STATE OF NORTH CAROLINA
UTILITIES COMMISSION
RALEIGH

DOCKET NO. E-2, SUB 1197
DOCKET NO. E-7, SUB 1195

In the Matter of	**)**	
Application by Duke Energy Carolinas	**)**	**INITIAL COMMENTS OF**
LLC and Duke Energy Progress, LLC for	**)**	**ENVIRONMENTAL DEFENSE FUND**
Approval of Proposed Electric	**)**	
Transportation Pilot	**)**	

Pursuant to the North Carolina Utilities Commission (the "Commission")'s June 14, 2021 Order Requesting Comments on Proposed Revised Pilot Programs, Environmental Defense Fund ("EDF") submits the following initial comments regarding the Joint Request by Duke Energy Carolinas, LLC's ("DEC") and Duke Energy Progress, LLC's ("DEP") (DEC and DEP collectively, "Duke" or the "Companies") regarding the Joint Request by Duke Energy Carolinas, LLC and Duke Energy Progress, LLC for Approval of Phase II Electric Transportation Pilots Programs (the "Phase II Pilots Filing") in the above-referenced docket.[1] The Phase II Pilots Filing was filed by the Companies on May 24, 2021, as directed in the Commission's Order Approving Electric Transportation Pilot In Part (the "2020 ET Pilot Order").[2]

It is encouraging to see that the various proposals in the Phase II Pilots Filing have some

[1] *See In the Matter of the Application of Duke Energy Carolinas, LLC and Duke Energy Progress, LLC for Approval of Proposed Electric Transportation Pilot*, Docket Nos. E-2, Sub 1197 and E-7, Sub 1195 (Joint Request by Duke Energy Carolinas, LLC and Duke Energy Progress, LLC for Approval of Phase II Electric Transportation Pilot Programs at 11, 14, 16-17) (May 24, 2021), *available at*: https://starw1.ncuc.net/NCUC/ViewFile.aspx?Id=809c4bcf-12ad-4f21-b56c-28254fbcb202 [hereinafter "Phase II Pilots Filing"].

[2] *In the Matter of the Application of Duke Energy Carolinas, LLC and Duke Energy Progress, LLC for Approval of Proposed Electric Transportation Pilot*, Docket Nos. E-2, Sub 1197 and E-7, Sub 1195 (Order Approving Electric Transportation Pilot, In Part) (Nov. 24, 2020), *available* at: https://starw1.ncuc.net/NCUC/ViewFile.aspx?Id=1c1665d0-d645-4293-82d8-ae9d7e672e3d [hereinafter, "2020 ET Pilot Order"].

potential to spur some progress toward greater vehicle electrification, including electrification of medium- and heavy-duty vehicles, which is our primary focus. However, significant elements are missing and/or were not considered in the course of the stakeholder collaborative that was ordered to be convened in the 2020 ET Pilot Order (the "Collaborative"), including elements that could yield significant savings for North Carolinian ratepayers and better environmental and public health results, as well as elements that the Commission stated, in the 2020 ET Pilot Order, are required to be included in any pilot filing and that are essential to effectively standing up the electrified vehicle marketplace.[3]

In these comments, we discuss several elements of a successful electrification program that are not addressed in the Companies' filings, and make recommendations to improve them, particular in relation to the electrification of medium- and heavy-duty vehicles ("MHDVs"). As a general matter, the Company's filings would be better poised to lay the groundwork for meaningful progress on electrification of MHDVs if they incorporated better consumer protections, better use of third-party funds, innovative rate designs, and a more robust vision for vehicle-grid integration. To further advance efforts to lay the groundwork for electrification at scale, we also discuss various elements that any medium-/heavy-duty transportation electrification program should include (reliance on emerging technology and data standards, well-tailored metering requirements, and well-tailored marketing, education, and outreach). Elements such as these are important for ensuring that the pilot programs will be able to provide meaningful insight into how Duke can support North Carolina's efforts to foster a full-scale electrified transportation system that is maximally beneficial at minimum cost to ratepayers, as contemplated in the Governor's Executive Order 80, North Carolina's Clean Energy Plan, and

[3] *See* Id. at 20-22.

the Commission's 2020 ET Pilot Order.[4]

Background

In 2019, Duke filed an Application for Approval of a Proposed Electric Transportation Program ("2019 Application") to address the electric vehicle ("EV") market in North Carolina.[5] Duke's 2019 Application included an EV Charging Management component, a Transit Electrification component (which consisted of an EV School Bus Charging component and an EV Transit Bus Charging component), and a Public Charging Expansion component.[6]

EDF evaluated the 2019 Application, as well as the new Phase II Pilots Filing, with particular attention to whether and how they would lay the groundwork for electrifying MHDVs such as trucks and buses. Transportation accounts for 32.5% of North Carolina's annual greenhouse gas emissions ("GHG"),[7] and Executive Order 80 requires statewide GHG reductions to 40% below 2005 levels by 2025.[8] In addition, diesel trucks and buses are a major source of emissions, such as NOx and particulate matter,[9] that are harmful to human health; for example, in North Carolina, heavy-duty diesel vehicles account for 23% of total NOx pollution from

