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Finding the ways that work

SUBMITTED VIA EMAIL TO BOARD.SECRETARY@BPU.NJ.GOV

Aida Camacho-Welch, Secretary
New Jersey Board of Public Utilities
Post Office Box 350
Trenton, New Jersey 08625

Re: Comment of Environmental Defense Fund on Docket No. QO20050357, In the Matter of Straw Proposal on Electric Vehicle Infrastructure Build Out

Dear Secretary Camacho-Welch:

Environmental Defense Fund ("EDF") respectfully submits this comment to New Jersey Board of Public Utilities ("Board" or "BPU") Docket No. QO20050357, In the Matter of Straw Proposal on Electric Vehicle Infrastructure Build Out. Per staff request, these comments are submitted via e-mail before 5:00pm EST on June 17, 2020 and thus are timely filed.

I. INTRODUCTION

EDF is a membership organization whose mission is to preserve the natural systems on which all life depends. Guided by science and economics, EDF seeks practical solutions to resolve environmental problems, and uses the power of markets to speed the transition to clean energy resources. Consistent with its organizational purpose, EDF is engaged in activities to facilitate cost-effective and efficient energy market designs that encourage investment to modernize the energy grid so that it can support the ongoing deployment of renewable energy resources and energy efficiency. EDF works collaboratively with market participants sharing these goals.

We have over 20 years of experience driving the adoption of clean trucks and buses. This includes collaborating with commercial entities such as FedEx to accelerate technology development and engaging in transformative legislative and regulatory initiatives focused on reducing diesel emissions, which include criteria pollutants that are harmful to human health as well as greenhouse gas ("GHG") emissions. EDF's current campaign focuses on moving at least 30% of new medium and heavy-duty vehicles ("MHDVs") to zero-emission solutions by 2030 – jumpstarting a transition that is an essential element of any global strategy to avoid the worst

257 Park Avenue South
New York, NY 10010
T 212 505 2100
F 212 505 2375
edf.org
New York, NY / Austin, TX / Bentonville, AR / Boston, MA / Boulder, CO / Raleigh, NC
Sacramento, CA / San Francisco, CA / Washington, DC / Beijing, China / La Paz, Mexico

global warming outcomes and improve air-quality related health outcomes for vulnerable urban populations. In this electrification campaign, EDF is once again collaborating with diverse market participants and stakeholders, ranging from vehicle manufacturers such as Daimler to fleet owners such as Walmart and UPS, as well as electric vehicle ("EV") charging industry participants such as Chargepoint and advocates such as ChargEVC.

EDF marries its extensive background working towards a transformation of the MHDV sectors with a robust history of engagement focused on ensuring a clean, cost-effective, and equitable utility energy system. In multiple states and in federal fora, EDF has advocated for reductions in pollution associated with these vehicles, as well as the build-out of a market and electric grid that give intermittent renewable resources an opportunity to thrive in the near term - while also providing the additional reliability and resiliency needed to prepare the electric system for a high-renewables future. In California, where vehicle electrification is well underway, EDF has been a strong voice advocating before that state's Public Utilities Commission for well-designed utility charging infrastructure deployment programs in order to ensure efforts in this regard are cost-effective, beneficial for the grid and the environment, and equitable. Here in New Jersey, we have advocated, through the Energy Master Plan process, for robust vehicle electrification as well as efficient electric rate designs that optimize environmental outcomes while minimizing costs. In the present proceeding, we participated in the June 3 public meeting, where we focused on the urgent need to electrify buses and trucks to clean the air, particularly in vulnerable communities. We thank you for the opportunity to submit these comments and provide an important perspective on New Jersey's EV development.

EDF supports BPU's efforts to advance New Jersey's EV ecosystem in an equitable and effective manner. In responding to BPU's Straw Proposal, this comment explains that:
(1) Expanding the State's EV ecosystem is vital for public health and decarbonization;
(2) Utility investment may be appropriate beyond Charger Ready infrastructure and in areas without private EV development;
(3) MHDV electrification requires much more immediate attention from BPU;
(4) Equity must be at the center of New Jersey's EV ecosystem development;
(5) Rate design, supporting technology, and practices that optimize EV charging and infrastructure are essential for widespread EV adoption, successful vehicle-grid integration, and optimal environmental outcomes, including low-cost, efficient integration of 100% clean electric generation; and
(6) BPU must design their marketing, outreach, and education plans to reach a broad array of communities, businesses, and other stakeholders.

II. DISCUSSION

1. Developing New Jersey's Electric Vehicle Ecosystem Is Critical

There is an urgent need to ambitiously expand EVs and EV infrastructure throughout New Jersey. Transportation is the largest emissions source in New Jersey, accounting for more than 40 percent of New Jersey's harmful GHGs,[1] and is a major contributor to local air quality problems that harm communities across the state.[2] Achieving the state's climate goals, as well as improving air quality and public health, demands rapid electrification in this sector.[3] This in turn requires a robust ecosystem composed of charging and grid infrastructure to support EVs.

