



Chairwoman Gladys Brown
Pennsylvania Public Utility Commission
400 North Street
Keystone Bldg.
Harrisburg, PA 17120

Re: Third Party Electric Vehicle Charging – Resale/Redistribution of Utility Service
Docket No. M-2017-2604382

Advanced Energy Economy (AEE) appreciates the opportunity to comment on the Motion to explore issues related to the operation of third-party electric vehicle charging stations. AEE commends Chairwoman Brown and the entire Pennsylvania Commission on starting a conversation around the important topic of electric vehicle (EV) infrastructure. We look forward to further actions of the Commission on electrification and other advanced transportation topics.

As a national association of business leaders who are making the global energy system more secure, clean, and affordable, AEE supports a transition to a 21st century transportation system. In the advanced transportation sector, AEE's membership includes manufacturers of different vehicle sizes, from small, low-speed vehicles to large heavy duty vehicles, operated on electric and hydrogen fuels, as well as charging infrastructure providers, grid integration solution firms, and companies providing supporting technologies and software services.

AEE is pleased to see that the Commission is seriously considering the regulatory barriers to greater EV adoption. With proper design and management, transportation electrification can ultimately benefit all ratepayers, not just the owners of PEVs. Studies, including those that have looked specifically at Pennsylvania, have shown that PEV adoption can reduce costs for all ratepayers while benefiting the grid and providing a range of societal and environmental benefits.¹ As such, the Commission has a critical role to play in facilitating the efficient deployment of the associated charging infrastructure and ensuring that all segments of the population are adequately served as PEVs move into the mainstream.

Please find below responses to the questions posed to each panel. If you would like additional information, please do not hesitate to reach out to our team.

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¹ <http://www.mjbradley.com/reports/mjba-analyzes-state-wide-costs-and-benefits-plug-vehicles-five-northeast-and-mid-atlantic>, <https://www.ethree.com/tools/electric-vehicle-grid-impacts-model/>

In the Chairwoman's Motion, the Commission has requested comment on the following matters:

1. *What restrictions, if any, each EDC's existing tariff establishes on the resale/redistribution of utility service for third-party electric vehicle charging.*
2. *The benefits and detriments of specific tariff provisions permitting unrestricted resale/redistribution of utility service when done for the purpose of third-party electric vehicle charging.*
3. *The appropriateness, or lack thereof, of encouraging EDCs across the state to move toward a tariff design, such as Duquesne Light Company's, which includes provisions for third-party electric vehicle charging resale/redistribution.*
4. *What other resale/redistribution tariff provision designs may aid in establishing clear rules for third-party electric vehicle charging stations.*
5. *What other regulatory options may aid in establishing clear resale/redistribution rules for third-party electric vehicle charging stations.*

We will address each question in order in the following comments, but first have an overarching viewpoint to share. Although the questions posed by the Commission do not specifically outline the Commission's view of third-party ownership of charging infrastructure, they do imply that the Commission is interested in this type of ownership model.

As context for considering the appropriate roles for third-parties in charging infrastructure ownership, we believe it is important to consider the potential role of utilities, the other major player in charging infrastructure. The paper *Electric Vehicles as Distributed Energy Resources*² outlines four potential roles for the utility to play in EVSE deployment at varying levels of involvement:

- 1) Utility as Facilitator: The utility treats EV charging like other potential load, providing nondiscriminatory electric service when and where requested, but not engaging directly in the business of vehicle charging.
- 2) Utility as Manager: In addition to delivering electric service to the location of the vehicle charger, the utility manages the charging operation to better integrate charging with grid capabilities and grid needs.
- 3) Utility as Provider (includes Manager role): The utility provides both the electric service to the charger and the charging equipment and charging service. It receives a cost-based payment for these services.
- 4) Utility as Exclusive Provider (includes Manager role): Vendors other than the utility are prohibited from providing charging service to the public, under laws precluding the resale of electric service.

AEE believes that both public utilities and third-party charging infrastructure companies have critical roles to play in the deployment of EVSE. AEE and its members fully support the opportunity for third-party ownership of PEV charging infrastructure. At the same time, we recognize that the utility should be able to own and operate EVSE under appropriate rules when there are market failures, such as those we currently see in the EVSE market: lack of a truly competitive market; inability of the market to deploy charging infrastructure for all customer classes, uses, and geographies; and slow deployment of EVSE that suppress PEV adoption and the broad public benefits that it can provide. The goals of utility participation should be to eliminate underlying market barriers to facilitate the development of an expanded competitive market while simultaneously ensuring service provision in areas that are outside

² <https://www.rmi.org/insights/reports/electric-vehicles-distributed-energy-resources/>



the reach of the competitive market. Our primary interest is in reducing the barriers to the growth of the PEV market given its widespread benefits to the public. Allowing for third-party infrastructure ownership and operation harnesses the power of the competitive market in a way that ultimately benefits consumers, while allowing for utility participation under appropriate market rules ensures that sufficient infrastructure exists to support market growth across all customer classes, uses, and geographies. While the Commission's questions do not specify its views on the ownership of charging infrastructure, AEE recommends that the Commission explore the development of a ruling that clearly articulates a comprehensive position.

