership at the outset – the Program would provide a diverse set of opportunities for market participants, and in growing the market, increase charging options for EV drivers.

Indeed, as noted above, Greenlots believes the Program's Public DC Fast Charging offering will benefit significantly by establishing the Utility Ownership Model at the outset of the program, rather solely as a "backstop" as envisioned in the initial filing. Enabling utility ownership will avoid slowing down EV adoption by relying solely on

third-party, private providers to step in and own and operate charging stations during the initial ramp-up of the Program.

Greenlots notes that PSE&G first filed its petition for approval of the CEF-EVES Program in 2018, but according to the approved Procedural Schedule in this docket, the earliest the Company could begin implementing the CEF-EVES Program will likely be in 2021. It follows that the earliest the Utility Ownership Model would be implemented would likely be 2022 or 2023 – an unnecessary and counterproductive delay for the state to leverage utility ownership to accelerate the market.

Q. How have other states reacted to the concept of utility ownership of charging infrastructure?

A. The value and market need for utility ownership is becoming increasingly understood by the stakeholder community and regulators. For example, last year in Maryland, in the Public Service Commission's Order approving a statewide portfolio of utility investment programs in EV charging infrastructure, it found that:

> …where private companies have been unable or unwilling to make initial capital investments in difficult and underserved areas, utility ownership can help reach these market segments faster.
>
> The Commission finds that the Utilities have resources, electrical connectivity, and the technical bandwidth within their service territories to address emerging challenges impacting the grid as a result of EV charging

on a mass scale. The Utilities can also leverage their customer relationships to educate and advertise EV ownership to potential buyers. Furthermore, the Utilities will also be responsible for ensuring that public charging stations are working and maintained in good working order. [11]

Last month, the Minnesota Public Utilities Commission approved Otter Tail Power's proposal to "own and operate a backbone fast charging network for its service territory, including the DC Fast Chargers." Attachment JJC-8 at page 4. Otter Tail Power's proposal is designed to ensure that 97% of its customers are within 30 miles of a DCFC station, and 100% are within 60 miles.

Last year, the Minnesota Public Utilities Commission also approved Xcel Energy's ("Xcel") $14.4 million proposal for a utility-owned fleet EV charging pilot. Xcel proposed to install, own and maintain the service connection and infrastructure costs, and, if requested by a participant, the charging stations as well.[12] The Commission found that the pilot advances the "goal of increasing transportation electrification in a manner that reasonably limits potential rate impacts, while presenting an opportunity for ratepayers and the public to benefit," and it approved Xcel's recovery request totaling $1.894 million in EV service connection costs; $9.853 million in EV supply

[11] Order No. 88997, MPSC Case No. 9478 at p. 63 (issued Jan. 14, 2019), available at https://www.psc.state.md.us/order-no-88997-case-no-9478-ev-portfolio-order/.

[12] Petition of Xcel Energy, *In re Matter of Xcel Energy's Petition for Approval of Electric Vehicle Pilot Programs*, MPUC Docket No. E-002/M-18-643 (filed Oct. 12, 2018). Both the order and Petition of Xcel are available online at https://www.edockets.state.mn.us/EFiling/edockets.

infrastructure and charging equipment costs; $575,000 for installation management; and $2.073 million in advisory services, outreach, program management and IT costs.[13]

Other examples include Avista Utilities in Washington State, Duke Energy in Florida, Pacific Gas & Electric (PG&E) in California, Pacific Power in Oregon, Portland General Electric (PGE) in Oregon and Puget Sound Energy in Washington.

Q. Please discuss how the CEF-EVES Program's Residential Smart Charging offering can help manage load and enhance and maximize grid and ratepayer benefits.

A. The proposed Residential Smart Charging program will leverage smart charging stations and financial incentives to encourage customers to charge during off-peak hours. By sending price signals, drivers can be incentivized to charge off-peak, when electricity is more plentiful and inexpensive. The Company further intends to leverage the data and experience its gains from customer participation in this offering to "evaluate the need for and design of a potential rate structure that could be implemented in the future to serve EV customers." CEF-EVES Program at p. 38. The development of rates that more accurately align the price of electricity to its cost helps shape EV load to reflect local or grid constraints and realities. Shaping load in this way is essential to align the increased electrification of transportation with the interests of the grid and the broader public.

[13] Order, *In re Matter of Xcel Energy's Petition for Approval of Electric Vehicle Pilot Programs*, MPUC Docket No. E-002/M-18-643 (issued July 17, 2019)

Q. How can PSE&G amplify the benefits of its smart charging offerings?

A. Greenlots views static TOU rates as envisioned by this filing as an often appropriate first step to deliver price signals to drivers, especially at low levels of EV market penetration. While beneficial, however, static rates are often a rather blunt approach whose value can be amplified through the use of smart technology. These smart charging strategies that leverage real-time or dynamic pricing represent more accurate instruments that can better shape, utilize, and dispatch flexible EV charging loads to better maximize system-wide benefits and cost reductions. While this is applicable to charging stations with longer dwell times such as residences and workplaces, dynamic pricing instruments can also be deployed in higher power charging and shorter dwell time contexts, including DC fast charging. For these reasons, we encourage the Board and PSE&G to consider technology-facilitated smart/managed charging programs not only for the Residential Smart Charging Program (Offering 1), but also for the Offerings 2 and 3 as well, in order to pilot and explore these benefits.

