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's ("Commission") April 18, 2019 Order, the Environmental Defense Fund ("EDF") submits the following comments regarding Duke Energy's proposed Electric Vehicle ("EV") transportation pilot. EDF's comments are generally directed toward the Fleet EV Charging Program, the EV School Bus Charging Program, and the EV Transit Bus Charging Program.

EDF supports Duke Energy's commitment to EV market expansion as outlined in North Carolina Governor Roy Cooper's Executive Order 80, and we support the environmental and air quality improvements that will result from electric transportation. Through investment in infrastructure and vehicle subsidies, especially for transit fleets and school bus fleets, Duke Energy's proposal will remove cost barriers to adoption of EVs. Moreover, EDF sees the possibility for transportation electrification to benefit ratepayers through more efficient use of existing grid infrastructure and thus lower rates in the long run. In addition to our general support, we offer suggestions for improvement below.

Background

EDF is particularly interested in these programs because, in order to reduce harmful emissions from the transportation sector, it is critically important to target medium- and heavy-

duty vehicles. Transportation accounts for 32.5% of North Carolina's annual greenhouse gas emissions ("GHG"),[1] and achieving a 40% GHG reduction by 2025 as instructed by Executive Order 80 requires reductions in all sectors of transportation, from light-duty to heavy-duty. Many states have started to develop programs to support residential EVs but few states have developed programs that specifically support medium- and heavy-duty EVs.

Heavy-duty vehicles – which range from box vans to buses to tractor-trailers – perform critical tasks for our economy. Through them, our kids our transported to school, grocery stores are kept stocked, power lines are maintained, and packages are delivered to our homes. However, these vehicles are a major source of environmental harm. They account for a quarter of all transportation GHG emissions globally and are on pace to nearly double these emissions by 2050.[2] Emissions from diesel buses and trucks degrade air quality at the local level and lead to tens of thousands of premature deaths annually.[3]

Over the next decade, we can alter the emissions trajectory of heavy-duty diesel vehicles. Electric power is an increasingly viable alternative for trucks and buses. Manufacturers have announced the development or production of more than 50 electric truck or bus models for the North American market alone. By establishing these EV trucks and buses as a major component of our fleets, we can make meaningful progress toward reducing GHG and local air pollutants.

In the U.S., medium-and-heavy duty trucks and buses annually account for 445 million metric tons of GHG and two million tons of nitrogen oxides (NOx) – a powerful pollutant that contributes to asthma and other respiratory problems. Diesel trucks and buses are a major source

[1] North Carolina Department of Environmental Quality, *North Carolina Greenhouse Gas Inventory (1990-2030)*, (p. 9) January 2019, www.deq.nc.gov/GHGinventory.
[2] International Energy Agency, *Energy Technology Perspectives 2017* (June 2017).
[3] H. Christopher Frey (2018) *Trends in Onroad Transportation Energy and Emissions*, Journal of the Air & Waste Management Association, 68:6, 514-563, DOI: 10.1080/10962247.2018.1454357

of NOx pollution in many areas, including North Carolina – where heavy-duty diesel vehicles account for 23% of total NOx pollution from mobile sources.[4]

Electrification of school and municipal bus fleets is also important from the standpoint of our children's health. Children's developing lung are especially vulnerable to diesel pollution. Asthma is a leading chronic illness among North Carolina children, with an estimated 18% of North Carolina children living with an asthma diagnosis as of 2014.[5] Worldwide, up to one-fifth of childhood asthma cases are attributable to diesel pollution.[6] Children's exposure to diesel pollution can be mitigated by electrifying our school and municipal transit bus fleets.

On-Bill Financing

EDF generally supports Duke Energy's proposal because it will help remove financing barriers for these vehicles – critical given the high upfront cost of EVs relative to their diesel counterparts. Utilities should develop pilot programs providing financial incentives for purchasing vehicles/equipment and charging stations to a limited number of public school districts, mass transit systems, public port and airports so that the utilities can study the load impacts, experiment with managed charging (V1G), develop appropriate time-of-use rates and electric vehicle-to-grid (V2G) programs.

In addition to Duke Energy's proposed direct payments to subsidize the school bus purchases, EDF recommends that Duke Energy modify its pilot program proposal to also include

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

[5] 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. https://schs.dph.ncdhhs.gov/data/champ/201314/k11q01.html.