Since the utilities need to carefully plan for any major changes in the grid, both in terms of generation and distribution, the Commission and any EVSE providers should work closely with the utilities on deployment to maximize the benefits that PEVs provide to the grid, and to ensure successful integration of the additional loads from PEV charging. This might include, but is not limited to, identifying preferred sites for EVSE to be located.

1. *What restrictions, if any, each EDC's existing tariff establishes on the resale/redistribution of utility service for third-party electric vehicle charging.*

AEE defers to the EDCs to respond to this question. Outside of the Duquesne language, we do not see any EDC directly addressing the issue of resale of electricity for third-party EV charging and thus assume no restrictions therein.

2. *The benefits and detriments of specific tariff provisions permitting unrestricted resale/redistribution of utility service when done for the purpose of third-party electric vehicle charging.*

AEE believes that the Commission should allow for resale/redistribution of electricity for third-party electric vehicle charging at all EDCs. Although we understand the potential need for certain restrictions on the resale of electricity by consumers, this use case is unique. Electric vehicle charging stations do not serve as typical commercial or industrial customers and should be allowed to "resell" electricity to drivers as needed. This kind of unrestricted resale will allow for greater EV adoption across the Commonwealth, benefitting all customers. Studies have shown that PEV adoption can reduce costs for all ratepayers while benefiting the grid and providing a range of societal and environmental benefits.³

In addition, vehicle electrification provides the potential for a number of benefits to EDCs. EDCs will financially benefit from an increase in load and a build out of supporting infrastructure but that's not all. Smart charging can improve system-wide asset utilization, and in the long run, can open-up important possibilities for using EVs as grid resources. A build out of EVSE and properly designed tariffs, facilitated by the ability to resell the electricity, will encourage greater adoption of EVs and increase demand, particularly in major cities like Philadelphia and Pittsburgh.

While we understand why the Commission wants to consider a separate tariff for the resale of electricity by third-party EV charging vendors, it is important for the Commission to balance that charging rate as compared to the residential rate. If the differential between the rates is high, it will influence consumer behavior so the Commission needs to think through those effects and any unintended consequences. AEE recommends that the Commission evaluate EV infrastructure deployment models holistically, looking at residential, workplace, and public

³ <http://www.mjbradley.com/reports/mjba-analyzes-state-wide-costs-and-benefits-plug-vehicles-five-northeast-and-mid-atlantic>, <https://www.ethree.com/tools/electric-vehicle-grid-impacts-model/>



charging models together, recognizing that increased adoption of EVs will impact the entire electric grid.

3. *The appropriateness, or lack thereof, of encouraging EDCs across the state to move toward a tariff design, such as Duquesne Light Company's, which includes provisions for third-party electric vehicle charging resale/redistribution.*

AEE believes it is appropriate for the Commission to encourage all EDCs to move toward a tariff design that includes provisions for third-party electric vehicle charging resale/redistribution. Because EDC territories abut each other, it is preferable to have clearly stated, uniformly structured tariffs for electric vehicle charging resale. Although each EDC has its own set of tariffs, having consistent provisions across the state would reduce market barriers to entry for infrastructure companies and allow for maximum deployment of charging infrastructure. This same principle applies to interconnection, as greater consistency across the Commonwealth will allow for more wide-scale adoption. Interoperability and consistency at all levels is key to mass EV charging infrastructure deployment, as it gives both providers and consumers a consistent experience across EDC territories.

4. *What other resale/redistribution tariff provision designs may aid in establishing clear rules for third-party electric vehicle charging stations.*

First, although this question deals more with how the utility collects bills rather than traditional rate design, it should be noted that the rate design associated with EV charging has important implications for EV adoption. Well-designed time-of-use or time-varying rates that encourage charging during off-peak hours can aid grid reliability and prevent expensive T&D upgrades.

Second, demand charges can interfere with wide-scale EV adoption because it is difficult for mass market customers to manage and respond to that type of price signal. Demand charges are one type of pricing mechanism that can actually inhibit the deployment and ownership of PEVs and EVSE. Depending on the design of the demand charge, the scale of the charge can single handedly discourage EV ownership. AEE believes that any EV charging tariff design implemented by the Commonwealth should not include a demand charge. Relatedly, fixed charges for necessary items such as maintenance should be kept to a minimum.

Third, a key enabler of tariff design that facilitates EV adoption is allowing for the use of two meters - one for the premise at which the device is located and a separate meter in the EVSE – each with its own tariff. Today utilities typically charge customers for electricity based on the measurement of usage taken at the point where the utility's electricity supply enters the premise, using a premise meter. This limits the ability of utilities and regulators to promote the adoption of EVs via special tariffs (e.g., discounted rates) because the rates must be applied at the premise level where the consumption is measured. As a result, the rates cannot be precisely targeted at EVs because they are billed on the same tariff as the entire premise. At the same time, if the entire premise is billed at the EV rate, all of the other electricity devices in the premise are billed for electricity at special rate. This can result in cross-subsidies. The solution is to have a system that includes meters in the EV chargers to allow for separate billing.