Establishing and sustaining an EV ecosystem is especially imperative for protecting communities across the state already disproportionately burdened by transportation and other sources of pollution.[4] But rapidly achieving EV-enabled air quality improvements in the communities that need them most demands a mindful approach to EV infrastructure build-out that prioritizes the phase-out of diesel vehicles operating in the most vulnerable communities.

It is crucial that New Jersey jumpstart its EV ecosystem immediately, as the charging infrastructure needed to support EVs will take years to build out – especially in light of the nascent state of New Jersey's EV charging marketplace. Drivers, businesses, and transit entities need that infrastructure to use EVs fruitfully throughout the state. Without the infrastructure, the EV sector will not achieve scale in New Jersey. Additionally, the faster New Jersey develops the infrastructure needed to charge EVs at scale, the faster it can utilize EVs and their infrastructure to meet grid storage needs and provide balancing services in a system increasingly reliant on intermittent renewable resources.[5]

New Jersey's EV ecosystem development must be cost-effective beyond strict monetary terms. To ensure that benefits outweigh costs, the BPU will need to consider impacts on total cost of ownership as well as societal costs and benefits of various policy approaches, including the health benefits, environmental impacts, and broader economic effects. Too often, direct program costs dominate consideration over these very real costs and benefits. Failing to account for the societal impacts of policies will result in uninformed, biased decisions that do not reflect New Jersey's reality. We appreciate the difficulty in formulating such a comprehensive analysis, and

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[1] New Jersey Bureau of Public Utilities, *2019 New Jersey Energy Master Plan: Policy Vision to 2050* at 24 (June 10, 2019), *available at* https://www.nj.gov/emp/docs/pdf/2020_NJBPU_EMP.pdf [hereinafter *NJ EMP*].

[2] Diesel Particulate Concentrations data retrieved on June 12, 2020 from New Jersey Department of Health, New Jersey State Health Assessment Data, available at https://www-doh.state.nj.us/doh-shad/indicator/view/DieselCnty.html.

[3] The *NJ EMP* seeks to establish a 100% clean energy system. Additionally, the Global Warming Response Act ("GWRA") requires New Jersey to reduce GHG emissions by 80 percent from 2006 levels by 2050. N.J.S.A. 26:2C-37 et seq.

[4] "Importantly, the health benefits will apply more directly to environmental justice communities and other New Jersey residents who are currently disproportionately burdened by air pollution." *NJ EMP* at 51. *See infra* section 4 for further discussion.

[5] *See* J. Coignard *et al.*, "Clean Vehicles as an Enabler for a Clean Electricity Grid," ENVIRON. RES. LETT. 13 (2018) 054031, *available at* https://iopscience.iop.org/article/10.1088/1748-9326/aabe97/pdf.

we applaud BPU's commitment to developing such a test in the near future.[6] Full and consistent evaluation of all these factors likely requires a transformative approach to cost-benefit analysis. But the Board should strive throughout this proceeding to make decisions with societal costs and benefits in mind as much as possible. BPU can utilize New Jersey's Societal Cost Test ("SCT"), preferably supplemented with some quantification and valuation of climate and public health benefits available from emissions reductions, even before the complete "Resource Value Test" is developed.[7] The SCT will allow the Board to assess all program costs and benefits from a societal perspective, "includ[ing] the effects of externalities."[8] More complete cost-effectiveness analysis, including societal impacts, is critical for equitable and effective decision-making at this stage of New Jersey's EV development. It also conforms with the state legislature's findings on vehicle electrification[9] and BPU's commitment to a least-cost decarbonization scenario outlined in the EMP.[10]

Grid capacity should also inform EV ecosystem development. To this end, EDCs should evaluate grid hosting capacity to identify locations with constraints or surplus electric capacity.[11] Although hosting capacity must not be the sole or major determinant of where charging infrastructure is located – transportation, transit, market, and equity considerations will also be vital – grid hosting capacity information is critical for helping utilities and developers select sites for potential build-out in the near term. In connection with considering the challenges that vehicle charging can pose for the grid, it is important to keep in mind that with the right enabling technology and market signals, some EV charging loads may be capable of functioning as significant grid assets – for example, improving the ability of the grid to integrate variable renewable resources, whether overall or at a particular location on the grid. Therefore, EV

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[6] *See In the Matter of the Implementation of P.L. 2018, c.17 Regarding the Establishment of Energy Efficiency and Peak Demand Reduction Programs*, *In the Matter of the Clean Energy Act of 2018 – Utility Demographic Analysis*, and *In the Matter of Electric Public Utilities and Gas Public Utilities Offering Energy Efficiency and Conservation Programs, Investing in Class I Renewable Energy Resources and Offering Class I Renewable Energy Programs in their Respective Service Territories on a Regulated Basis Pursuant to N.J.S.A. 48:3-98.1 – Minimum Filing Requirements*, BPU Docket Nos. QO1901040, QO19060748 & QO17091004, Order dated June 10, 2020 (Agenda Item 8D) at 32. *Available at* https://www.nj.gov/bpu/pdf/boardorders/2020/20200610/8D--Order%20Directing%20the%20Utilities%20to%20Establish%20Energy%20Efficiency%20and%20Peak%20Demand%20Reduction%20Programs.pdf.

