ADVANCED ENERGY ECONOMY
the business voice of advanced energy

Rhode Island Public Utilities Commission
Division of Public Utilities and Carriers
89 Jefferson Boulevard
Warwick, RI 02888

Rhode Island Office of Energy Resources
One Capitol Hill
Providence, RI 02908

August 11, 2017

Re: Notice of Inquiry and Request for Responses to Stakeholder Comments Regarding a Utility's Role in Deploying Beneficial Electrification with Focus on Plug-in Electric Vehicles

Advanced Energy Economy (AEE) appreciates the opportunity to reply to stakeholder comments filed in response to the original Notice of Inquiry (NOI). AEE commends the RIDPUC, RIPUC, and RIOER on starting a conversation around the important topic of transportation electrification. We look forward to further actions and leadership from Rhode Island's policymakers on this issue.

AEE is a national association of business leaders who are making the global energy system more secure, clean, and affordable. Advanced energy encompasses a broad range of products and services that constitute the best available technologies for meeting energy needs today and tomorrow. Among these are energy efficiency, demand response, energy storage, natural gas electric generation, solar, wind, hydro, nuclear, advanced vehicles, biofuels and smart grid technologies. It is all the innovations that make the energy we use more secure, clean, and affordable. As it relates to this NOI, AEE's membership includes manufacturers of electric and hydrogen vehicles from small low speed to large heavy-duty vehicles, fleet owners, charging infrastructure providers, grid integration solution firms, and companies providing supporting technologies and software services.

With proper design and management, transportation electrification can ultimately benefit all ratepayers and citizens, not just the owners of plug-in electric vehicles (PEVs). 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.[1,2] As such, the RIPUC and other state policymaking bodies have 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 our reactions to the comments with a focus on the specific requests for more input on the utility role in PEVs adoption and the goals of an electric vehicle program. If you would like more information, please do not hesitate to contact me.

Sincerely,

Matt Stanberry
VP of Market Development, Contact: mstanberry@aee.net, (919) 423-8897

cc: Janet Besser, NECEC
Jamie Dickerson, NECEC

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

Context for Determining the Goals of an Electric Vehicle Program

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[3]. 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.[4] 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).[5] 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 with 200+ mile range within the next twelve months. The Chevrolet Bolt already offers a range greater than 200 miles on a single charge.[6]

Nevertheless, PEV sales still represent less than 1% of all vehicles sales in the United States[7] 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 Rhode Island design a program with an eye towards addressing these barriers to PEV deployment that impact a number of markets. In addressing these issues, Rhode Island 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.

- Lack of Charging Infrastructure – The fear that a driver will be stranded during a trip once her/his vehicle depletes its charge because they cannot find a place to charge, commonly referred to as "range anxiety," remains a real problem for PEVs. While the availability of long-range vehicles helps address this issue, it is clear that more charging infrastructure, which is commonly referred to as "electric vehicle supply equipment" (EVSE), is required quickly. As outlined in a recent Altman Vilandrie and Co report, among individuals who are aware of PEVs, 85% of survey respondents cited a lack of charging infrastructure as a reason they are not buying a PEV.[8] That result aligns with research cited in National Grid's comments that included a prior report that found EV adoption is most strongly related to charging infrastructure availability and data reported by vehicle manufactures like Nissan and Tesla, including Nissan's finding that sufficient infrastructure could roughly double the number of repurchases of Nissan Leafs by existing owners.[9,10] As Rhode Island looks to scale the PEV market from hundreds of

[3] Advanced Energy Now Market Report 2017, https://info.aee.net/aen-2017-market-report
[4] https://www.greentechmedia.com/articles/read/everyone-is-revising-electric-vehicle-forecasts-upward
[5] 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
[6] http://www.chevrolet.com/bolt-ev-electric-vehicle
[7] https://www.nytimes.com/2017/01/04/business/2016-record-united-states-auto-sales.html?_r=0
[8] http://www.altvil.com/events/press-release-new-altman-vilandrie-company-survey-lack-of-awareness-high-costs-may-short-out-electric-vehicle-adoption/, https://electrek.co/2017/01/03/electric-vehicle-adoption-awareness/
[9] http://www.sciencedirect.com/science/article/pii/S0301421514000822
[10] http://www.pevcollaborative.org/sites/all/themes/pev/files/9_Nissan_DPeterson_20150309.pdf

vehicles to tens of thousands of vehicles by 2025 in pursuit of its goal of 15% of all new light-duty car sales coming from ZEVs and the much more aggressive electrification it will have to undertake to hit its greenhouse gas (GHG) reduction targets, it is clear that the state needs to stimulate targeted EVSE build out quickly. In order to best meet those GHG targets, Rhode Island should also consider utilizing clean, distributed DC generation co-located with EVSE.