[6] Achakulwisut, Pattanun, Michael Brauer, Perry Hystad, and Susan Anenberg, *Global, National, and Urban Burdens of Paediatric Asthma Incidence Attributable to ambient NO2 pollution: estimates from global datasets*. The Lancet Planetary Health vol. 3, issue 4 (April 2019): 166-178, https://doi.org/10.1016/S2542-5196(19)30046-4.

an option for school districts and public transit agencies to purchase EV buses by financing the purchases through monthly installments. These payments would appear on the customer's utility bill, in an amount based on total cost of ownership savings of electric buses compared with diesel buses. By spreading out the payments for the upfront cost of EV buses over several months, on-bill financing would allow the customers' payments for EVs to more closely mirror the pattern and amount of payments for their diesel fleets.

Tariff on-bill financing would greatly reduce the amount of direct financial subsidy required to incentivize the purchase of EV buses. Reducing the subsidy required by the fleet owner would magnify the purchase power of both Volkswagen settlement funding and Duke Energy subsidies, allowing a much greater number of school districts and public transit agencies to participate in a financing program. One study indicated that five million dollars in funding would allow for the purchase of 15 EV buses if used as a direct subsidy but would allow for the purchase of 50 EV buses if used for on-bill financing.[7] Duke Energy would incur financing costs; however, these finance costs could be either be passed on to the customer or offset by returns from greater infrastructure investment. EDF requests that the Commission's Order authorize Duke Energy to implement such a service.

Duke Energy applied for approval of a similar EV pilot program in South Carolina. The Office of Regulatory Staff ("ORS") recommended against direct subsidies for school bus purchases and recommended that, as an alternative, Duke Energy should consider offering on-bill financing. The ORS argued that on-bill financing would be a less costly way for the utility to

[7] Clean Energy Works, *Accelerating Electrification of Transportation: Utility On-Bill Investment at the Grid Edge* at 16 (May 2, 2019), available at: https://drive.google.com/file/d/0B54Xcq5PzcNjalkxNlVqeEs3NU16VzBuQUtaVzVIOTRmRTVV/view.

eliminate higher upfront purchase price for EV buses, which can act as a barrier for school districts. The ORS stated:

> However, incentives proposed by the Companies focused on the purchase of the electric school bus are unique and should not be funded by customers absent a clear policy directive. Other alternative incentive options exist that may be less costly to customers such as on-bill financing offered by a utility to the school district to assist in the purchase of electric vehicles or EVSE.[8]

EDF agrees with the South Carolina ORS that on-bill financing would be an excellent option for Duke Energy to offer school districts and public transit agencies. EDF retained Clean Energy Works (CEW) to investigate the feasibility an on-bill financing program for EV buses in North Carolina transit fleets. CEW is a non-profit organization specializing in clean energy finance, and is led by Dr. Holmes Hummel, who holds a PhD in interdisciplinary studies in clean energy technologies. CEW offers the following explanation of how an on-bill financing program would work and how it would benefit transit agencies and school districts:

> Transit agencies around the world are looking for ways to buy zero-emission electric buses to replace diesel buses – and eliminate their air and noise pollution. Electric bus manufacturers have recently reached cost parity with diesel buses in key markets when evaluated on a lifecycle basis, yet the upfront cost premium can be above 50%, creating a barrier for procurement. Because many transit agencies are operating in financially constrained conditions, accelerating retirement of the dirtiest diesel buses in favor of zero-emission buses requires a financing solution.
>
> **Harnessing a utility's business model can accelerate investment**
> Utilities have sold electricity for nearly a century under a terms of service agreement called a tariff, and in the last decade, innovations in the field of energy efficiency for buildings have yielded an opt-in tariff for upgrades like better lighting or heat pumps. These utility tariffed on-bill programs accelerate investment in cost effective upgrades by resolving the upfront cost for customers and providing net benefits from the start. When applied to the transportation