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[4] *See* Executive Order No. 80, North Carolina's Commitment to Address Climate Change and Transition to a Clean Economy, October 29, 2018, *available at* https://files.nc.gov/ncdeq/climate-change/EO80--NC-s-Commitment-to-Address-Climate-Change---Transition-to-a-Clean-Energy-Economy.pdf [hereinafter "Executive Order No. 80"]; The North Carolina Department of Environmental Quality, *Clean Energy Plan* (October 2019) , *available at* https://files.nc.gov/ncdeq/climate-change/clean-energy-plan/NC_Clean_Energy_Plan_OCT_2019_.pdf at 12 ("Foster long-term energy affordability and price stability for North Carolina's residents and businesses…") and 69 ("…using a phased approach to the development of new performance incentive mechanisms could result in better informed targets and incentive levels that don't under- or over-compensate the utility."); 2020 ET Pilot Order at 21 ("…the Commission supports incentives where appropriate to collect data or encourage behavior with clear financial benefits to the system.").

[5] *In the Matter of the Application of Duke Energy Carolinas, LLC and Duke Energy Progress, LLC for Approval of Proposed Electric Transportation Pilot*, Docket Nos. E-2, Sub 1197 and E-7, Sub 1195 (Duke Energy Carolinas, LLC and Duke Energy Progress, LLC's Application for Approval of Proposed Electric Transportation Pilot) (March 29, 2019), *available at:* https://starw1.ncuc.net/NCUC/ViewFile.aspx?Id=991a74b5-15ed-46ca-9706-aac6d45897a7 [hereinafter, "2019 Application"].

[6] *See generally* Id.

[7] North Carolina Department of Environmental Quality, *North Carolina Greenhouse Gas Inventory (1990-2030)* (Jan. 2019) at 9, *available at* www.deq.nc.gov/GHGinventory.

[8] *See* Executive Order No. 80.

[9] *See generally* https://www.epa.gov/no2-pollution/basic-information-about-no2 and https://www.epa.gov/pm-pollution/health-and-environmental-effects-particulate-matter-pm.

mobile sources.[10] With an estimated 18% of North Carolina children living with an asthma diagnosis as of 2014,[11] the need to eliminate the tailpipe emissions from the trucks and buses that foul the air breathed by young lungs, including from the school buses they ride and that tend to idle in front of school buildings, is an urgent public health need.

On July 5, 2019, EDF submitted initial comments ("2019 Initial Comments") to the 2019 Application, recommending that Duke include adequate financing for customer cost recovery and support of EV MHDVs.[12] In EDF's 2019 Initial Comments, EDF recommended that Duke include on-bill financing, billing protection for electric ratepayers, rate design development, demand charge mitigation, third-party owned and operated direct current fast charging, make-ready cost recovery for customers, managed charging, submetering in the bus program, and more comprehensive education and outreach.[13] Then, on July 22, 2019, EDF filed reply comments ("2019 Reply Comments") responding to concerns raised in the initial comments of Public Staff and providing additional analysis regarding on-bill financing for transit fleets and school bus fleets.[14]

In July 2020, while the 2019 Application was pending, a significant shift in state

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[10] North Carolina Department of Environmental Quality, *State of North Carolina Volkswagen Mitigation Plan*, (Aug. 2018) at 4, *available at* https://files.nc.gov/ncdeq/Air+Quality/motor/grants/files/VW/NC_Final_VW_Mitigation_Plan_082018.pdf.

[11] North Carolina State Center for Health Statistics, *2013-2014 North Carolina Statewide CHAMP Survey Results: Asthma.* North Carolina Child Health Assessment and Monitoring Program. 2014, *available at* https://schs.dph.ncdhhs.gov/data/champ/201314/k11q01.html.

[12] *In the Matter of the Application of Duke Energy Carolinas, LLC and Duke Energy Progress, LLC for Approval of Proposed Electric Transportation Pilot*, Docket Nos. E-2, Sub 1197 and E-7, Sub 1195 (Initial Comments of Environmental Defense Fund) (July 5, 2019), *available at:* https://starw1.ncuc.net/NCUC/ViewFile.aspx?Id=fa8a9c13-3655-4b7d-8407-738c703f3a68 [hereinafter, "2019 Initial Comments"].

[13] *See* Id.

[14] *In the Matter of the Application of Duke Energy Carolinas, LLC and Duke Energy Progress, LLC for Approval of Proposed Electric Transportation Pilot*, Docket Nos. E-2, Sub 1197 and E-7, Sub 1195 (Reply Comments of Environmental Defense Fund) (July 22, 2019), *available* at *https://starw1.ncuc.net/NCUC/ViewFile.aspx?Id=52c15479-2b55-4ea1-8ba7-16fa202e2ccf* [hereinafter "2019 Reply Comments"].