[7] *Id*.

[8] California Public Utilities Commission, *California Standard Practice Manual: Economic Analysis of Demand-Side Programs and Projects* at 18 (Oct. 2001), *available at* https://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/Utilities_and_Industries/Energy_-_Electricity_and_Natural_Gas/CPUC_STANDARD_PRACTICE_MANUAL.pdf.

[9] "…vehicle electrification offers a wide range of benefits, such as improved air quality, reduced greenhouse gas emissions, and savings in motor vehicle operating costs for vehicle owners." N.J.S.A. 48:25-1.

[10] The EMP states that the "costs of needed investments" to reach the state's climate goals "are more than offset by avoided fuel costs, avoided air pollution, and other emission reduction benefits." *NJ EMP* at 257.

[11] *See generally,* Interstate Renewable Energy Council, *Optimizing the Grid: A Regulator's Guide to Hosting Capacity Analyses for Distributed Energy Resources* (Dec. 2017), *available at* https://irecusa.org/wp-content/uploads/2017/12/Optimizing-the-Grid_121517_FINAL.pdf.

charging load may be relevant to the system's hosting capacity with respect to distributed renewable generation.

In addition, each EDC should be required to perform a distribution grid impact study ("DGIS"), which would evaluate longer term grid impacts and build-out that are foreseeable based on projections of what vehicle electrification will entail. Such a study would consider the impact of incremental electric load resulting from the electrification of light-duty, medium-duty, and heavy-duty vehicles on transmission and distribution systems (i.e., any required electric system investments and the associated costs), including at the feeder level.[12] Needs identified can potentially be met through conventional wire infrastructure and/or through non-wires solutions including batteries, demand response programs, and/or vehicle-grid integration ("VGI") optimized through efficient price signals.

2. Utility Support May Be Expanded beyond Charger Ready Infrastructure and Areas of Last Resort

The shared responsibility model laid out by the Straw Proposal is a reasonable foundation for allocating roles and responsibilities among utilities and non-utility companies. We agree that the Electric Distribution Companies ("EDCs") should be "responsible for the wiring and backbone infrastructure necessary to enable a robust number of Charger Ready locations."[13] We would recommend further clarifying that it is appropriate for the EDC to engage in developing such wiring and backbone infrastructure, including on customer property and on either side of the meter, where customer-located and customer-side wiring and backbone infrastructure is reasonably necessary to prepare a site for EV charging. With their EVSE and power infrastructure experience, EDCs are in the best position to build New Jersey's Charger Ready infrastructure. California, the state with by far the most developed EV ecosystem in the U.S.,[14] mainly utilized this approach as well.

However, utility involvement in EV development should be more extensive and flexible than the Straw Proposal describes. As it stands, EDCs have the "ability to own and operate Electric Vehicle Service Equipment ("EVSE") in specified circumstances,"[15] limiting utility support to places "where investment in EVSE is not occurring."[16] Investing in EV development for these areas and promoting a more equitable distribution of EV infrastructure is an important role for

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[12] *See, e.g.,* J. Coignard *et al.*, "Will Electric Vehicles Drive Distribution Grid Upgrades?: The Case of California," in IEEE ELECTRIFICATION MAGAZINE, vol. 7, no. 2, pp. 46-56 (June 2019), *available at* https://ieeexplore.ieee.org/document/8732007.

[13] Notice: *In the Matter of Straw Proposal on Electric Vehicle Infrastructure Build Out* at 2, BPU Docket No. QO20050357 (May 18, 2020) [hereinafter *Straw Proposal*].

[14] U.S. Department of Energy, Alternative Fuels Data Center, "Electric Vehicle Registration Counts by State," *available at* https://afdc.energy.gov/data/10962.

[15] *Straw Proposal* at 2.

[16] *Id*. at 7.

utilities to play. But utility support for EV development is needed beyond areas of "last resort,"[17] including the MHDV sector and other more nascent EV market segments. We must allow EDCs to own and operate EVSE in a wider range of circumstances.

There are clear advantages to expanding utility involvement in New Jersey's EV ecosystem given their general infrastructure experience and greater capital flexibility. Allowing utilities to install and operate their own EV infrastructure can help address issues of range anxiety and upfront cost that are currently preventing broader uptake of these vehicles. EDCs can ensure charging infrastructure is consistently available throughout the state. This includes but should not be limited to developing the EV ecosystem in locations considered uneconomical by non-utility market participants, creating a more equitable distribution of EVSE and its benefits. By limiting utility ownership to portions of the EV marketplace where uptake is lagging, the shared responsibility model should also limit any anti-competitive effect that could arise as a result of utility ownership. For example, permitting utilities to own EVSE on behalf of commercial fleet owners could also present a turnkey solution for those who are considering electrification of their fleets but who do not wish to own and operate their own charging infrastructure and would view finding and working with non-utility service providers to be an additional, insurmountable barrier.