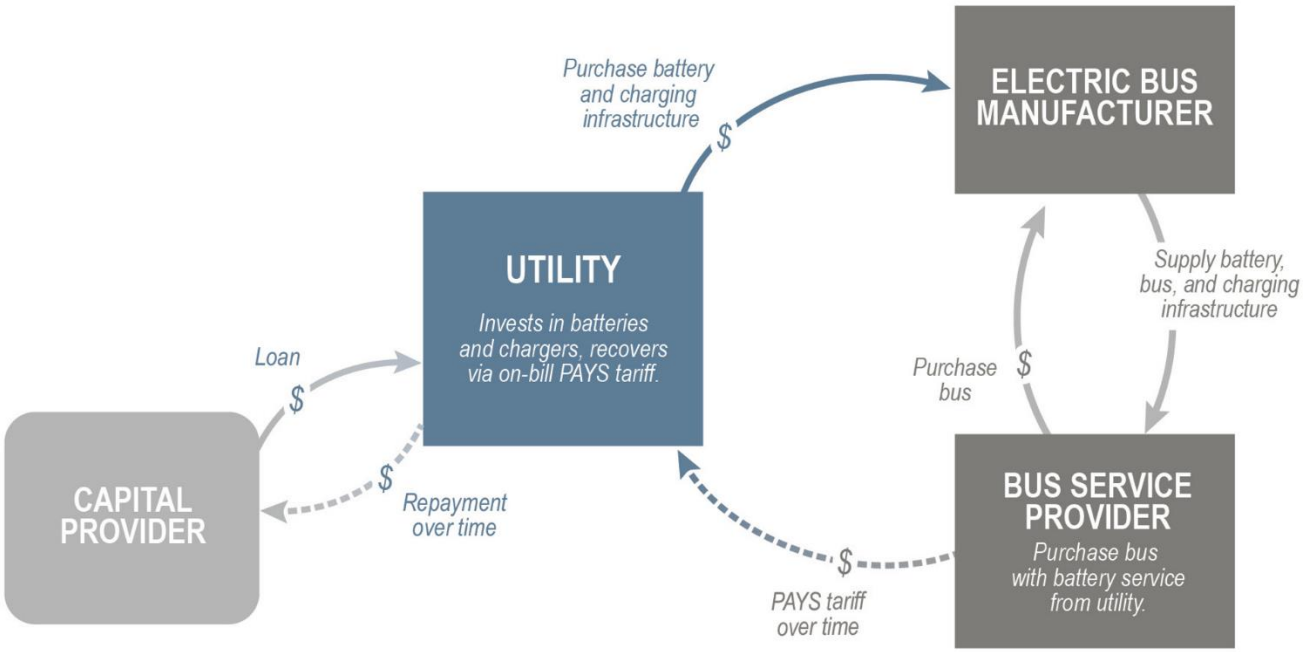
[8] *In re Applications of Duke Energy Carolinas, LLC and Duke Energy Progress, LLC for Approval of Proposed Electric Transportation Pilot and an Accounting Order to Defer Capital and Operating Expenses*, Docket Nos. 2018-321-E and 2018-322-E (Comments of the South Carolina Office of Regulatory Staff at 6) (May 20, 2019), available at: https://dms.psc.sc.gov/Attachments/Matter/b79a6140-a911-4953-a026-3d922df00edc

sector, these programs can break through the upfront cost barrier for batteries and charging stations by allowing a utility to invest directly in the equipment that drives the premium cost of electric buses.

Here's how it works: Financing Transit Bus Upgrades with an Opt-in Tariff

First, the utility establishes a terms of service agreement (a tariff) for investing in the battery and charging station for each new electric bus sought by a transit agency in its service area. Second, the transit authority opts into a terms-of-service agreement (a tariff) that allows the utility to put a charge on the agency's monthly bill that is capped at a level below the estimated savings (relative to the cost of diesel fuel for a diesel bus) and to recover its costs within the warranty period of the equipment it has financed. If the equipment has been maintained as per warranty conditions, the utility can call on the warranty to address upgrades that need repair or remedy.

As a result, the transit authority's upfront cost to replace a diesel bus with electric would be the same as if they were buying a new diesel bus – except that electric is better. For the transit agencies that opt in, the utility pays for energy saving upgrades to the bus fleet, and the transit authority pays nothing upfront for the premium cost of the zero-emission electric bus. The utility gains approximately $100,000 in new sales over the life of each electric bus that displaces a diesel bus. Bus riders and communities served by both the utility and the transit agency are then spared the hazards of air pollution and the nuisance of noise pollution produced by diesel buses.