government efforts to move the needle on emissions from trucks and buses occurred: fifteen states, including North Carolina, signed onto the Multistate Medium- and Heavy-Duty Zero Emission Vehicle Memorandum of Understanding ("MHDV MOU").[15] In the MHDV MOU, Governor Cooper and the other signatories acknowledged the urgent threat posed by diesel trucks and buses – acknowledging their statutory obligation to provide their citizens with air quality that meets federal standards and the role of MHDVs in harming air quality, the fact that MHDVs' emissions constitute an environmental justice problem that "directly and disproportionately impacts disadvantaged communities located near freight corridors, ports and distribution centers,"[16] and the fact that electrification of the entire transportation sector is "essential" to achieving greenhouse gas goals and eliminating these harmful air quality impacts.[17] The new MHDV MOU thus established commitments by signatory states to meet 2030 and 2050 targets for sales of zero-emissions MHDVs.[18] Governor Cooper and the other signatories specifically recognized that to achieve these goals, an additional set of programs, targeted to electrify trucks and buses – especially transit buses – would be needed to build on the programs that had previously been developed mainly for cars.[19]

Just over four months after North Carolina joined fourteen other states and the District of Columbia in committing to the need to electrify trucks and buses and acknowledging the need for programs tailored to electrifying that sector, the Commission issued its 2020 ET Pilot Order, approving portions of Duke's Electric Transportation Pilot and tabling others. With respect to

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[15] *See* Multi-State Medium- and Heavy-Duty Zero Emission Vehicle Memorandum of Understanding, https://www.nescaum.org/documents/multistate-truck-zev-governors-mou-20200714.pdf ["hereinafter MHDV MOU"].
[16] Id.
[17] *See* Id.
[18] Signatories to the MOU agreed to strive to make 30% of all MHDV sales zero-emissions by 2030, and 100% of MHDV sales zero emissions by 2050. *See* Id.
[19] *See* Id.

components of the order relating to MHDVs, the Commission approved a reduced version of the School Bus Charging program while declining to approve the Transit Bus program.[20] The Commission's Order declining to approve key elements of the 2019 Application, explained that the Commission was "not persuaded that the other programs proposed by Duke [were] appropriately focused and sized," and that "[t]hese programs, as currently proposed by Duke [were not] designed to sufficiently explore system benefits that would ultimately justify the estimated expenditure of ratepayer funds."[21]

In other words, the Commission declined to approve large programs for school buses or transit buses, but tasked the Companies with a second round of pilots which, it stated, should explore system benefits in a manner that would be sufficient to ultimately justify expenditures of ratepayer funds. To that end, the Commission required that pilots consider or include various attributes, including proper scale and scope; rate design; cost-benefit analysis; leveraging other funding; make-ready approach; objectives, metrics, and verification; and reporting and stakeholder engagement.[22] It is worth noting that several of these attributes pertain to scalability, with the Commission specifying, inter alia, that "[t]he scale and scope of a pilot program should be set in a manner that allows the utility to test a concept at a smaller scale without incurring substantial capital costs, such that if the pilot program is successful it can then be readily deployed system-wide with more assurance that it will be economically viable."[23] Overall, it appears that Commission was looking for small pilots – including pilots for school buses – that would lay the groundwork for electrification at scale. Given that utility programs for MHDV vehicles lag behind those for light-duty vehicles nationwide, North Carolina has an opportunity

[20] 2020 ET Pilot Order at 16.
[21] Id. at 20.
[22] *See* Id. at 20-21.
[23] Id. at 20

to play a leading role in promulgating full-scale programs for this sector by intentionally designing full-scale programs based on well-designed pilots.

The Commission ordered Duke and the Public Staff to "organize and facilitate a collaborative stakeholder process in compliance with the guidelines provided in this Order and file any stakeholder developed pilot programs within six months of this Order."[24] Thereafter, Duke and Public Staff met with an ET stakeholder group monthly beginning in December 2020, to develop the proposals for what ultimately became a second pilot filing.[25] The group was convened online approximately monthly over the six-month period. The typical meeting consisted of a presentation by the Companies (during which participants other than the utility could pose questions via the videoconference chat), whereupon presenters on behalf of Duke would address questions, after which Public Staff would typically respond to what they had heard from the utility during the last few minutes of each meeting. Toward the end of the six-month period, Duke filed its Request for Approval of Make-Ready Credit Programs on April 30, 2021, followed by the Request for Approval of Phase II Electric Transportation Pilot Programs on May 24, 2021.

The Phase II Pilots Filing may lay the groundwork for progress in some areas. However, although the Commission stated that the purpose of the second phase of the pilot was to "gather operational data needed to quantify the specific costs and benefits attributable to EV usage and to assign these costs and benefits to the appropriate parties,"[26] in the area of MHDV electrification, the Phase II Pilots Filing appear unlikely provide insight that will lay the groundwork for significant progress toward electrifying school buses.

[24] Id. at 22.
[25] *See* Phase II Pilots Filing at 11, 14, 16-17.
[26] 2020 ET Pilot Order at 20.

Electric Vehicle Supply Equipment ("EVSE") Tariffs

The only option Duke has proposed to facilitate customers' acquisition of EVSEs is EVSE Tariffs (one for each of the Companies) that the Companies say are modeled on "outdoor lighting programs" in the sense that, outdoor lighting programs, they provide for perpetual utility ownership and maintenance of the equipment.[27] The proposal is that Duke would make discrete, site-specific expenditures on equipment that the utility would own and maintain – and would charge customers for the service of making that equipment available for customer use – essentially in perpetuity.[28] Electric utilities such as Duke are well positioned to benefit from transportation electrification – and should be expected to play a significant role in enabling the transition to electric vehicles. Unfortunately, the sole mechanism that Duke has proposed to assist in the deployment of EVSE equipment may be unjust and unreasonable in its effects.

