TO: New Jersey Board of Public Utilities, EVSTAKEHOLDER.GROUP@BPU.NJ.GOV

FROM: Noah Garcia, Natural Resources Defense Council

RE: Follow-Up Task 1 Questions

DATE: February 2, 2018

The following comments are respectfully submitted on behalf of the Natural Resources Defense Council (NRDC), an international non-profit environmental organization with more than three million members and online activists, including over 65,000 in New Jersey. Since 1970, our lawyers, scientists, and other specialists have worked to protect the world's natural resources, public health, and the environment. NRDC appreciates the Board of Public Utilities' initiative in addressing electric vehicle infrastructure topics.

On September 15, 2017, the Board of Public Utilities (BPU) held its first New Jersey Electric Vehicle Infrastructure Stakeholder Group meeting. BPU staff explained their interest in addressing regulatory topics surrounding electric vehicles (EVs) and participants discussed the current state of the EV market in New Jersey. In December, 2017, Staff presented a series of follow-up questions to Task 1 that we address below.[1]

1.1 Are the analysis and findings of the USDOE AFDC and ANL accurate and supported by other independent analysis? Please cite why or why not.

NRDC generally believes that the analysis and findings of the USDOE AFDC and ANL are accurate and that EVs are more efficient than their gasoline powered counterparts in BTU/mi terms. However, BTU/mi is not the sole metric by which EVs should be evaluated: emissions/mi is a more interesting efficiency metric that has tangible impacts for New Jersey residents and implications for the achievement of state climate goals. Additional analysis by USDOE AFDC finds that on New Jersey's current generation mix, a battery electric vehicle produces approximately 76 percent less greenhouse gas emissions per mile than a conventional internal combustion engine (ICE) vehicle.[2]

[1] We address only a subset of the BPU's questions.
[2] https://www.afdc.energy.gov/vehicles/electric_emissions.php

Accounting for PJM imports and exports may influence this figure slightly, but overall, EVs are far superior to ICE vehicles regarding well-to-wheel emissions.

2.2 Would an EV fueled by a New Jersey electric generation mix meet the definition of conserving energy in the definition for energy efficiency as set forth at N.J.S.A. 48:3-98.1? If so why? If not why not?

NRDC is supportive of BPU and utility engagement to accelerate the electrification of the transportation sector and achieve the state's climate and Zero Emissions Vehicle (ZEV) goals. While utility programs designed to further progress toward those goals could reasonably fall under the definition of energy efficiency (EE) as set forth at N.J.S.A. 48:3-51 and/or N.J.S.A. 48:3-98.1.d, the BPU should consider the potential unintended consequences of doing so and may wish to rely upon other sources of authority to encourage and to review utility programs designed to accelerate the efficient electrification of the transportation sector.

EE and conservation program are defined in N.J.S.A. 48:3-98.1.d. as:

Any regulated program, including customer and community education and outreach, approved by the board, pursuant to this section for the purpose of conserving energy or making the use of electricity or natural gas more efficient by New Jersey customers, whether residential, commercial, industrial, or government agencies.

EVs require less energy per mile than internal combustion engine (ICE) vehicles by virtue of the efficiency advantage of electric motors. In this sense, EVs conserve energy. Utility transportation electrification (TE) programs can be designed to accelerate EV adoption, conserving energy in the process, and to foster EV charging that improves the efficiency of the electrical grid by taking advantage of spare system capacity.[3]

However, additional questions arise when determining if TE programs should be classified as traditional energy efficiency programs as defined above, including but not limited to:

- Would TE programs displace traditional utility EE programs or diminish EE program funding; and
- Are the cost-effectiveness tests and evaluation criteria designed for traditional EE programs appropriate for potential TE programs?

Traditional EE programs are a critical component of safe, reliable, and affordable utility service. They save customers money on their utility bills, reduce emissions from fossil

[3] The term "utility transportation electrification programs" used above is meant to describe programs that increase education and access to electric transportation options for utility customers to accelerate the electrification of the transportation sector, including light-duty vehicles. These programs may include, but are not limited to, the following elements: education and outreach, deployment or support for charging infrastructure, load management, R&D, reporting and evaluation.

fuels, and help safeguard the reliability of the grid. Potential TE programs should be additional to EE programs. Both are needed to meet the state's climate goals. The BPU should also consider the fact that traditional EE cost-effectiveness tests may not be an appropriate fit for TE programs that provide a different set of potential benefits and that have the effect of increasing electricity consumption, while still reducing overall energy consumption. More discussion is needed to assess the appropriate evaluation criteria for TE programs.