- Relatively Small Number of PEVs on the Road Today – The fact that fast growing vehicle sales, like charging infrastructure, are starting off from a very small number presents a market barrier to the development of the charging infrastructure needed to support these large levels of vehicle deployment. In short, the current low penetration of vehicles leads to low EVSE utilization rates, which are commonly cited as 2 to 4% for public charging stations, meaning that is extremely difficult for EVSE owners to develop a charging business that can break even (never mind run profitably) on the basis of charging fees alone. While the situation should improve over time and may be supplemented by the evolution of business models to derive significant revenues from other offerings that are provided in addition to the electricity for charging (e.g., the provision of food and drink at a charging rest stop), there is little question that the fundamental challenge to lack of robust business model for EVSE ownership is undercutting EVSE deployment. As a result, we recommend that Rhode Island at this point in time allow its utility, National Grid, to participate in EVSE deployment as outlined below.

- The Purchase Price of Vehicles – While it is true that PEV vehicle costs are declining rapidly and that a few relatively inexpensive options are available in the market today, it is also true that on average the purchase price of a PEV remains thousands of dollars more expensive than that of a comparable internal combustion engine (ICE) vehicles. The aforementioned Altman Vilandrie and Co report found that 83% of survey respondents who were aware of PEVs cited the cost of the vehicle as a reason they had not purchased a vehicle.[11] There is ample evidence that providing incentives that help close the cost gap can demonstrably accelerate PEV sales. One need look no further than the state of Georgia to find evidence that incentives work. Georgia had a $5,000 tax credit that expired in July of 2015. Before its expiration, the state was the second largest PEV market in the country with PEVs sales in Georgia making up approximately 17% of all PEV sales nationally. After the credit expired, Georgia's percentage of the U.S. market fell to just 2%.[12]

  Given that data shows incentives work to accelerate the PEV market and the deployment of PEVs provides broad based public benefits as described above,[13] we recommend that the state look for ways to continue, expand, and enhance its vehicle incentive program. In incentivizing the purchases, the state will be helping to accelerate technology deployment, which in turn shortens the timeframe over which the cost reductions associated with technology learning occur. In other words, the purchase incentives lead to cost reductions that increase vehicle deployment that leads to further cost reductions, so that a virtuous cycle is established. As the state looks to enhance the incentive program, Rhode Island should consider the incentive type. Tax credits, like those used in Georgia, clearly work, but they require the vehicle owner to pay the full up-front cost of the vehicle without the incentive, and then go through the process of filing for a credit on their income tax return. Rebates accelerate the speed at which the consumer receives financial benefit while reducing the effort involved in

---

[11] http://www.altvil.com/events/press-release-new-altman-vilandrie-company-survey-lack-of-awareness-high-costs-may-short-out-electric-vehicle-adoption/, https://electrek.co/2017/01/03/electric-vehicle-adoption-awareness/

[12] https://www.wsj.com/articles/california-pushes-new-incentives-for-zero-emissions-vehicles-1500116400#livefyre-toggle-SB12291349753356754580104583268083935295530

[13] http://www.mjbradley.com/reports/mjba-analyzes-state-wide-costs-and-benefits-plug-vehicles-five-northeast-and-mid-atlantic

claiming that benefit. Point-of-sale rebates take it the final step of bringing the financial benefit to the consumer when they make the purchase decision, thus holding the promise of the greatest influence over the customer's decision to buy.