Essentially, the primary risk to ratepayers is that customers who use Duke's EVSE tariffs to acquire EVSEs that are expected to unlock cost savings over time could even wind up paying more overall than those savings are actually worth to them – without ever actually acquiring the equipment.

The utility is asking the Commission to agree that pricing for that service with a regulated rate of return can be set with a cost recovery period of 7 years.[29] When the utility's costs for the equipment are recovered, the basis for a regulated rate of profit based on that cost is gone, yet the utility seeks approval for the charge for equipment cost recovery to continue without end. It is possible (though not yet demonstrated) that such a model may have some appeal to municipal

[27] Phase II Pilots Filing at 11.
[28] *See* Phase II Pilots Filing, Attachments A and B.
[29] *See EDF Stakeholder Meeting Data Request No. 1* (attached as Attachment 1 to these Comments), Response to question 1 regarding the EVSE Tariff Proposal.

customers if they have a significant interest in avoiding taking on ownership responsibility for any additional equipment, and therefore, are willing to pay perpetual charges for equipment cost recovery and regulated returns, potentially long past the point at which the cost for the equipment has been recovered. However, as a general solution to the challenge of customers meeting the upfront cost challenge of electrifying vehicles (including acquiring EVSE equipment), it is not especially satisfactory. In fact, for customers who are looking for a way to *afford* EVSE equipment (not have it taken off their hands), the terms of the EVSE tariff may fail to meet the basic threshold of being just and reasonable.

In EDF's 2019 Initial Comments and EDF's 2019 Reply Comments on the 2019 Application, EDF described tariffed on-bill investment for site-specific upgrades as an option to help school districts and transit agencies overcome the first-cost barrier associated with the on-board batteries and charging stations for EV buses.[30] As EDF explained in its Reply Comments:

> the terms of the tariffed on-bill program would… assure that the utility would be able to recover its cost with a charge on the fleet owner's monthly bill that is less than the estimated savings from avoided fuel and maintenance for a diesel bus. By spreading out the cost recovery for the upfront costs to span the warranty period for the battery on board the bus, tariffed on-bill financing would allow the timing of expenditures associated with EV buses to more closely mirror the timing of payments that is familiar to diesel fleet owners.[31]

Tariffed on-bill programs are premised on the fact that new equipment will make savings available to a customer over time. In any such program, a reasonable estimate of savings in energy costs, as such savings are expected to accrue over time, provides a basis for structuring monthly customer payments which, together over a specified period, recover the upfront cost of equipment. Although EDF's 2019 Initial Comments and Reply Comments focused primarily on the buses and their batteries, EDF also sponsored analysis showing that such savings exist in the

[30] 2019 Reply Comments at 2.
[31] 2019 Reply Comments at 2.

case of both transit bus batteries *and* EVSE equipment.[32]

The proposed EVSE tariffs share a common thread with tariffed on-bill programs insofar as they would convert an expenditure that would otherwise need to be made upfront into payments over time. But the similarity ends there, and to the customer's detriment. Whereas tariffed on-bill programs demand that there be a relationship between the size of the payments and savings in other costs that customers expect to use the equipment to realize, Duke's EVSE tariff proposal incorporates no such requirement. Moreover, whereas tariffed on-bill programs are limited to equipment acquisition and installation, the proposed EVSE tariffs conflate equipment acquisition/installation and maintenance, with potentially disastrous implications for a customer – because whereas equipment acquisition/installation costs are essentially fixed upfront and can eventually be recovered in full, the need for maintenance is by its nature perpetual – so bundling the payment of those upfront costs with costs associated with maintenance provides a pretext for perpetual charges that are much larger than necessary and continue long after the utility has recouped all upfront costs. As a consequence, whereas in a tariffed on-bill program the utility structures payments to facilitate customer acquisition of equipment, the proposed EVSE tariffs would lock customers into a very long-term financial obligation to the utility – an obligation that could potentially last longer, and cost more on a net present value basis, than would be needed to finance equipment acquisition – without the end result of the customer in fact acquiring any equipment. While there may be customers who are content to pay a significant premium for the comfort of knowing they will be spared from having to maintain this equipment, Duke has not shown that this is likely to be the case for anyone – let alone for most customers –

[32] *See Financial Analysis For Electrification of Lake City's Transit Bus Fleets,* EDF Initial Comments Appendix A – Cadmus Lake City Report, *available* at https://starw1.ncuc.net/NCUC/ViewFile.aspx?Id=7b4b9f4c-a0e3-4744-8204-b7b943ea9e97.

and the absence of any proposal for a financing option that would appeal to more cost-conscious customers is glaring.

Although we appreciate that Duke's billing systems are not yet capable of supporting the implementation of a fully fleshed-out tariffed on-bill payments for EVSE equipment (an issue that may soon be remedied), the Commission should nonetheless require that any EVSE financing that Duke is permitted to pilot include the opportunity for customers to be presented with terms that bear a reasonable relationship to the customer economics underlying the transaction – that is, the cost of equipment being financed and the approximate savings it is projected to make available to the customer – and that to the extent any program involves customer paying the full cost to acquire site-specific equipment (or more), customer ownership of equipment should be an option (after the utility's costs for the equipment are recovered).