Relatedly, it is unclear what metrics will determine if a market "is not sufficiently mature to build EVSE without financial assistance,"[18] such that EVSE may be built, operated, and owned by utilities as contemplated by the current Straw Proposal. With Stakeholder input, the BPU needs to specify which metrics will be used to make this decision and circumscribe separate markets in the first place. BPU should also explore whether broader policy changes are necessary. For example, BPU may need to establish special interventions or incentives for multi-unit dwellings where landlords are not motivated to install EVSE. There are also permitting, land use, and other policy issues that BPU should examine with an eye toward streamlining EV ecosystem development in an equitable way.

3. Medium- and Heavy-Duty Vehicles Need More Systematic Attention

New Jersey has committed significant investments to electrify the MHDV sector through the Volkswagen Mitigation Trust and Regional Greenhouse Gas Initiative ("RGGI") fund, making the state a national leader in supporting this market sector transformation.[19] However, the Straw

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[17] *Id*.
[18] *Id*. at 11.
[19] The state plans to fund more than $37 million electric replacements for old diesel vehicles using the Volkswagen Mitigation Trust. New Jersey Department of Environmental Protection, "New Jersey to Invest Nearly $45 Million in Electrification of Transportation Sector; Focus on Air Quality Improvements in Environmental Justice Communities," (Apr. 22, 2020), *available at* https://www.nj.gov/dep/newsrel/2020/20_0018.htm. This year alone, New Jersey will invest $60 million to electrify the state's transportation sector. New Jersey Department of Environmental Protection, New Jersey Economic Development Authority, and New Jersey Board of Public Utilities,

Proposal focuses almost entirely on light-duty vehicles ("LDV") and their infrastructure, putting meaningful MHDV development in jeopardy. This is understandable, given the general thrust of New Jersey's Plug-In Vehicle Law ("PIV law"),[20] but ultimately misguided. BPU must immediately and extensively advance MHDV ecosystem development alongside LDVs for several reasons.

First, although the PIV law does not promulgate specific electrification goals for most classes of MHDVs, it does establish electrification goals for one sector: transit buses. Section 3(a)(9) of the PIV law establishes explicit goals for the electrification of transit buses, ultimately requiring 100% of public bus purchases to be zero-emission vehicles by 2032.[21] Further, it clearly signals that goals for the entire MHDV sector are to be set by the end of 2020,[22] less than a year after the law itself was passed and less than seven months from now. Without systematic and clear attention, it is not clear New Jersey can fulfill MHDV-specific requirements within the timelines set out in the PIV law.[23] Moreover, it is worth noting that Public Service Electric and Gas ("PSE&G"), in its currently pending Clean Energy Future-Electric Vehicle/Energy Storage filing,[24] has proposed nothing that would advance electrification of transit buses despite having the service territory that is home to more polluting New Jersey Transit buses than any other. Importantly, low-income customers are unlikely to be early owners of light-duty EVs without additional policy support for them to purchase such vehicles (and many low-income residents of New Jersey don't even own internal combustion engine cars).Thus, the electrification of transit buses and other MHD vehicles that presently belch significant pollution in vulnerable communities is likely the best near-term opportunity to ensure that low-income New Jersey residents benefit directly from the early phases of vehicle electrification.

There is a real risk of utility companies holding up this environmentally beneficial market transformation. Though nascent, and though some portions of the sector require policy support, it is also clear that MHDV technology is advancing rapidly.[25] For example, Bloomberg estimates

RGGI Strategic Funding Plan: Years 2020 through 2022 (Apr. 17, 2020), *available at* https://nj.gov/rggi/docs/rggi-strategic-funding-plan.pdf.

[20] N.J.S.A. 48:25-1 et seq.

[21] N.J.S.A. 48:25-3(a)(9).

[22] *Id*. at (a)(10).

[23] *Id*. (a)(9) and (10).

[24] Petition of Public Service Electric and Gas Company, *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 (Oct. 11, 2020), *available at* https://nj.pseg.com/aboutpseg/regulatorypage/-/media/6EA1F476B43F4BCBAB7D5F7A46E19DF7.ashx.

[25] Navigant Research, *Medium and Heavy Duty Trucks and Buses with Hybrid, Plug-In Hybrid, Battery Electric, and Fuel Cell Powertrains: Global Market Analysis and Forecasts* (2018)*, available at* https://www.navigantresearch.com/reports/market-data-electric-trucks-and-buses.

that 80 percent of transit buses globally will be electric by 2040.[26] CALSTART's Zero-Emission Technology Inventory estimates there will be 195 MHDV models available or announced by 2023, roughly double the number in 2019.[27] However, as with LDVs, it is clear that the lack of charging infrastructure is perceived as a significant barrier to fleet electrification for many entities – which means that these deployment estimates hinge on the availability of charging equipment.[28] Further, New Jersey must be prepared to take on significant increases in electricity loads from MHDVs. Mismanagement of this transition – for example, by forestalling attention to MHDV needs, thus necessitating duplicative upgrades of the same infrastructure being upgraded to support LDV electrification – could delay further market traction in this space and increase the costs of this transition. Ultimately, fleet owners and/or ratepayers would bear these avoidable costs.