- Lack of Consumer Education - The Altman Vilandrie and Co report found that a remarkable 60% of survey respondents were unaware of electric vehicles, meaning that when these individuals consider vehicle purchases, they do not even consider electric vehicles.[14] There are a wide variety of reasons for this phenomenon, including the relatively brief time that these vehicles have been available to the mass market, shortage of automobile manufacture advertising driven in part by the split incentives facing manufactures that also make traditional ICE vehicles, etc. AEE recommends that Rhode Island strongly consider leveraging the relationships that its utility has with the majority of customers in the state by working with the utility to develop customer education programs.
- Lack of Interoperability – 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. To drive innovation and foster competition in the transportation electrification space, it is vital that open charging standards or protocols are adopted for both front-end and back-end interoperability. An open system also promotes greater transparency of vital data and information, which can be shared with a variety of innovative companies.
- The Cost of Charging Stations – While Level 1 chargers are "free" in that any standard electrical plug can provide a charge, Level 2 chargers can run $500 to $6,000 depending on the application and complexity of installation, and DC fast chargers cost approximately $50,000. Depending on the needs that a particular station is designed to fill, these costs delay or even prevent the installation of a station. Given the wide-ranging benefits of expanded PEV adoption for utility ratepayers and the broader public,[15] there is good rationale for considering utility rebates or other incentives for deployment.
- Demand Charges - It is difficult for vehicle owners and charging station owners to manage and respond to the type of price signal sent by a demand charge. Depending on its design and magnitude, a demand charge can single handedly discourage PEV and charging station ownership. AEE believes that any EV charging tariff design implemented by the state should not include a demand charge. Relatedly, fixed charges for necessary items such as maintenance should be kept to a minimum.
- Lack of Time-Varying Rates – The greatest benefits from PEV deployment will only be achieved if charging is done in such a way as to minimize the need for building additional infrastructure, including generation, transmission, and distribution. Moreover, if done right, the additional load from PEV charging can also improve the utilization of existing utility assets and in so doing, drive down rates for all customers. These benefits require various levels of control of charging, depending on the size and composition of the PEV fleet. A key aspect of achieving this control will be the use of appropriately designed time-varying rates (TVR). Well-designed time-varying rates will encourage charging during off-peak hours, can aid with grid reliability, and prevent expensive T&D upgrades, thus benefiting all grid customers.

---

[14] http://www.altvil.com/events/press-release-new-altman-vilandrie-company-survey-lack-of-awareness-high-costs-may-short-out-electric-vehicle-adoption/, https://electrek.co/2017/01/03/electric-vehicle-adoption-awareness/

[15] http://www.mjbradley.com/reports/mjba-analyzes-state-wide-costs-and-benefits-plug-vehicles-five-northeast-and-mid-atlantic

TVR encompasses a range of tariff design options, from simple time of use (TOU) rates with predefined peak and off-peak periods to fully dynamic pricing, where rates vary by the hour (or more frequently) based on the actual market price for electricity. As Rhode Island moves forward with PEV deployment, it can learn from what other states have done in this arena and the Commission can also direct utilities to develop pilot programs where they can test out different rate designs. Our preference is for well-designed TOU rates with a move towards more precise TVRs that eventually include dynamic pricing elements. The latter will also facilitate an eventual move to bi-directional flow of electricity where PEVs can inject electricity at particular times when it is most valuable to the utility.

Presently, 25+ utilities offer EVSE tariffs, most of which see a significant increase in rates during peak hours and rate reductions of up to 95 percent during off-peak hours.[16] It is important to note that any tariffs that rely on on-/off-peak hours should be revisited regularly as the power production profile of the grid changes. As an example, California is currently examining the possibility of allowing lower rates during midday hours as rising solar penetration has made more electricity available during that period.

Rate design associated with PEV charging has important implications for PEV adoption; therefore, significant consumer education around these types of pricing schemes is important for customer adoption. In order for consumers to adjust their behavior to time-varying rates, they first need to understand the benefits of doing so. They will also need tools and access to timely and geographically appropriate information that they can use to respond to the rates. Otherwise, the benefits of TVR will not be realized.

- Lack of EV-Only Rates and Ability to Meter Only EVSE - 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 support the adoption of PEVs via specific rates (e.g., discounted rates or TVRs focused on PEV charging) 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 PEVs because they are billed on the same tariff as the entire premise. At the same time, if the entire premise is billed at the PEV rate, all of the electricity use in the premise is billed at the special PEV rate. This can result in cross-subsidies. The solution is to have a system that includes meters in the EVSEs 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 less than $50 for volume deployment. In order for the utility to apply separate tariffs, three elements are necessary:
    - The reading of the EVSE and premise meters must be synchronized
    - All of the meter data must be delivered to the utility's software system
    - The meter readings must be disaggregated for billing purposes
- Lack of Data Access – There is a clear need for customer usage data availability and data access to allow for personalization of products and services offered to EV users. 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 utility uses 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.

[16] https://about.bnef.com/blog/u-s-utilities-offer-multiple-electric-car-charging-rates/

Specific Comments on the Role of the Utility

As outlined in the paper *Electric Vehicles as Distributed Energy Resources,*[17] there are 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 the utility 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 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.

Since the utilities need to carefully plan for any major changes in the grid, both in terms of generation and distribution, the Rhode Island Commission and any EVSE providers should work closely with the utility 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.

[17] https://www.rmi.org/insights/reports/electric-vehicles-distributed-energy-resources/