Finally, to fund any EVSE financing program, there may be important opportunities to leverage funds other than ratepayer dollars, including third-party funds. Scaling vehicle electrification to the extent embraced by policymakers in commitments such as those contained in the MHDV MOU will be costly; to ensure maximum net benefits for the Companies' ratepayers (participating as well as non-participating) – and consistent with the 2020 ET Pilot Order's admonitions that pilots should lay the groundwork for scaling and should leverage third party funding – we would recommend a thoughtful approach to funding sources, including leveraging third-party funds as the Commission recommended in its 2020 ET Pilot Order.

Rate Design

With respect to rate design, the Commission specified as follows:

> Suitable pilots should involve experimental rate designs and contain measures to track and measure customer response to such rates. The Commission recognizes

> that in the pending DEC and DEP general rate cases the utilities have proposed to study the general system-wide implementation of special rate plans for electric vehicles as part of a more comprehensive examination of overall rate design. The Commission does not believe it would prejudice that comprehensive study but would in fact be beneficial to that exercise if the utilities offered to a limited group of customers in a pilot program experimental rates to encourage or support EV use.[33]

With respect to MHDVs, nothing in the Phase II Pilots Filing satisfies the Commission's directive that innovative rate designs be part of any pilot proposal.

The Commission's order appears clearly to be contemplating rates for actual consumption of energy (hence the reference in the Order to the Comprehensive Rate Design proceeding, which to our knowledge is focused on prices that users face when consuming energy).[34] But the only relevant proposed new rate design relevant to trucks or buses is the one proposed to pay for EVSEs.[35]

Medium- and heavy-duty EVs are constitute a set of distinct use cases for energy consumption, and existing rate designs may not be a good fit for them. By failing to propose anything that speaks to the needs of those heavier vehicles at this time and assuming without analysis that currently existing tariffs will be suitable, Duke is missing an important opportunity, in addition to falling short of what the Commission has expressly directed. Indeed, MHDV charging as a whole will constitute a heterogeneous set of users who will have a variety of needs and capabilities. Since one size won't fit all, these users will probably need a variety of potentially suitable rate designs if they are to electrify quickly and efficiently and without negative impacts on the grid. Because the grid impact of large vehicles is likely to be substantial, and because there is a sizable opportunity for customers to help shape that impact, Duke urgently

[33] 2020 ET Pilot Order at 20.
[34] 2020 ET Pilot Order at 20.
[35] *See* Phase II Pilots Filing at 11.

needs to study its existing rate designs and identify where new approaches may be necessary. Ideally, rate designs for these users should ensure that a customer's cost to charge a fleet will be lowest if they charge the fleet in a manner that minimizes its cost impact on the electric system and on other ratepayers (or, even better, in a manner that maximizes its system benefits).

While the Collaborative was still ongoing, we noticed this omission and sent an inquiry to Duke about it. At the time, they said in a response (attached to these comments as Attachment 1) that they were considering proposing various rates, which they described in brief. For example, the response states that they were considering a dynamic SGS CPP-TOU rate design and opt-in experimental rate designs.[36] Although they did not provide enough information for a stakeholder to actually evaluate what they were contemplating, their description appeared to suggest the possibility that they had something in the works. However, to our knowledge, there was no substantive discussion, at any meeting of the Collaborative, of the potential rate design proposals for larger customers that were included in this response, and nothing resembling what is described in the response is included in the Phase II Pilots Filing.

The Commission was cognizant, when it issued the 2020 ET Pilot Order, of the then-upcoming comprehensive rate study to be undertaken by the Companies, and it nonetheless directed the Companies to consider or include rate designs in these pilots; anticipating any argument that this would duplicate or undermine that comprehensive work, the Commission stated expressly that studying a limited number of "experimental rates" in these pilots would *complement* that effort. It is unclear as to why Duke failed to bring any of its thinking about such rates to the Collaborative for input, nor to incorporate any of this thinking in its Phase II Pilots Filing, and the Commission should direct the Companies to remedy these omissions.

[36] *EDF Stakeholder Meeting Data Request No. 1* (attached as Attachment 1 to these Comments), Response to question 2 regarding experimental rate designs.

School Bus Program

Given EDF's well established interest in the rapid, successful electrification of MHDVs, our appreciation for the need for thoughtful vehicle-to-grid integration (as further discussed below), and the unique vehicle-to-grid ("V2G") opportunity presented by school buses,[37] we greatly appreciated Commission's statement in the 2020 ET Pilot Order that it is "interested in the potential to utilize batteries with bidirectional power flow capabilities in electric school bus fleets as a grid asset," and its approval in that order of an initial, 15-bus pilot including V2G capabilities.[38] The Commission also directed further development of the proposal, stating that it "expects that after this 'proof of concept' pilot Duke may further propose in a second 'proof of value' stage of this pilot program sufficiently scaled and concentrated clusters of electric school buses with bidirectional flow capabilities that will enable the utility to explore their potential as storage resources for local grid support."[39] Unfortunately, the Companies have been delayed in their ability to stand up the first phase of this effort,[40] and their proposed second phase, which the Commission appears to envision as a step toward full-scale deployment, is incompletely described – especially given that the Commission's expectation was that this second phase would prove the *value* of school buses' V2G capability.