If the BPU declines to hold that EVs fall under the definition of EE, the BPU still has regulatory authority to encourage and to consider potential TE programs. Under N.J.S.A. 48:2-13d, the BPU is required to oversee and ensure the safety and reliability of electric service for all utility customers. The BPU can address program proposals that affect the safety and reliability of electric service, including ones that deal with EVs and associated charging infrastructure. NRDC encourages BPU and utility engagement to efficiently accelerate the electrification of the transportation sector. If the BPU finds that EVs do fall under the definition of EE, measures must be taken to ensure that traditional efficiency programs are not displaced by TE programs and that appropriate criteria are established to evaluate TE programs.

2.3 Would an EV fueled by a New Jersey electric generation mix meet the definition of using less electricity or natural gas in the definition for energy efficiency as set forth at N.J.S.A. 48:3-98.1? If so why? If not why not?

See response to 2.2 above.

4.1 What is the state of the technology that could allow the EV to be utilized as a demand response technology? What is the availability of the technology now and how/when will that availability evolve? What actions should NJBPU take to take advantage of the use of EVs as demand response technology? If not why not?

EVs are already being utilized as demand response resources today. Examples of programs and pilots include Pacific Gas & Electric's and BMW's iChargeForward pilot, Pepco's EV demand response program, Southern California Edison's (SCE) Workplace Charging Pilot, and Eversource's EV pilot program.[4] Demand Response is a key feature in several full-scale utility TE programs. For example, SCE is in the process of developing a demand response program for the 1,500 stations it is currently deploying in its Charge Ready program.[5] National Grid in Massachusetts has also committed to the

[4] http://www.pgecurrents.com/2017/06/08/pge-bmw-pilot-successfully-demonstrates-electric-vehicles-as-an-effective-grid-resource/ ; https://www.utilitydive.com/news/how-pepco-is-finding-ways-to-shift-demand-through-maryland-ev-pilot-program/434156/ ; http://www3.sce.com/sscc/law/dis/dbattach5e.nsf/0/4C2BD1823FF37D8588257FF800826113/$FILE/R1309011-A1410014-SCE%20Final%20Plug-In%20Electric%20Vehicle%20Workplace%20Charging%20Pilot%20Report%20.pdf ; http://www.elp.com/articles/2014/06/nstar-electric-to-kick-off-electric-vehicle-program.html

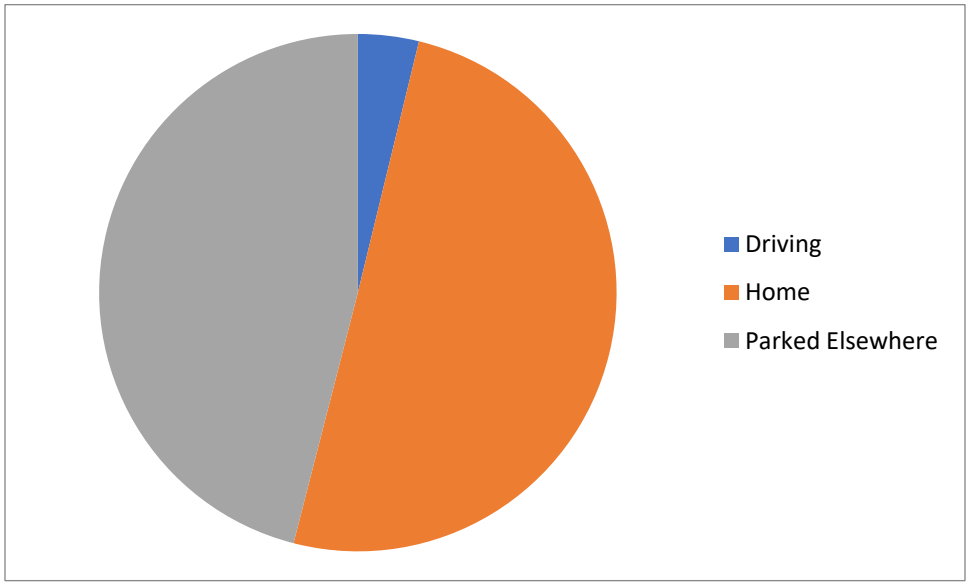
[5] http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M157/K835/157835660.PDF

