June 5, 2023

Hon. Michelle L. Phillips, Secretary
New York State Public Service Commission
Three Empire State Plaza
Albany, New York 12223-1350

VIA ELECTRONIC SUBMISSION

Subject: Case 23-E-0070 – Proceeding on Motion of the Commission to Address Barriers to Medium- and Heavy-Duty Electric Vehicle Charging Infrastructure

Dear Secretary Phillips:

In response to the Public Service Commission's Order Instituting Proceeding and Soliciting Comments issued and effective April 20, 2023 (the "Order"), and the Notice Extending Comment Period issued and effective May 12, 2023, the Institute for Policy Integrity at New York University School of Law[1] ("Policy Integrity") and Resources for the Future ("RFF") respectfully submit the following initial comments.

Policy Integrity is a non-partisan think tank dedicated to improving the quality of government decisionmaking through advocacy and scholarship in the fields of administrative law, economics, and public policy. Policy Integrity has extensive experience advising stakeholders and government decisionmakers on the rational, balanced use of economic analysis, both in federal practice and at the state level.

RFF is an independent, nonprofit research institution in Washington, DC. Its mission is to improve environmental, energy, and natural resource decisions through impartial economic research and policy engagement. RFF is committed to being the most widely trusted source of research insights and policy solutions leading to a healthy environment and a thriving economy. While RFF researchers are encouraged to offer their expertise to inform policy decisions, the views expressed here are those of the individual authors and may differ from those of other RFF experts, its officers, or its directors. RFF does not take positions on specific policy proposals.

[1] This document does not purport to present the views, if any, of New York University School of Law.

We are grateful for your consideration of these comments.

Sincerely,

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On April 20, the Public Service Commission (the "Commission") commenced this proceeding to address the electrification needs of the State's medium- and heavy-duty vehicle sector. The Order explains that such a proceeding is necessary to ensure achievement of the state's greenhouse gas reduction goals and will be essential to addressing the disproportionate pollution burden borne by certain areas including disadvantaged communities. It also signals a strong awareness that achieving these emission reductions through electrification will require new infrastructure investments, stating that "significant increases in the availability of zero-emission public transportation services and infrastructure will be needed to adequately address the non-attainment counties and to enable the 40 to 75 percent of zero-emission MHD vehicle sales by 2035 required by the [Department of Environmental Conservation's] Advanced Clean Trucks regulation."

As a first step toward addressing the identified needs, the Commission has posed a series of questions to stakeholders; these initial comments are limited to question 12, which asks "How can managed charging programs reduce upfront infrastructure needs?" On the whole, our response is centered around depot charging, in which multiple vehicles are charged by their operator at infrastructure that is controlled by that operator and (typically) used exclusively by that entity. To that end, our comments draw on research that examines fleet charging needs in this type of depot setting; in a charging hub or other shared charging context, we would expect that different analysis and tools would be needed.

I. To be maximally effective at reducing infrastructure needs, managed charging programs would need to align price signals experienced by charging customers with overall system costs.

Existing research, including research commissioned by New York government agencies, suggests that managed charging can reduce upfront infrastructure needs. For example, the Transportation Electrification Distribution Impact Study ("TEDI Study") prepared by Resource Innovations for New York State Energy Research and Development Authority ("NYSERDA") suggests that whether and how vehicle charging is managed could have a decisive impact on the total cost of distribution system upgrade costs, with managed charging lowering the total net present value of costs by 46 percent in the low distribution system impact scenario and by 61 percent in the high distribution system impact scenario.[2]

In the TEDI Study, "Managed charging measures modeled… primarily focus on managing EV load around [New York Independent System Operator ("NYISO")] system net load after the integration of renewables – referred to as 'system peak avoidance.'" While this may be a reasonable assumption for a statewide study, it is important to recognize that charging customers may manage their charging in any one of a number of ways – including, for example, shifting their own maximum load to avoid the statewide system peak (i.e., the NYISO peak experienced at the transmission level) and/or the network peak (i.e., a local distribution peak that may or may not coincide with the system peak), flattening their demand throughout the period during which they charge, and/or fluctuating charging speed in order to provide grid services.[3]

The various objectives with respect to which charging load can be managed may not always align with one another. And, as a general matter, to the extent they have the technical capability of doing so, charging customers should be expected to optimize ultimately for their

[2] New York State Energy Research and Development Authority (NYSERDA). 2022. "Transportation Electrification Distribution System Impact Study," NYSERDA Report Number 22-13. Prepared by Resource Innovations, CA. nyserda.ny.gov/publications at 41.

[3] These comments do not address question 11(a) set forth in the Order, concerning the maturity of vehicle-grid integration technology.

own lowest total cost of charging, accounting for, to the extent applicable, utility rates, supply charges of all kinds (regardless of whether the customer takes supply from the utility or from a third party), and payments for grid services provided by the customer,[4] as well as any incentive payments and/or penalties arising from dedicated managed charging programs. To maximize the benefits from reduced infrastructure investment requirements that managing charging can provide, the *combined* effect of these myriad price signals – tariffs, wholesale price signals actually experienced by customers, revenue opportunities associated with performing grid services, and managed charging programs – will need to incentivize charging behavior that minimizes distribution system impacts.