The proposal states that "the school bus battery would be available for vehicle-to-grid dispatch when not in transportation service."[41] As is widely recognized, school buses are a

[37] *See, e.g.*, St. John, Jeff, *Electric School Bus Fleets Test the US Vehicle-to-Grid Proposition*, GREENTECHMEDIA (Nov. 16, 2020), https://www.greentechmedia.com/articles/read/electric-school-bus-fleets-test-the-u.s-vehicle-to-grid-proposition.
[38] 2020 ET Pilot Order at 17.
[39] 2020 ET Pilot Order at 17.
[40] *See* Phase II Pilots Filing at 19 ("The Companies are aware of forthcoming state and federal grant opportunities that the Companies could leverage to reduce ultimate program or participate costs. Although the details of these grant opportunities are still forthcoming…").
[41] Phase II Pilots Filing at 19.

highly promising grid resources due to their extensive and predictable downtime, especially during the summer. However, the Companies have provided essentially no details about how the V2G capability will work, including neither a basic description of the technical specifications nor relevant business terms governing the customer's participation, if any, in the use of the batteries for V2G functionality. Specifically, there's no express description of how the batteries will be controlled and by whom, what grid services they would be used to provide and with what frequency, nor how battery management or replacement would work (including what happens if batteries require replacement during the life of the vehicle). The economics from Duke's perspective are also not described; although there is no wholesale market on which grid services can be sold, presumably the use of these batteries to provide services will mean other costs are avoided, and it is unclear how are these avoided costs to be accounted for, and what they mean for Duke's bottom line or savings to customers. In other words, although the Commission specifically directed that the second phase of the school bus pilot focus on "proof of value," the proposal in fact appears to scale up a vaguely described (and not yet implemented) first phase without specifying the analytic basis for evaluating the value of the initiative.

The proposal also does not include any means of testing out a customer or other third-party role in ensuring optimal vehicle-to-grid integration ("VGI") – which encompasses far more than occasional injections of power to the grid (i.e., V2G). VGI concerns how vehicles are integrated with the grid around the clock, not just during the very highest peak demand periods, and optimizing VGI necessarily means optimizing how vehicles are charged. Yet despite the pilot's emphasis on one aspect of VGI – vehicle-to-grid injections – the proposal is silent on whether and how customers will be engaged in optimizing their charging and whether and how they will be compensated for optimally shaping their load. As already noted, the Companies –

despite having been expressly directed to include innovative rates in all pilot proposals – have proposed neither controls nor rates to encourage optimal charging; they are proposing to apply existing commercial tariffs to the charging of these vehicles, with no examination of whether those tariffs will reward optimal charging behavior or otherwise work in an efficient, sustainable manner for these customers, or whether they could be improved upon. The proposal also does not expressly address the opportunity for vehicle batteries to facilitate the provision of fast-responding grid services (some of which can be accomplished even without V2G), or for resiliency services (potentially including vehicle-to-building – known as "V2B," as distinct from V2G – for critical facilities), nor how the bus owners might be compensated for allowing their vehicles to be used in such a manner. Similarly, the proposal is heavily dependent on a variety of one-time grant opportunities to enable the Companies to purchase the batteries, and lacks any proposal to leverage funds that would give a third party an ongoing business interest (ownership or otherwise) in the storage resources, even though full-scale deployment of this technology might be far more affordable to ratepayers if third-party funds can be made available at meaningful scale.

Other Recommendations

In addition to the above observations regarding instances in which the pilot proposals fall short of what the Commission has directed the Companies to file or are simply unjust or unreasonable, our experience in other fora has demonstrated that there are ways in which these proposals could be greatly improved upon, even beyond what is specifically directed in the 2020 ET Pilot Order. The balance of these comments addresses some of these gaps.

As previously discussed, the 2020 ET Pilot Order includes a list of seven elements that should be included or considered as an aspect of all electric transportation pilots. We would

suggest that going forward, the Commission add several additional criteria that are essential for laying the groundwork for scalability of vehicle electrification, as follows:

- **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.[42] By leveraging electric vehicles' inherent flexibility to provide highly time-sensitive services through optimal VGI, utilities can help integrate more renewable generation in order to meet the State's clean energy and EV goals.[43] As discussed above in the context of the proposed school bus pilot, VGI includes unidirectional charging services (that is managed charging, which is sometimes called "V1G") and bidirectional V2G and V2B capabilities. On an ongoing basis, optimizing VGI is an essential element of ensuring electrification at scale does not require more infrastructure investment than necessary and yields maximum system benefits, and thus ensuring that the transition to electric vehicles is just and reasonable for all customers. In the context of an emergency, electric vehicles with bidirectional

[42] *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.