development of a demand response program if its TE proposal before the Department of Public Utilities is approved.[6] San Diego Gas & Electric is also deploying 3,500 charging stations at workplaces and multi-unit dwellings that will be served on a dynamic rate that reflects hourly wholesale energy prices, with a goal of encouraging charging at times when there is spare grid capacity and when renewable generation peaks.[7]

Demand response and other load management mechanisms are valuable tools for minimizing impacts that a growing number of EVs can have on the grid. These technologies will be particularly useful in residential and workplace settings, where the majority of EV charging takes place today. The combination of these two locations, where EVs are generally stationary for approximately 23 out of 24 hours in any given day, ensures maximum availability for EVs to serve as a grid resource.

Estimated Percentage of Time EVs Spend by Location

(Adapted from Langton & Crisotomo, *Vehicle-Grid Integration*, California Public Utilities Commission)[8]



The BPU should also ensure that utilities incorporate EVs into their demand response offerings. If utilities put forward proposals to accelerate transportation electrification at the BPU, the Board should consider requiring enrollment in a demand response or load management program as a precondition for participation in certain utility TE program offerings.

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[6] Massachusetts Department of Public Utilities Docket 17-13, *Petition of Massachusetts Electric Company and Nantucket Electric Company, each d/b/a National Grid, for Approval of its Electric Vehicle Market Development Program, and of its Electric Vehicle Market Development Program Provision, pursuant to G.L. c. 164, §§ 76, 94, and Acts of 2016, c. 448.*, available at: http://web1.env.state.ma.us/DPU/FileRoom/dockets/bynumber

[7] https://www.sdge.com/clean-energy/electric-vehicles/poweryourdrive

[8] Chart adapted from Adam Langton and Noel Crisotomo, *Vehicle-Grid Integration*, California Public Utilities Commission, October 2013., www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=7744.

4.4 If the EV could be utilized as a demand response technology in a two way communication with the grid, distribution and/or transmission, would the EV meet the definition of demand side management in N.J.S.A. 48:3-51? If so why? If not why not?

Demand side management (DSM) is defined in N.J.S.A. 48:3-51 as:

The management of customer demand for energy service through the implementation of cost-effective efficiency technologies, including, but not limited to, installed conservation, load management and energy efficiency measures on and in the residential, commercial, industrial, institutional and governmental premises and facilities in this State.

EVs are a uniquely flexible load and power storage resource that can be used to benefit utilities, their customers, and the grid. However, if left unmanaged or managed poorly, EV load could pose challenges for the distribution system, undermine the goals of DSM, and fail to make use of EV storage capability. Consequentially, EVs can be viewed as DSM to the extent that EV load is managed to occur at times that do not stress the grid. The BPU should consider EV load management strategies, such as time-varying rates and demand response, to encourage charging to occur in a manner that reliably and cost-effectively integrates EV load. The potential for grid services provided by EV load is significant and grows with every customer purchase of an EV. However, the BPU should not necessarily restrict utility programs to accelerate the electrification of the transportation sector to only instances in which load can be served during off-peak hours. For example, the electrification of diesel-powered industrial equipment or transit buses may contribute to system peak demand, depending upon duty-cycles, but it could still provide substantial local air quality benefits that would make it well worth the investment.

4.6 If the EV could be utilized as a demand response technology, should the BPU consider changes to demand charges? If so why? If not why not?

Demand response and demand charges are important and related issues to address at the intersection of utility regulation and transportation electrification. However, modifications to demand charges should not be contingent upon EVs' status as a demand response resource.

A robust network of Direct Current Fast Charging (DCFC) stations along major transportation corridors will be critical to enable long-distance electric travel and give prospective EV drivers range confidence. At the same time, for car owners and shared mobility drivers that lack designated off-street parking or workplace charging options, local DCFC options may prove essential for enabling EV ownership. In addition, DCFC technology is rapidly changing, with stations with significantly higher throughput on the horizon.