Second, MHDVs have vastly different characteristics than LDVs. These vehicles have larger batteries, which leads to higher demand, longer charging time, and higher overall energy consumption. As a consequence, MHDVs can have vastly larger grid impacts than LDVs, especially if large numbers of them are charged in depots at particular locations and times, which is a reasonable expectation for many fleets based on present duty cycles of such vehicles. Additionally, the universe of MHDVs is far more diverse than that of LDVs, given the incredible variety of functions they serve.[29] For example, the power and service needs of public transit buses will be very different from those of delivery trucks, refuse trucks, drayage trucks, or heavy construction equipment like a bulldozer – and their divergent power and service needs mean that their infrastructure needs are also likely to diverge. Planning for MHDV infrastructure needs while the infrastructure needed for the light-duty sector can improve the economics of both, if duplication can be avoided by adding more capacity during initial upgrades. But developing the light-duty piece of the EV infrastructure ecosystem as an isolated initiative, without keeping future MHDV needs in mind, will not meaningfully prepare the utilities or the system to support the development of the charging infrastructure required by the more demanding and complex medium- and heavy-duty sector, and will result in higher costs in the long run.

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[26] Bloomberg New Energy Finance, *Electric Buses in Cities*, (Mar. 29, 2018), *available at* https://c40-production-images.s3.amazonaws.com/other_uploads/images/1726_BNEF_C40_Electric_buses_in_cities_FINAL_APPROVED_%282%29.original.pdf?1523363881.

[27] CALSTART, Zero-Emissions Technology Inventory, "Model availability to double by 2023," (June 3, 2020), *available at* https://globaldrivetozero.org/tools/zeti-analytics/.

[28] *NJ EMP* at 65. *See also* McKinsey, *Charging ahead: Electric-vehicle infrastructure demand*, (Aug. 2018), *available at* https://www.mckinsey.com/~/media/McKinsey/Industries/Automotive%20and%20Assembly/Our%20Insights/Charging%20ahead%20Electric-vehicle%20infrastructure%20demand/Charging-ahead-electric-vehicle-infrastructure-demand-final.ashx.

[29] *See, e.g.,* California Air Resources Board, Public Hearing to Consider the Proposed Advanced Clean Trucks Regulation, Staff Report: Initial Statement of Reasons (Oct. 22, 2019), Exhibit E (Zero Emission Truck Market Assessment), *available at* https://ww3.arb.ca.gov/regact/2019/act2019/appe.pdf.

Finally, MHDVs are critical to equitable electrification of the vehicle sector. They are responsible for an outsized portion of harmful, localized pollution from transportation, including nitrogen oxides ("NOx") and particulate matter.[30] This pollution disproportionately impacts certain communities across the state, often low- and moderate-income and environmental justice communities.[31] This is especially true of diesel vehicles that contribute to heightened levels of diseases such as asthma and heart disease.[32] Far more than for the LDV sector, electrifying the MHDV sector will result in outsized air quality benefits for communities experiencing the worst pollution burdens. Conversely, delaying the electrification of this sector will perpetuate public health inequities that have plagued these communities for far too long.

The EMP recognized this, prioritizing electric public transportation in environmental justice communities for the reasons described above.[33] To prepare the state for this equitable transformation and garner the significant benefits associated with it, BPU must devote systematic attention to the MHDV sector. Equity demands that MHDVs emitting diesel fumes in environmental justice communities be an early and urgent focus of BPU's electrification strategy.

For all of these reasons, infrastructure to support electric MHDVs is a distinct part of the EV ecosystem that needs to be viewed through a separate lens, but developed simultaneously with, infrastructure to support electric LDVs.

4. Equity Must Guide All EV Ecosystem Decision-Making

EDF appreciates the Straw Proposal's emphasis on equity as a key consideration in vehicle electrification. Low- and medium-income and environmental justice communities across the state continue to experience a disproportionately large share of New Jersey's environmental burdens while often failing to accrue environmental benefits.[34] Without active, deliberate policies and action, there is a substantial risk that these communities will continue to be left out of New Jersey's clean energy progress. Through this proceeding, BPU has the opportunity to reverse some of this injustice by elevating equity throughout its vehicle electrification decision-making.

It is important that BPU ensure that communities and community-based organizations are included in the selected approach to developing the EV infrastructure ecosystem from the outset in order to ensure that the EDCs' programs and investments are structured to adequately address equity concerns. This will necessarily involve establishing and maintaining respectful

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[30] *NJ EMP* at 59.
[31] *Id*. at 61.
[32] Y. Huang *et al.*, "Global climate and human health effects of the gasoline and diesel vehicle fleets," *GeoHealth* (2020), *available at* https://agupubs.onlinelibrary.wiley.com/doi/pdf/10.1029/2019GH000240.
[33] *Id*. at 8.
[34] *NJ EMP* at 198.

relationships with community leaders, organizations, businesses, governments, and other stakeholders who can provide a necessary, locally-informed perspective on the unique risks and tensions implicated by BPU or utility decisions. Further, this accords with key BPU directives[35] and the spirit of the EMP,[36] both of which emphasize the need to consider environmental justice and participation by the communities most impacted by air pollution.