[43] *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.

capability can be an asset insofar as they can provide emergency power when the grid is out.[44] The pilot proposals do not address these capabilities in any detail. To ensure that North Carolina's electrification and clean energy programs are efficient and sustainable, and that vehicle batteries provide North Carolinians with the resiliency benefits that our increasingly turbulent climate demands, the Commission should require that all electric transportation pilot proposals consider how VGI can be optimized, including through appropriate price signals.

- **Standards.** For the emerging electrified transportation system to operate optimally, standards are critical. To that end, state utility regulators should require that all EV programs, including pilots, incorporate consistent standards, including technology and communications standards as well as standardized data formats for metering (including submetering). These are important for enabling a wide variety of Electric Vehicle Service Providers ("EVSPs") to participate in the marketplace, and for customers to change EVSPs without undue cost, confusion, and complexity. North Carolina can benefit from work already done in leading states such as California, which have established various best practices and standards North Carolina can readily adopt. These include Open Charge Point Protocols ("OCPP"), which standardize communication between EVSEs and EVSPs;[45] Open Charge Point

[44] 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/.

[45] Standardizing communication between EVSE and Electric Vehicle Service Providers (EVSP) allows 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, North Carolina can avoid that risk.

Interface ("OCPI"), a standard for communications among EVSPs which can enable seamless usage, pricing, and billing for customers who occasionally use a different EVSP from their usual one; one of the emerging standards for a communications protocol between the vehicle and the charger;[46] and requiring charging stations to have Open Automated Demand Response ("OpenADR").[47] Standards such as these are critical to ensuring interoperability as well as to avoid stranding assets if the mix of market participants changes, yet the pilot proposals under consideration are largely silent on this issue. The Commission should require that North Carolina utilities bake the applicable standards into their electric transportation systems from the start.

- **Appropriate metering requirements.** In any electric transportation pilot, metering should be properly calibrated to expected business needs, including the ability of vehicle charging customers to modulate their consumption in a manner that allows them to optimize their load shape and, to the extent applicable, provide grid services. Different approaches to optimization require different metering or telemetry; for example, enabling vehicles to respond to hourly prices would certainly require interval meters but would not require 6-second telemetry or even one-to-five-minute telemetry – but where vehicles are in fact being considered as potential providers of frequency regulation, a service that some MHDVs may be able to provide quite well, 6-second telemetry would be appropriate.

[46] Although the marketplace has not yet settled on a single such standard (contenders include ISO15118 and IEEE 2030.5), promulgating a standard here is essential, as the absence of any standard may leave drivers with insufficient charger access to alleviate range anxiety and prevent drivers from becoming stranded simply because they can't access the "right" charging station.

[47] OpenADR is a demand response standard for sending and receiving signals for load and generation flexibility, both at the utility level and, where applicable, at a regional transmission organization. This will enable EV charging customers to manage their demand in a manner that maximizes system value as the electric transportation marketplace matures.

In addition, the number of meters should be properly tailored to actual billing needs, and in some cases, 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.[48] Allowing the 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. In light of the range of options available and the varying flexibility that these options will unlock, utility proposals for an electric transportation pilots should include explanations of their proposed approach to metering and explanations of why their proposals are well-calibrated to the expected approach to VGI and pricing.

- **Marketing, Education, and Outreach.** The Commission should require that all pilot proposals include marketing, education, and outreach proposals that are well tailored to the anticipated market. In the case of medium- and heavy-duty vehicles, this will mean recognizing that many fleet electrification customers – particularly smaller businesses – lack prior experience with sophisticated electric procurement and are likely to need significant and ongoing assistance, and proposing specific strategies to reach out to such customers and provide appropriately calibrated

[48] 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 Energy, *Compliance Filing – Residential Electric Vehicle Charging Tariff*, Minnesota Public Utilities Commission 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 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.

education over the relevant time period. In addition, in the case of MHDV pilots that present a material opportunity to provide air quality or other environmental justice benefits in disadvantaged communities, the Commission should require tailored outreach to environmental justice communities to ensure that the pollution reduction benefits of these pilots do not fail to reach the people who need them most.

Conclusion

EDF thanks the Commission for the opportunity to provide these comments on Duke Energy's Phase II Pilots Filing.

Respectfully submitted,

/s/ Daniel J. Whittle

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CERTIFICATE OF SERVICE

I hereby certify that all persons on the docket service list have been served true and accurate copies of the foregoing filing by hand delivery, first class mail deposited in the U.S. mail, postage pre-paid, or by email transmission with the party's consent.

This 29th day of July, 2021.

/s/ Daniel J. Whittle

Attachment 1

EDF Stakeholder Meeting Data Request No. 1

1. Given the funding shortfall, how does Duke anticipate being able to complete phase 1 of the school bus pilot?

Response: Duke Energy supported an application by the NC Department of Public Instruction to the EPA DERA grant process on March 15th. If awarded this grant will provide the remaining funding needed to deploy 16 EV school buses. Duke Energy is also in communication with NC DEQ regarding the remaining tranches of VW Settlement funding, our current operating assumption is that the remaining 14 buses in the 1st phase of the Pilot will be funded by either the VWS or a local match.

DEC

2. Please specify the rates that you anticipate will apply to vehicle charging by school bus fleets, including (a) what existing tariffed rates are likely to be applicable and (b) what experimental rate designs Duke is going to propose.