> The transit authority has no loan, no lien, and no debt associated with this transaction; just lower costs of operation and a better bus fleet. When the utility recovers its costs, the monthly charges end, and when the transit agency has exhausted a battery used for on-board storage, the utility may opt to buy battery packs for second life applications for stationary storage.
>
> PAYS [Pay-As-You-Save, another name for on-bill financing] offers all customers the option to access cost effective energy upgrades using a proven investment and cost recovery model that benefits both the transit authority and utility. Although the PAYS system has not yet been applied to transit buses, recent cost reductions achieved by manufacturers have now put that breakthrough within reach.[9]

EDF hired Cadmus, an energy industry consulting firm, to work with EDF, CEW and a regional Southeast transit bus operator (referred to in the Cadmus report as "Lake City") to study the economics of on-bill financing for EV transit buses. Cadmus used available industry information on the purchase price and operating costs for buses as well as information from the regional transit bus operator. The Cadmus report is attached to these comments. The Cadmus report concludes that: (1) the total cost of ownership for EV buses is competitive with other types of buses; (2) an on-bill financing program would eliminate the upfront barrier of the higher initial purchase price for EV buses, bringing the monthly payments for EV buses in line with the initial and monthly payments that Lake City would otherwise make for buying and operating diesel buses; and (3) on-bill financing would triple the number of EV buses that could be purchased as compared to using direct subsidies to offset the higher initial purchase price for EV buses versus diesel buses. Given the clear benefits of on-bill financing, EDF requests that the Commission's Order authorize Duke Energy to implement this service.

[9] Clean Energy Works, *Tariffed On-Bill Finance to Accelerate Clean Transit*, available at: http://www.cleanenergyworks.org/clean-transit/

Bill Protection

EDF strongly recommends that Duke Energy revise the Application to incorporate protections for participants from any potential dramatic and unexpectedly high bills arising from higher demand charges or from the higher electricity usage forcing the customer into a different rate class. Particularly in the case of transit agencies and school districts operating on limited publicly-funded budgets, a financial burden correlated with the new technology of electric transportation could dissuade those agencies from pursuing further electrification. Duke Energy's plans for education and outreach in the Application would help cultivate a positive financial experience for participants. However, ensuring that pilot participants' electricity bills remain manageable during the three-year pilot requires that Duke Energy incorporate bill protection into the terms of the participant agreements.

The following stated objectives of the pilot indicate Duke Energy's intent for pilot participants to have a positive experience such that demonstration projects at a fleet or transit agency will turn into more widespread adoption:

- "Support public transit electrification and associated cost savings for public agencies in North Carolina"
- "Support the development of a competitive market for EV charging services"

Duke Energy should make explicit in the Application that it will credit participating customers on a monthly, quarterly, or yearly basis for higher electricity bills arising from higher demand charges or from the customer's higher electricity usage forcing it into a different rate class Without bill protection within the scope of the pilot, participants would be subjected to unnecessarily high risk given that the programs are proposed as fixed-term, small-scale trials.

Additionally, EDF recommends that Duke Energy modify the Application such that, at minimum, transit and school district pilot participants are given the option of remaining on their

current existing tariff structure through the duration of the three-year pilot and receive protection against higher demand charges. EDF also requests that Duke Energy modify the Application to specify the exact tariff schedule for the transit and school bus programs in the exhibits that describe each program. Exhibit E, detailing the school bus charging program, says the agency will "be billed under the applicable general service schedule," and Exhibit F, detailing the transit bus charging program, says the participating agency would "be billed under the applicable TOU service schedule." The Application should instead specify the name of the rate and include the full schedule in each exhibit to maximize clarity and transparency of the pilot programs.

Rate Design

EDF recommends that Duke Energy revise the Application to offer fleet operators, school districts and transit agencies participating in this program service under [randomly-assigned] new EV rates appropriate for their customer class. This means going beyond bill protection as a way to preserve affordability for participants during the limited term of the pilot program. Rather, Duke Energy should design and implement rate structures that it can then use in the long term for EV fleets, including for transit agencies and school districts.

The following stated objectives of the pilot express Duke Energy's intent to gather meaningful lessons on best practices for rate design from the three year pilot:

- "Better understand EV charging behavior and the effects of charging multiple types of EVs on the Companies' bulk electric system"
- "Establish the extent to which utility-managed charging can shape charging behavior and the value of doing so for [residential EV, fleet EV, school bus EV, transit bus EV, and DC Fast Charging ("DCFC")] EV segments."

- "Determine procedures to cost-effectively integrate vehicle charging by actively managing charging loads"

Given the current list of objectives stated above, providing only one tariff option for each group of customers limits Duke Energy's ability to study the effect different types of rates could have on charging patterns. To this end, EDF recommends some expansion of the rates offered. To begin, rates that Duke Energy tests during the pilot should include rates that incentivize charging at off-peak times when charging is less costly to the grid. Rate structure options should also include more than one time-of-use rate structure with a goal of determining the effect of shorter peak periods and higher cost differentials between on- and off-peak.