5. Prepare for Optimal Charging: Technology, Standards, and Price Signals

EV charging has been shown to place downward pressure on utility rates broadly by improving system utilization overall, but this outcome cannot be taken for granted; rather, the electric EV infrastructure ecosystem, including the price signals experienced by vehicle owners, must be deliberately designed to achieve these outcomes. Overall, rates should facilitate electrification by providing an affordable, manageable value proposition to vehicle owners while incentivizing them to minimize the costs they impose on the grid and, ideally, to maximize the benefits they provide. In the case of MHDVs – which, as noted earlier, are an extraordinarily diverse group with divergent needs and capabilities – this is less a question of particular rate designs and more a question of a principled approach. Moreover, the system must embed the technology and standards that make efficient price signals possible.

As previously discussed, MHDV charging will involve a wide variety of energy and operational needs. Fleet customers are differentiated based on their size, the duty cycle of the vehicles and how flexible it is, the extent of their prior experience with complex electric rates, and other factors. It is important to ensure that there are rates that are understandable and manageable even for small businesses with MHDVs; and outreach and education will be important for building understanding of even simple rates, as well as laying the groundwork for future migration to more complex rates. Those who can manage the most complexity and granularity may be well-positioned to provide services to the grid and realize economic benefits for themselves. It is essential to recognize that in light of this diversity, there will not be a single fleet-charging rate that works well for all or most MHD EV owners; rather, a variety of optional rates will be necessary to rapidly scale up electrification of this sector.

Some Principles for Rate Design. Pricing of electric service has an essential role to play in: ensuring that operating electric MHDVs is affordable for truck and bus operators; that the grid burden imposed by MHDV charging is not excessive; and that the benefits of MHDV electrification can be fully realized. Some important principles to keep in mind include the following:

- **Well-designed rates should help ensure the grid costs no more than it needs to, based on actual grid costs.**

[35] Exec. Order No. 23 (Apr. 20, 2018), 50 N.J.R. 1241(b) (May 21, 2018).
[36] *NJ EMP* at 197-214.

- *Pricing should encourage customers to keep their demand, especially their peak demand, from being excessive.* Well-designed time-variant volumetric charges may provide an adequate signal to contain demand for some customers, especially those with smaller loads. However, the larger any specific load becomes, the more important it may be to provide a price signal that directly shapes demand – that is, a demand-based rate of some kind.
- *Pricing should provide a disincentive to charge at high-cost times.* Both demand-based and volumetric rates can accomplish this.
- *The price of the energy commodity should generally be volumetric*, reflecting the reality of how individual units of energy are purchased at wholesale to serve load. Moreover, to reflect the fact that wholesale clearing prices for units of energy vary constantly, energy prices should always be time-variant. Additionally, rate options should be based on level of granularity – from relatively crude time-of-use structures to fully dynamic pricing.
- *To encourage charging in areas of the grid where costs are especially low, incentives can be used.* In addition to temporal differences in costs, there are geographic differences as well; however, utility rates for energy consumption are generally uniform throughout a service territory. To the extent that EV charging could be especially beneficial at particular locations, price signals to encourage such beneficially-located charging could be incentivized via a geographically targeted incentive available outside the tariff.

- **To ensure rapid electrification occurs on a widespread basis, rates must allow vehicle operators to keep their bills manageable.**
  - *Demand-based rates can be challenging for some types of commercial charging customers – particularly publicly-accessible charging customers, but also fleet owners with potentially unpredictable, round-the-clock duty cycles.* Although volumetric rates are an option, the importance of managing demand for very large customers means developing demand-based rates that can be made manageable for those customers should be a high priority.
  - *Demand-based rates should generally be based on coincident demand.*[37] For customers who are able to charge mostly off-peak, this by itself may make demand charges manageable.
  - *Innovations in demand-based rates can also make them more palatable.* For example, subscription charges that allow customers to specify a level of demand and try to stay below it, with new peaks not necessarily leading to permanently higher bills, provide an example of demand-based rates that might work well for some fleets. Other methods that avoid punitive results from inadvertent overages may also be possible, such as assessing demand based on several high-demand periods rather than a single peak.
- **Well-designed pricing is essential for realizing the grid and environmental benefits of MHDV charging.** Some medium- and heavy-duty electric vehicle fleets extremely well suited for providing grid services, such as load balancing that allow the grid to work more efficiently and to integrate higher levels of intermittent renewable generation at low cost. Granular pricing for power consumption is an important first step for enabling these

[37] Coincident charges are applied from when the highest amount of energy is demanded across the relevant grid. Peak time energy usage on that grid will have the highest charges while off-peak times will have the lowest. Non-coincident charges are based on a customer's highest energy demand, regardless of when it occurs.

benefits; as the market matures, directly paying MHDV customers for services provided will become an increasingly important part of operating the grid at low cost while also improving the EV value proposition available to vehicle owners and operators.