A separate meter can be installed in front of the charger, but the cost ranges between \$500 and \$1,500 (all in). However, use of the EVSE's meter can reduce that to an estimated below \$50 for volume deployment. In order for the utility to apply separate tariffs, three elements are necessary:



- the meter measurements of the EVSE meter and premise meter must be synchronized in time
- all of the meter measurements must be delivered to the utility's software system
- and the meter measurements must be disaggregated

Implementation of these elements allows one tariff to be applied to all of the electricity consumed in a premise other than the electricity consumed by the targeted device, and another tariff to be applied to the electricity consumed by the targeted device.

Although the Commission framed this question around third-party ownership of charging infrastructure, AEE would like to note that some of these same tariff and ratemaking principles, specifically around time-varying rates and demand charges, should also be applied to charging broadly speaking. The former is important encouragement for drivers to charge during off-peak hours, and the latter is important for consumer adoption of PEVs.

5. *What other regulatory options may aid in establishing clear resale/redistribution rules for third-party electric vehicle charging stations.*

AEE's preference is for a uniform structure across the state for an electric vehicle charging station tariff. We do see some benefits of other options, such a utility-specific tariff, as noted above. Another potential alternative is direct-to-customer billing in which the utility would directly bill the EV driver for the electricity instead of billing the third-party charging infrastructure owner. However, this option is challenging because drivers cross EDC service territory borders state borders regularly.

The potential electrification of transportation is a transformational shift that brings a host of public benefits, including broad-based cost savings for ratepayers, increased consumer choice in the transportation sector, improved financial performance for utilities, improved security from reduced dependence on conventional fuels that are often imported from volatile regions of the world, and improved air quality. Combined with the fact that PEVs provide drivers with performance improvements over conventional vehicles from improved torque to reduced maintenance, the market for these vehicles is growing quickly, 997% growth from 2011 to 2016 AEE market report.⁴ Battery prices, which are a primary determinant of PEV cost, are declining faster than anticipated with Wood Mackenzie reporting that battery pricing in 2017 is already lower than some projections that were made in 2012 for 2030.⁵ As a result, Bloomberg New Energy Finance forecasts that the purchase price of PEVs will fall below that of conventional vehicles sometime between 2025 and 2030, and AutoGuide provided a list of all PEVs available in 2017, showing that an electric car can be purchased today for as little as \$23,000-24,000 without incentives (with new low-speed vehicles available for as little as \$8,500 today).⁶ As costs decline, vehicle range, the distance a PEV can travel on a single charge, is rising. Nissan, Mercedes-Benz, Tesla, and other companies are all planning to release affordable vehicles

⁴ Advanced Energy Now Market Report 2017, <https://info.aee.net/aen-2017-market-report>

⁵ <https://www.greentechmedia.com/articles/read/everyone-is-revising-electric-vehicle-forecasts-upward>

⁶ <https://www.bloomberg.com/news/articles/2017-07-06/the-electric-car-revolution-is-accelerating>, <http://www.autoguide.com/auto-news/2017/07/all-the-electric-vehicles-currently-available-in-2017.html>



with 200+ mile range within the next twelve months. The Chevrolet Bolt already offers a range greater than 200 miles on a single charge.⁷

Nevertheless, PEV sales still represent less than 1% of all vehicles sales in the United States⁸ as several important institutional and market barriers stand in the way of these vehicles reaching the large-scale deployment levels that will drive the broad public benefits outlined above. AEE recommends that Pennsylvania design a program with an eye towards addressing these barriers to PEV deployment that impact a number of markets. In addressing these issues, Pennsylvania should keep in mind that there are significant opportunities available not only for light duty vehicles, but for all classes of vehicles, including low speed, medium-duty, and heavy-duty vehicles.

AEE looks forward to providing guidance on these issues, including lack of charging infrastructure; the relatively small number of PEVs on the road today; the purchase price of vehicles; lack of consumer education; and the cost of charging stations, at a later date. One issue we believe the Commission needs to consider now is implementation of EVSE interoperability standards. By issuing interoperability standards for hardware and software, third-parties and utilities will provide a better, more consistent experience for customers as they travel the Commonwealth. Interoperability standards will aid in ensuring consistency for future technological upgrades to equipment across the state. The limited networks that have been deployed to date have too often lacked full payment system interoperability and have too often been closed, proprietary networks. The resulting balkanized system does not easily allow drivers to move from a charging station in one network to a station in another network, thus lowering EVSE utilization rates because more EVSEs are required for a given number of vehicles.

Interoperability will also make it easier to supply quality customer data for third parties. AEE would like to highlight the need for customer usage data availability and data access to allow for personalization of products and services. Third-party access to customer data will allow for better service and a wider array of products offered to EV consumers. We recommend that the IOUs use the Green Button platform to provide customers the option to provide access to their consumption and billing data, including the data that will emanate from EV usage.

⁷ <http://www.chevrolet.com/bolt-ev-electric-vehicle>

⁸ <https://www.nytimes.com/2017/01/04/business/2016-record-united-states-auto-sales.html? r=0>