Furthermore, rate structure options should include those without demand charges that are volumetric only, and more than one rate structure that incorporates demand charges. For example, rate structures that include demand charges could bill for maximum customer daily demand within the system peak period rather than maximum monthly demand, or could bill for the maximum customer demand during the handful of hours of the year that the system is most strained (these variations in demand charge structuring can help ensure bill protection against short-lived, infrequent spikes in demand during peak hours).

As the EV market grows, managing charging behavior through rate design will help prevent cost increases for all customers, including those who do not own EVs. Combined with education and outreach work that Duke Energy proposes in the Application, piloting additional EV rate structures would enable the end of the pilot to also be the beginning of a much larger roll-out of pre-tested EV rates.

One rationale for Duke Energy to subsidize EV buses and fleet depots is that electrifying these fleets will benefit the grid by providing greater usage of existing infrastructure and "filling in the holes," or using electricity at off-peak times that does not stress the grid or require greater

investment to expand the grid's capacity.[10] These benefits will be realized only if the customer takes service on a time-of-use rate schedule.

The Application states that fleet owners and transit agency operators participating in the program must agree to take service under a time-of-use rate, but does not appear to make this a requirement for school districts. EDF suggests that Duke Energy offer a time-of-use option for school districts to offer consistent incentives across customer types and to provide an opportunity to study managed charging by school districts.

Demand Charges

EDF also recommends that Duke Energy revised its Application to include a plan to mitigate demand charges during the term of the pilot program. Demand charges can have a disproportionate impact on the customer's electricity bill. Customers might have a negative experience with this program if Duke Energy does not mitigate demand charges during the pilot program. This could create a barrier to further adoption of EV buses.

Demand charges are a function of how much electricity the customer uses and when the customer uses the electricity. The following example shows how two customers with the same amount of monthly electricity usage (5,000 kWh), but different monthly peak demands (500 kW vs. 50 kW), can have extremely different monthly electricity bills.[11]

[10] M.J. Bradley & Associates, *Accelerating the Electric Vehicle Market* (March 2017), available at: https://www.mjbradley.com/sites/default/files/MJBA_Accelerating_the_Electric_Vehicle_Market_FINAL.pdf

[11] U.S. DOT Federal Transit Administration, *Peak Demand Charges and Electric Transit Buses* at 21 (October 1, 2014), available at: https://calstart.org/libraries-publications-peak_demand_charges_and_electric_transit_buses_white_paper-sflb-ashx/

Demand Charge Impact on Two Customers with the Same Usage

	Customer A	Customer B
Energy Usage	5,000 kWh	5,000 kWh
Energy Charge	5,000 kWh x $0.10 = $500	5,000 kWh x $0.10 = $500
Peak Demand	500 kW	50 kW
Peak Demand Charge	500 kW x $15.00 = $7,500	50 kW x $15.00 = $500
Total Charges	**$8,000**	**$1,250**

As a practical example, consider a school that usually charges its buses in the evening to take advantage of the lower electricity rates available under time-of-use rates. Suppose the school takes the students home at the end of the day, then returns and immediately re-charges the buses to drive the football team to an away game. Even though this only occurs a couple of times during a month, this might lead to an unexpectedly high bill, similar to Customer A in the example above.

Duke Energy should mitigate the demand charge during the pilot program because:

- School districts and mass transit agencies are public entities funded by taxpayers. Mitigating the demand charges would help conserve their scarce resources and would protect taxpayer funds.

- Schools and mass transit agencies will not have the resources to pay for outside services to manage their EV charging practices, and they will need to learn as they go.

- EV charging will be new for schools and mass transit agencies, and Duke Energy will need time to educate them on the best practices for charging their buses.

- The demand charge is calculated based on the customer's monthly peak demand. The peak demand may occur during a time when the school is charging its buses or not. Applying a demand charge will make it very difficult to compare the cost of operating an EV bus versus the cost of operating a diesel bus.

- If demand charges are not mitigated, a school district or mass transit agency that does not manage its charging prudently, due to lack of experience, could receive unexpectedly high bills, leading to customer dissatisfaction. This might deter other school districts and mass transit agencies from purchasing EV buses.