Vehicle-Grid Integration. With the right technology and sufficiently granular price signals, vehicle owners and operators can provide a wide variety of values to the grid – ranging from peak reduction to energy storage/discharge onto the grid to highly time sensitive needs such as voltage support and frequency regulation.[38] By leveraging electric vehicles' inherent flexibility to provide highly time-sensitive services through optimal vehicle-grid integration, utilities can help integrate more renewable generation in order to meet the State's goal of 100% clean energy by 2050, as well as EV goals adopted now and in the future, in the most cost-effective manner.[39] VGI includes unidirectional charging services ("V1G") and bidirectional vehicle-to-grid ("V2G")/vehicle-to-building ("V2B") capabilities. In the context of an emergency, electric vehicles with V2G/V2B capability can be an asset insofar as they can provide emergency power when the grid is out. BPU must ensure New Jersey is prepared to harness the VGI capabilities of EV and improve grid resiliency.[40]

Technology and Standards for Optimal Charging. Optimal charging/VGI is only possible with billing and metering systems capable of supporting a wide variety of rate structures that evolve over time. Where EV load may be more flexible than other load at a given premises, submetering can be leveraged to apply such pricing specifically to vehicles.[41] Allowing the

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[38] *See* N. Deforest *et al.*, "Day ahead optimization of an electric vehicle fleet providing ancillary services in the Los Angeles Air Force Base vehicle-to-grid demonstration," *Applied energy*, 210, 987-1001 (Jan. 15, 2018), *available* at https://reader.elsevier.com/reader/sd/pii/S0306261917309418?token=E8D0250737AB10AAC9EEA328FB9BA69E84A169C21F6526EE5DAAC144A2C46CAB85BA8CF91F6B29DC4E33D2DFD65CF399. Other capabilities including demand charge management, integration of intermittent renewables, and peak load reduction, are being explored by Nuvve Corporation and American Honda Motor Co., Inc. *See* Nuvve Press Release, "Nuvve Corporation and Honda are Collaborating to Demonstrate the Benefits of Vehicle Grid Integration (VGI)," (April 25, 2019), *available at* https://www.prnewswire.com/news-releases/nuvve-corporation-and-honda-are-collaborating-to-demonstrate-the-benefits-of-vehicle-grid-integration-vgi-300837982.html.

[39] *See, e.g.*, C. Zhang *et al.*, "Quantifying the benefits of electric vehicles on the future electricity grid in the midwestern United States," *Applied energy*, 270 (July 15, 2020), *available at* https://www.sciencedirect.com/science/article/abs/pii/S0306261920306863 *and* J. Coignard *et al.*, "Clean Vehicles as an Enabler for a Clean Electricity Grid," ENVIRON. RES. LETT. 13 (2018) 054031, *available at* https://iopscience.iop.org/article/10.1088/1748-9326/aabe97/pdf.

[40] Nissan already offers this service for cars. *See* Nissan Motor Corporation, *EVs as Power Source for Living, available at* https://www.nissan-global.com/EN/TECHNOLOGY/OVERVIEW/vehicle_to_home.html. Proterra, a manufacturer of electric buses, now offers a bidirectional charger with V2G capability. *See* Proterra, "Proterra Introduces New High Power Interoperable EV Charging Technology," (May 7, 2018), *available at* https://www.proterra.com/press-release/proterra-introduces-new-high-power-interoperable-ev-charging-technology/.

[41] To the extent that more efficient results may be achieved by placing vehicle load on a different price structure than other load at the same premises, there is no reason to allow the cost of separate metering or submetering to be a barrier to doing so. Submetering-like functionality that is sufficiently reliable to be used as the basis for pricing is built into electric vehicle supply equipment. This has been demonstrated by Xcel Energy through a pilot. *See*, Xcel

submetering functionality built into EVSE to be used in this manner can reduce the cost of putting EV charging on a granular rate by thousands of dollars, unlocking significant additional opportunity for valuable VGI optimization.

It is also essential that New Jersey adopt consistent standards, including communications standards as well as standardized data formats for metering (including submetering). These are important for enabling a wide variety of EV Supply Providers ("EVSPs") to participate in the marketplace, and for customers to change EVSPs without undue cost, confusion, and complexity. New Jersey can benefit from work already done in leading states such as California, which have established various best practices and standards New Jersey can readily adopt. These include Open Charge Point Protocols (OCPP)[42] and requiring charging stations to have Open Automated Demand Response (OpenADR).[43] Standards such as these are critical to ensuring interoperability as well as to avoid stranding assets when the mix of market participants changes. As the EV infrastructure ecosystem takes off and evolves, the state will need to ensure emerging issues in EV development are addressed promptly and in a manner that aligns with accepted standards. Establishing a standing stakeholder working group that includes participants familiar with emerging practice in other jurisdictions will help the Board and EDCs stay up to date.