Assessing the magnitude of the reduction in infrastructure investment need available from managing the charging of medium- and heavy-duty electric vehicles requires a granular understanding of the infrastructure need as well as a granular understanding of the future vehicle population and its geographic characteristics. Importantly, the ability of vehicle and fleet owners and operators to manage their charging can be expected to vary significantly based on vehicle type and operational needs. Price responsiveness and flexibility across fleet type is a question that we are currently exploring in joint research conducted by RFF, Policy Integrity, University of North Carolina, University of Illinois, and CALSTART. This analysis employs observed telematics data (extracted from the Department of Energy's Livewire data platform) for a variety of diesel truck and bus fleets across the country (including school buses, transit buses, refuse trucks, and delivery vehicles) to develop hypothetical operating cycles. From these simulated operational cycles (which identify dwell times and daily vehicle miles traveled requirements), hypothetical charging loads assuming highly simplified battery behavior – first based on an

[4] To the extent electric vehicle and fleet owners are technically able to provide ancillary services, the resulting income stream may be a meaningful piece of the total pricing environment they experience.

unmanaged charging profile, and next based on responsiveness to the price signals provided by the underlying electric tariff are simulated. A wide range of existing commercial tariffs, extracted from the Utility Rate Database, are used to understand each fleet's ability to react to pricing and the potential private economic benefits (in the form of reduced electric bills) from shifting demands into off-peak hours and reducing maximum demands by slowing the speed of charging (as applicable, depending on what is incentivized by the applicable tariff). Our research is limited to tariffs that include both distribution charges and the energy commodity, which is not typical of commercial tariffs in New York and other states where electric utilities have been restructured. Preliminary results of our still ongoing research suggest that, among the fleet types we are examining, the ability to shift maximum demand and the ability to flatten demand to fill the available dwell time vary significantly depending on the fleet's operational needs. In particular, the relationship between high cost times and the fleet's hours of operations and dwell periods will determine the extent to which managed charging can result in *both* decreased bills and decreased system impacts. Initial findings indicate that the benefits of managed charging depend on the underlying tariff.

A different study, conducted by Gladstein, Neandross & Associates ("GNA") on behalf of Environmental Defense Fund in 2021,[5] explored similar research questions using a much more granular and locationally specific methodology, by closely analyzing two specific existing fleets of Class 8 trucks in California, based on a full year of detailed information provided by the fleet owners. The study simulated the fleets' unmanaged loads given operational requirements, and then simulated managed charging profiles (with and without distributed energy resources ("DERs")) whereby the fleets respond to a variety of actual tariffs available from California

[5] Gladstein, Neandross & Associates (GNA). 2021. California Heavy-Duty Fleet Electrification Summary Report. https://cdn.gladstein.org/pdfs/whitepapers/california-fleet-electrification-case-study.pdf

utilities. The report found that each of these fleets had the possibility to reduce maximum demands during peak hours by shifting loads into off-peak hours, thereby increasing base load. Though the maximum benefits to the fleets accrued under a DER adoption scenario, even without these technologies, managed charging that responds to existing time-varying tariffs allowed for on-peak demand reductions and better utilization of existing infrastructure in off-peak periods. However, despite the similarities between the fleets – both were fleets of 40-50 class 8 semi-tractors in the same state – their respective abilities to reduce their individual peak loads based on the analyzed tariffs were significantly different in magnitude, illustrating the diversity in opportunities and outcomes based on the specific facts on the ground.

Both the EDF-GNA study and our ongoing research suggest that consideration of the relationship between fleet operations and the pricing environment – and the resulting grid implications – is highly fact-specific. Unfortunately, to our knowledge, no detailed consideration of New York truck and bus fleet operations analyzing the electric pricing environment experienced by New York fleets has been done to date. This gap suggests an urgent need to conduct similar analyses of potential fleet operations considering actual pricing associated with existing tariffs, wholesale market operations, and applicable programs, applicable within New York's utility service territories.

II. To be maximally effective at reducing greenhouse gas emissions and emissions that are harmful to human health, managed charging programs would need to align the price signals experienced by charging customers with marginal power sector emissions while adjusting for the deleterious emissions impact of increased diesel vehicle use if charging becomes uneconomic.