Demand charges have challenged the economics of operating DCFC equipment, given that these stations frequently have high throughput (>50 kW) and at current levels of EV adoption, they also have low, unpredictable usage rates. Indeed, DCFC equipment does

not operate much like the commercial and industrial facilities for which demand charges were originally designed.[9] To spur development of DCFC infrastructure, we recommend the BPU establish a proceeding to explore how demand charges impact DCFC deployment and how they can potentially be improved across utility service territories to better reflect distribution system costs. The appropriate solution may also vary by customer segment. Any tariff proposal or demand charge mitigation strategy should be predictable, easy to understand, reflective of incremental electric system costs, and reasonably allow drivers to realize fuel cost savings relative to gasoline if they charge in a manner that benefits the grid. Simply put, rate design should be optimized to account for intended use cases.

5.1 Is vehicle charging a fully competitive market across all market sectors (e.g. residential, public L2, public DCFC, low income communities and Multi Unit Dwellings)? If not which market sectors are not competitive and why not? Which market sectors are competitive? What is the business case for the EVSE industry and where does the business case fail?

A private market for EV charging services already exists; according to US Department of Energy, there are approximately 17,000 public charging stations across various market segments in the US and many more residential stations not accounted for.[10] There is no test or methodology that NRDC is aware of that can credibly determine the competitiveness of a particular segment and we resist the categorization of market segments in such a black-or-white manner.

However, there are two points that the BPU should consider related to EVSE deployment:

- Greater EVSE deployment across all market segments, including segments dedicated to medium- and heavy-duty vehicles, will be necessary to support the attainment of New Jersey's transportation and climate goals in an equitable manner.
- Certain market segments may face greater challenges than others in deploying charging infrastructure for financial or other structural reasons.

This is not to say that difficult-to-reach segments are uncompetitive – or vice versa. Additional investments are needed across all areas, but a particular focus for utility investments should be in these difficult-to-reach segments that will reasonably be expected to accelerate transportation electrification, including but not limited to: residential and multi-unit dwellings (MUDs), workplace, low income communities or facilities that provide services to low income communities, and highway corridor DCFC.

In sum, the question posed presents a false dichotomy between competitive and monopoly solutions. A growing number of charging service providers, automakers,

[9] https://www.rmi.org/wp-content/uploads/2017/04/eLab_EVgo_Fleet_and_Tariff_Analysis_2017.pdf
[10] https://www.afdc.energy.gov/fuels/electricity_locations.html

environmental organizations, business groups, and other organizations recognize that *partnerships* between electric utilities and charging service providers are critical for expanding EVSE deployment. These partnerships, manifested in utility TE programs, can help grow the charging services industry and increase opportunities for competition among providers in key market segments where it otherwise would not have existed before.

5.2 If the charging market sections are not competitive should the utilities be allowed to develop managed charging programs for the non-competitive charging market sections? If not why not?

5.3 If the charging market sections are competitive should the utilities be allowed to develop managed charging programs for the competitive charging market sections? If not why not?

Questions 5.2 and 5.3 are addressed here.

It is unclear what the BPU means by "managed charging programs" in these two questions. If the BPU is referring to programs that manage or modify EV charging loads through smart charging or rate design, the BPU and the utilities should invariably be allowed to authorize and develop such programs – regardless of whether a market segment is deemed "competitive."

If the BPU is referring to programs that deploy EVSE, the utilities should not be precluded from making investments in charging infrastructure that support and accelerate transportation electrification. There are certain segments, including those described in response to 5.1, that utilities can *prioritize* to facilitate greater EV adoption and greater usefulness of charging assets. However, arbitrarily limiting where utilities can support greater infrastructure deployment ultimately could hamper New Jersey's ability to achieve its policy goals. No other state public utilities commission we are aware of has made any determination on utilities' ability to support the deployment of charging stations based on the market segment of the stations.

5.4 If the utilities are allowed to develop managed charging programs is there a time limit or other criterion that should be imposed on this participation? If so what timeframe? Should any utility managed charging program have a sunset date?