Smart charging technology is also key to optimzing charging speeds needed to maximize the impact of shifting or managing EV loads. Additionally, and especially in the residential market, smart networked charging stations are critical to help enable consumers to respond to advanced rates and charging programs utilizing pre-defined, but potentially evolving and reconfigurable hands-off “set it and forget it” preferences. What is key to understand here is that EV-specific rates and programs governing a single load type and managed with technology does not require active customer involvement to respond to price signals, as the technology embedded within the charging station and

network software handles this actively on behalf of the customer or site host. This capability not only makes traditional arguments against advanced rate structures inapplicable, but it also makes it practical and warranted to move to advanced rates and/or rate alternative technology-driven programs. This more fully leverages the capabilities of the underlying technology at the outset, and in an ongoing manner. Greenlots therefore also encourages the non-residential offerings to contemplate, evaluate, and potentially incorporate such capabilities and functionality.

Looking not too far down the road, and recognizing the value provided by technological solutions already being deployed in EV charging hardware and software today, it is relatively easy to envision a future where the needs addressed and values historically provided by rate design are instead provided in a more predictable and effective manner by software-facilitated technological solutions. Indeed, to reiterate, managed charging programs are not limited to complementing rate design, but can instead go further and be a more effective alternative strategic solution for maximizing outcomes such as effective load management and cost savings.

In the context of DCFC, unfortunately there has been a trend towards unmanaged charging, premised on the notion that in this context, drivers always need full power immediately and must be as fully charged as quickly as possible. In fact, there are often opportunities to reduce both site host and system costs through technology and dynamic rates or fee structures that could be a valuable subject for evaluation in the context of a pilot. For example, a driver could be given the option to receive a discount on their

charging session if they are able to wait a few minutes to begin charging. Or they could be offered a similar discount for a slightly longer session at a lower power level. While there are limitations in feasibility if other drivers are queued up, there are very workable solutions to reduce site and system costs associated with DC fast charging while passing on a portion of savings to the driver. This is likely to become more critical over time with a shift to higher and higher power charging.

Greenlots therefore also encourages evaluation of such strategies in the context of the Public DC Fast Charging offering. Green Mountain Power is currently implementing a fast charging pilot which is an example of how a utility program can apply managed charging specifically to DC fast charging stations. The pilot's objectives include testing "different functionality of controls such as load sharing, load management and other functions that help to also reduce peak-driven costs from electric vehicle charging infrastructure. This pilot will help to show if we can strike a balance between customer convenience of a fast-public charging station and the ability to shave even a few kW off the peak hours during charging sessions."[14]

Effective management of EV load is critical to fulfill the promise of EVs for the grid, and as Greenlots has emphasized, smart technology is fundamental to realize these benefits. While potential grid impacts today may be minimal, as EV adoption grows and transportation electrification scales, regulated utilities such as PSE&G cannot turn on a dime and immediately deploy the necessary tools and infrastructure on short notice. It is

[14] See Vermont PUC: *Green Mountain Power's Charge Fast Innovation Pilot*. Vermont PUC Docket No. 20A-0619: available at https://epuc.vermont.gov/?q=node/64/147995.

critical that utilities and commissions both plan now and establish foundational programs and appropriate regulatory frameworks to effectively manage this new load. As Greenlots has described, technological solutions represent the platform on which powerful, effective, and customer-friendly load management solutions will be built. It is vital that regulators, utilities, and stakeholders think through how to leverage this technology in the near term.

III. CONCLUSION

Q. Please summarize Greenlots' position regarding the value of EV charging programs in general.

A. Greenlots is a strong supporter of scaling the market for EVs and EV charging products and services as quickly as possible, believes the electric utility has a critical role to play as a market transformer, and believes a portfolio approach that tailors different offerings to different customer segments has significant value. Such an approach offers value beyond the program itself in that it contributes to building a base of knowledge, data, and positive customer experience. This in turn helps decision-makers make more informed decisions about how to refine future filings to support and scale these markets.

Q. Please summarize Greenlots' position regarding PSE&G's proposed CEF-EVES Program in this proceeding.

A. Greenlots supports and respectfully requests that the Board approve PSE&G'S proposed CEF-EVES Program. Greenlots further recommends that the Board modify Offering 3 to authorize the Company to deploy its Utility Ownership Model from the outset of the

program, rather than limiting utility ownership to a backstop to be considered in a later phase of program implementation.

Q. Does this conclude your pre-filed verified direct testimony?

A. Yes.