Section 1 of this comment describes a pricing environment that would incentivize the minimization of infrastructure costs. As discussed in the introduction to these comments, however, the Order describes the electrification of medium- and heavy-duty vehicles as necessary to achieve New York's greenhouse gas goals and as having important ramifications for disadvantaged communities, including nonattainment areas.[6] Electrification is, by its nature, an effective means of entirely eliminating a vehicle's tailpipe emissions; however, when diesel fuel is replaced with electric generation, the exact emissions outcomes enabled by electrification will depend in part on what electric generation is dispatched to serve the new load. It is important to recognize that electric infrastructure cost mitigation and overall emissions reductions are two different potential goals of managed charging, and that a pricing environment designed to optimize for one cannot also be expected to optimize for the other. That is, a pricing environment that successfully incentivizes vehicle and fleet operators to minimize their system cost impacts is unlikely also to be a pricing environment that incentivizes optimal emissions outcomes *from charging*, unless the high cost and high electric generation emissions periods occur at exactly the same time of day. This is important to recognize if this proceeding is to achieve the Commission's stated purpose, namely, "[t]o ensure a holistic approach that supports the decarbonization goals codified in the Climate Leadership and Community Protection Act."[7]

In Case 22-E-0236, the Joint Utilities ("JU") filed an Immediate Solution Program Design on March 21, 2023[8] in response to the Commission's January 19, 2023 *Order*

[6] *See* Order at 1-2.
[7] *See* Order at 1.
[8] Case 22-E-0236, *Proceeding to Establish Alternatives to Traditional Demand-Based Rate Structures for Commercial Electric Vehicle Charging*, Joint Utilities Immediate Solutions Program Design (Mar. 21, 2023) [hereinafter, "Program Design"].

Establishing Framework for Alternatives to the Traditional Demand-Based Rate Structure.[9] This Program Design includes operating cost relief programs that would be available to electric fleets across the different service territories. The Downstate Utilities proposed a Commercial Managed Charging Program ("CMCP") that would include two incentives: a "Pro-Rated Peak Avoidance kW Incentive" that pays the fleet for peak period kWs avoided, and an "Overnight Off-Peak Charging kilowatt-hour (kWh) Incentive" that rewards fleets for shifting charging into overnight periods.[10] Crucially, the CMCP appears designed to incentivize shifting of demands into the off-peak period in order to reduce distribution costs, yet it does not address any potential environmental impacts of the shifting behavior.

If the Commission seeks to prevent the incremental generation due to vehicle charging from resulting in more air emissions than necessary, while prioritizing mitigation of infrastructure costs, it would need to consider the impact of the pricing environment that influences managed charging decisions on generation deployment, and consider adjustments if it finds that fleet owners and operators are incentivized to use highly-emitting generation. For example, where high-emissions periods for generation occur outside peak periods identified based on infrastructure costs, extending those peak periods to include more of the high-emissions period could be desirable. Ideally, this would be done based on localized data, as peak emissions periods may vary by location and season, and would be regularly revisited in response to changes in grid make-up. Ensuring that the hours of off-peak pricing experienced by vehicle charging customers do not include high-emission periods can reduce the pollution and climate change impacts of EV charging, leading to greater social benefits.

[9] Case 22-E-0236, *Proceeding to Establish Alternatives to Traditional Demand-Based Rate Structures for Commercial Electric Vehicle Charging*, Order Establishing Framework for Alternatives to the Traditional Demand-Based Rate Structure (Jan. 19, 2023).
[10] Program Design at 5.

The overlapping objectives of emissions reductions and avoided infrastructure investments may be achievable but would require further study and simulation to understand the ability of fleets to respond to different timed price signals (along with any additional monetary incentive provided for avoiding peaks) that reflect both the environmental impacts and the distribution cost impacts of charging. Additional research in this area can assist the Commission with achieving its stated purpose of supporting Climate Leadership and Community Protection Act decarbonization goals, and more generally to encourage the utilities to "formulate and carry out long-range programs… with economy, efficiency, and care for the public safety, the preservation of environmental values and the conservation of natural resources."[11] For example, studies that assess the impact of existing and proposed tariffs and programs on a variety of charging scenarios, including realistic medium- and heavy-duty charging scenarios, and how tariff and pricing options compare in performance and outcomes (including potential air quality impacts as well as reduced infrastructure need) could provide a robust empirical foundation for future program design and Commission oversight of utility programs. In order for findings from such research to remain relevant to decisionmaking over time, they will require periodic reassessment as the composition of the generation fleet serving New York electric load evolves.

Moreover, to the extent the Commission seeks to be mindful of the total air emissions impact of the programs and tariffs it approves, it would need to be cognizant of the risk that price signals associated with charging could discourage charging altogether and thus give rise to lost opportunities to reduce diesel vehicular emissions. This is especially critical because, although electric pricing includes some elements that in effect require electricity users to internalize some of the pollution costs they impose on society, diesel users face no comparable price signals. This

[11] N.Y. Public Utilities Law Section 5(2).

speaks to the need to better understand the aggregate effect of the utility's tariffs and programs on overall customer costs related to charging (including purchases of energy from third party suppliers and any off-bill incentives or penalties) and the potential for customer savings from managed charging, in addition to quantifying the impact on emissions and infrastructure upgrades.