Assuming that the BPU's use of "managed charging programs" is synonymous with the use of "utility transportation electrification programs" above, there should not be a time limit imposed on these programs. The EV and charging services markets are still evolving and time limits may unintentionally impede efforts to accelerate transportation electrification in New Jersey. Most utility TE programs that have been put forward before public utilities commissions around the country generally have a 3-6 year timespan, but it does not preclude the utilities from filing additional programs after or even parallel to

existing programs. Each of the three investor-owned utilities in California have already received approval for two programs and are awaiting approval of a third program proposal. It is likely that a continuing partnership between the electric industry and independent EV charging companies will persist and evolve in the long-term.

We offer several criteria that the BPU may wish to consider below when reviewing utility TE programs aimed at reducing barriers to greater transportation electrification. Strong utility TE proposals should:

1. Increase access to electricity as a transportation fuel for all utility customers, including those in low- and moderate-income communities;

2. Maximize benefits to all utility customers;

3. Stimulate competition among third party EV service providers and provide customers with choice of products and services while leveraging multiple sources of funding;

4. Provide for load management that improves grid reliability, system flexibility, and renewables integration, and allows EV drivers that provide grid benefits to realize fuel cost savings relative to gasoline;

5. Allow for utility customer engagement and learning opportunities that improve program performance and increase awareness of transportation electrification and related benefits; and

6. Collect data on key program metrics and publicly report on program progress with regular frequency.

6.1 Should electric utilities engage in rate-based "Charge Ready" programs? What additional measures beyond Charge Ready are appropriate in non-competitive markets? Should utilities offer rebates on EV chargers or own/operate EV chargers in non-competitive markets?

If by "Charge Ready" the BPU means utility programs that make electric infrastructure investments up to but not including the charging station that generally include an incentive for site host purchase and ownership of charging equipment (similar to Southern California Edison's "Charge Ready" program), then utilities should be permitted to explore this avenue in their TE program offerings.

However, there is no "right" model to facilitate infrastructure deployment in key market segments, and utilities should retain the flexibility to explore models that effectively maximize program participation in these areas. Early data from the implementation of Southern California Edison's Charge Ready program suggests that a make-ready or "Charge Ready" approach may not provide the turn-key solution needed to overcome barriers in certain market segments. Consider that MUDs only account for four percent of

site hosts in SCE's pilot, despite the utility's increased outreach to potential site hosts in that segment.[11] In contrast, about 37 percent of San Diego Gas & Electric's likely site hosts in the "Power Your Drive" program, which includes utility ownership and operation of charging stations, are multi-unit dwellings, suggesting that property owners may prefer for the utility to own and maintain the charging equipment.[12]

What this early data from utility TE programs suggests is that different models may be more effective in different market segments. Utilities should pursue a diverse portfolio of charging infrastructure offerings that explore different deployment models. Difficult-to-reach market segments may likely require a more turn-key approach to facilitate greater EVSE penetration.

7.1 What policies should the Board establish to take advantage of AMI, Smart Grid / Smart Meters with respect to the EV market?

The BPU should encourage the deployment of AMI to the extent that it facilitates the implementation of EV load management tools such as EV-only time of use (TOU) rates and demand response programs. Ideally, these rates and programs are well-designed to the grid conditions of a particular utility service territory, open to an unlimited number of eligible customers, and do not require the installation of a second meter, which largely eliminates any of the savings or customer value of the programs. To this end, we recommend that the utilities and BPU explore and implement pathways to greater EV load management through solely through smart charging stations or the vehicles themselves. Ultimately, incentivizing off-peak charging is critical to realizing the grid and utility customer benefits upon which utility TE programs are premised.

NRDC appreciates the opportunity to provide comments on the questions posed by the BPU on policies related to the electrification of the transportation sector. We look forward to continued participation in the New Jersey Electric Vehicle Infrastructure Stakeholder Group and the BPU's upcoming report on transportation electrification topics.

Respectfully Submitted,

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[11] SCE presentation, Charge Ready Advisory Board, May 19, 2017, p. 7.
[12] SDG&E presentation, Power Your Drive Program Advisory Council Meeting, March 14, 2017.