Response: Locations with only 1 bus (demand less than 75 kW): SGS or OPT. Locations with 2 or more buses (demand more than 75 kW): LGS or OPT. The Companies are planning to propose a new rate option for commercial customers with EVs. The first is a Dynamic SGS CPP-TOU rate with refreshed TOU periods and Critical Peak Pricing Events that will increase On-Peak pricing for up to 20 CPP Event days. This will also include an overnight Super-Off-Peak period that the Companies believe will be very attractive for most EV charging. There will be no demand charge for the first 30 kW of demand on this rate design. This will be available for demands up to 75 kW. The Companies are also planning on filing a pilot for Hourly Pricing (sometimes referred to as Real Time Pricing) and Fleet EV charging. This rate design should create the most opportunities for savings and the features of this design result in lower demand charges. However, more data is needed before the Companies can offer this design on a wider basis, and therefore this is proposed as a pilot with a maximum of 10 participants. This design is currently intended for customers with large expected demands.

3. With respect to any experimental rate designs, please specify whether they will be mandatory, opt-in, or opt-out; fixed components; demand components; volumetric components; any applicable time differentiation; whether separate metering will be required for consumption associated with vehicle charging and if not what will be the basis for assessing consumption and demand.

Response: These experimental rate designs will be opt-in. They will consist of fixed customer charges in line with established cost of service. SGS CPP-TOU will not contain a demand charge for demands less than 30 kW.

a. The SGS CPP-TOU will not require separately metered EV charging load, however that option would be available to the customer if they did not want to put their entire premise on CPP-TOU pricing.
b. The Hourly Pricing pilot rate would need to be separately metered.

DEP

4. Please specify the rates that you anticipate will apply to vehicle charging by school bus fleets, including (a) what existing tariffed rates are likely to be applicable and (b) what experimental rate designs Duke is going to propose.

Response: Locations with demand less than 1,000 kW (the majority of expected school bus fleets): MGS or SGS-TOU. Locations with demand greater than 1,000 kW: LGS or LGS-TOU

5. With respect to any experimental rate designs, please specify whether they will be mandatory, opt-in, or opt-out; fixed components; demand components; volumetric components; any applicable time differentiation; whether separate metering will be required for consumption associated with vehicle charging and if not what will be the basis for assessing consumption and demand.

Response: The experimental SGS TOU-CPP rate in DEP is currently expected to be only for demands less than 30 kW, which is the current maximum demand under DEP's SGS rate design. The Comprehensive Rate Design study recently ordered by the NCUC will explore how DEC and DEP rates can become better aligned. This may include recommendations on expanding the demand limit on SGS in DEP or implementing some form of Hourly Pricing for EVs in DEP. However, due to the current structure of DEP's rates, we are unable to offer those options for demands likely to match school bus charging at this time.

With respect to the EVSE Pilot Tariff Proposal:

1. How long will cost recovery for EVSE devices take after installation?

Response: The average life of Level 2 EVSE is 7 years and the average life of DCFC EVSE is 10 years. Recovery will match the asset life as we will replace the equipment as it fails.

2. When will the tariffed charge for cost recovery end? Is it perpetual?

Response: The equipment will be replaced at end of life once it fails, thus the payments are perpetual unless the customer ends their service agreement.

3. Once the utility has recovered its cost for EVSE equipment through site-specific charges, what would be the customer's path to ownership of the equipment?

Response: The EVSE Tariff is not an on-bill financing arrangement. It is a service agreement whereby customers can operate the equipment; however, the equipment remains the property of Duke Energy.

4. What services other than equipment use will Duke provide to those who take advantage of the tariff?

Response: Duke Energy will provide maintenance of the equipment and replacement of the EVSE upon failure. Maintenance and replacement include but is not limited to, storm damage, vandalism, and equipment failure.

5. How will Duke's operation of the EVSE affect customers' ability to manage their own charging?

Response: The equipment will be customer operated. The Companies may offer other voluntary programs in the future to help customers manage charging when energy prices are lower. Any future offerings will be independent of the EVSE rate and completely voluntary.

6. If customers decide to do business with an EVSP other than Duke after initially taking advantage of the EVSE tariff, what options would they have? Will they face an exit fee?

Response: There is an initial contract term. Cancellation is 40% of the remaining payments if the contract is terminated early. A typical residential will have a 3-year contract term. Non-residential customers may have a 5- or 10-year contract term. The 5-year contract term is applicable to L2 chargers and the 10-year contract term is applicable to DCFC.

7. Did Duke consider solutions for financing the installation of EVSE infrastructure that were proposed by stakeholders in on-the-record comments in this proceeding, such as tariffed on-bill investment? If so, how do customer economics of the EVSE tariff solution compare to a tariffed on-bill program based on the Pay as You Save (PAYS) system over various time horizons? If not, why not?

Response: Though we are transitioning to our new billing system currently for DEC and in November for DEP, the on-bill financing functionality is not ready for implementation until both utilities are fully implemented and the system stabilizes. On-bill financing may be considered in the future. At this time, given the Companies' current inability to support on-bill financing due to transitioning the Companies' legacy billing systems, we have not performed a comparative analysis for purposes of our EVSE proposal.