Relatedly, the Straw Proposal uses the term "managed charging" on page 13 but does not define this phrase in the terminology section of the Straw Proposal. As Staff has welcomed suggestions for terms that should be included in the list (but currently are not), we would recommend expressly defining "managed charging," which is also known as "smart charging." Smart charging means adapting the charging cycle of EVs to both the conditions of the power system and the needs of vehicle users. This facilitates the integration of EVs and the grid while meeting mobility needs.[44] The advantages and opportunities from smart charging will evolve as the EV

Energy, *Compliance Filing – Residential Electric Vehicle Charging Tariff*, Docket No. E002/M-15-111 & E002/M17-817 at 10 ("With EVSE that can provide billing quality data of on and off peak charging, customers are able to avoid the high cost of having a second meter on their premises") and 21 ("Through on-site product testing, both vendors' charging equipment met the requirement for metering data at an accuracy of plus or minus two percent, a 10 standard that is enforced by the [Minnesota Public Utilities] Commission for traditional metering technology.") (May 31, 2019), *available at* https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId={4E71E55E-AEE5-43B2-87B7-4E1BDFCC47C9}&documentTitle=20157-112040-01.

[42] OCPPs standardize communication between EVSE and Electric Vehicle Service Providers (EVSP), allowing systems from different vendors to communicate with each other. This prevents companies from using proprietary communication standards, which could strand assets if the EVSP goes bankrupt. In California, where the electric vehicle marketplace has had some time to develop, some EVSE funded by ratepayers have been rendered useless this way. By adopting a generally accepted standard, New Jersey can avoid that risk.

[43] OpenADR is a demand response standard for sending and receiving signals for load and generation flexibility at both the regional transmission organization and utility levels. This will enable EV charging customers to participate fully in the marketplace as it matures.

[44] *See* International Renewable Energy Agency, *Innovation landscape brief: Electric-vehicle smart charging* (2019), *available at* https://irena.org/-

ecosystem and grid develop synchronously. Early on, external signals may primarily encourage users to shift charging away from peaks and/or allow grid operators to avoid excessive load at certain times. But over time, smart charging may come to encompass a range of much more sophisticated practices to provide energy services (even fairly granular ones such as frequency regulation). Laying the groundwork for smart charging requires a future-proofed combination of hardware, software, and standards in which the most beneficial charging behaviors can flourish, even as expectations for what is most beneficial change over time.

6. The Straw Proposal Must Explain its Marketing, Education, and Outreach Approach

Marketing, education, and outreach ("ME&O") are essential for successful vehicle electrification in New Jersey. Yet the Straw Proposal makes little to no mention of BPU's plans for these vital aspects of their EV build out programs. Extensive ME&O will be necessary for informed, effective, and equitable development of New Jersey's EV ecosystem.

BPU and New Jersey's EDCs should provide details, commitments, and concrete plans of action for the extensive ME&O this proceeding requires. BPU should explain how it will provide education about the health, environmental, and economic benefits of EVs, and should also discuss how they will guide people and businesses in utilizing the relevant incentives, rebates, and power rates associated with EVs and EVSE. Utilities cannot merely post information on their websites. Information should be disseminated actively and made available in multiple formats and languages. EDCs should connect stakeholders with knowledgeable representatives to timely answer any questions or concerns about their programs.

ME&O will need to be specially targeted and formatted for different classes of stakeholders, including municipalities, community-based organizations, local environmental groups, potential fleet owners, businesses of various sizes, and critical load sites (e.g. shelters, schools) among others. And as previously mentioned, BPU and EDCs will need meaningful, ongoing engagement with these various stakeholders to assess their needs and maintain open lines of communication. Stakeholders should be able to provide feedback at many points along BPU and EDC decision-making around EV ecosystem development. In other words, creating and preserving transparency throughout every stage of this process is absolutely paramount.

In the case of medium- and heavy-duty vehicle electrification, which is a nascent sector about which little is widely known since much is just emerging, ME&O should include studying the market potential for MHDV electrification in New Jersey. This would entail EDCs undertaking affirmative outreach to customers within their territories to identify those who are or may soon be undertaking electrification initiatives. A market potential study can be an important first step

/media/Files/IRENA/Agency/Publication/2019/Sep/IRENA_EV_smart_charging_2019.pdf?la=en&hash=E77FAB7422226D29931E8469698C709EFC13EDB2.

for the EDCs to understand the task ahead of them, while also providing an opportunity to educate their customers about the process – which may take several years – of arranging for the charging capacity needed to support a major fleet electrification initiative.

Another area where the MHDV fleets will have a particularized need for ME&O as they electrify is rate design. Not all commercial customers will have experience with complex electric rates prior to electrification. Although some fleet owners are commercial or industrial customers with significant electric energy needs and long experience managing complex rates, some owners of diesel vehicles – or even entire fleets – may have had relatively small electric energy needs prior to switching from diesel to electric vehicles. Making it possible for these types of businesses and institutions to participate successfully in the future EV charging marketplace will entail significant education and outreach to ensure that they are charged rates they can manage, and that they understand and have the requisite technology to in fact understand and manage the price signals they face.

III. CONCLUSION

EDF respectfully requests that the Board consider the foregoing comments in taking any action in this docket and proceeding to expedite the state's readiness for widespread electrification of transportation. We appreciate the opportunity to comment on this crucial piece of New Jersey's decarbonization, and welcome future engagement as the process continues.

Respectfully submitted,

Elizabeth B. Stein
Lead Counsel, Energy Transition Strategy
Environmental Defense Fund
257 Park Avenue South
New York, New York 10010
(212) 616-1327