- The size of this pilot program is so small that it will not have a material impact on Duke Energy's revenues.

- Duke Energy, Public Staff and other stakeholders need time to work collaboratively to develop a rate design that gives Duke Energy an opportunity to recover its costs and is a just and reasonable solution for the school districts, mass transit agencies and all customers.

Utilities in other states have mitigated demand charges during the early stages of EV adoption by commercial customers. Here are examples of the mitigation plans used by other utilities:

- Pacific Gas & Electric Company uses a "subscription fee" in 10 kW or 50 kW increments, depending on maximum anticipated demand. This allows the customer to choose how much electricity they will need for EV charging, and the subscription levels can be changed on a monthly basis. The subscription charges are much lower than traditional demand charges and result in more predictable electricity bills.

- Southern California Edison proposed to waive all demand charges for the first five years of their commercial EV charging program to give them time to educate their customers about managed charging and for customers to adapt their charging practices to avoid high demand charges.

- Xcel Energy will cap its demand charge at a pre-determined level for customers with commercial EVs to avoid unexpectedly high bills.

- National Grid gives customers bill credits to fully offset the impacts of commercial EV charging on demand charges.[12]

EDF therefore submits that the Commission should require Duke Energy to mitigate the impact of demand charges for this pilot program. EDF also recommends that the Commission convene a collaborative working group to study customer EV charging practices and the impact of demand charges on charging behavior and bills. The working group should be tasked with developing rate designs that equitably balance all stakeholder interests. The rates should give the

[12] Union of Concerned Scientists, *Utility Investment in Truck and Bus Charging: A Guide for Programs to Accelerate Electrification* at 9 (April 2019), available at: https://www.ucsusa.org/clean-vehicles/electric-vehicles/electric-utility-investment-truck-and-bus-charging

utility an opportunity to recover its revenues while providing fair rates for owners of medium- and heavy-duty buses and trucks and Direct Current Fast Charging stations ("DCFC").

Direct Current Fast Charging Market

Although Duke Energy proposes to site, own, and operate all DCFC installed during this pilot program, Duke Energy has not proposed a long-term plan for the future to enable third parties to own and operate DCFC. When these stations are initially deployed, few customers will be using them and the demand charges the customer of record faces will make the stations unprofitable. As a result, utilities in other jurisdictions have developed plans to mitigate the demand charge for DCFC.

> Several utilities proposed limited-time demand charge reductions or alternative charges for DC fast charging station operators in order to promote the development of these stations, since demand charges can often make fast charging stations cost-prohibitive. Demand charge reductions were approved in Nevada, Oregon, Pennsylvania, and Rhode Island, while utility proposals are under consideration in California, Massachusetts, and New York.[13]

EDF therefore submits that the Commission should require Duke Energy to mitigate the impact of demand charges for customers who wish to install DCFC that will expand the foundational network Duke Energy proposes to install during this pilot.

Make-Ready Work

Duke Energy's Application provides for it to subsidize customer purchase and installation of Electric Vehicle Supply Equipment ("EVSE"); however, the Application does not specify who

[13] North Carolina Clean Energy Technology Center, *50 States of Electric Vehicles – Q4 2018 Quarterly Report and 2018 Annual Review* (February 2019), available at: https://nccleantech.ncsu.edu/wp-content/uploads/2019/02/Q4-18_EV_execsummary_Final.pdf

will be responsible for the cost of make-ready work – the electrical work up to, but not including the EVSE. This work could include items such as transformer upgrades, circuit upgrades and new service drops. EDF recommends that Duke Energy revise the Application to specify that it will perform the make-ready work for customers participating in the pilot program and recover the make-ready costs through rates. This will remove a barrier for customer adoption of EVs and is reasonable given that the increased penetration of EVs should result in greater utilization of the grid infrastructure and drive down all customers' rates over time.

Managed Charging

Duke Energy's Application specifies utility-managed charging for just two of the seven programs: Residential EV Charging Program and the EV School Bus Charging Station Program. EDF suggest that Duke Energy consider piloting such load management with other programs, such as the Fleet EV Charging Program and the EV Transit Bus Charging Station Program. This would make the pilot program much more useful.

Metering

Duke Energy's Application specifies separate metering for charging stations in the Fleet EV Charging Program. EDF suggest modifying the application to include separate metering or submetering in the bus programs too. Given that a stated goal of the pilot is to "better understand EV charging behavior and the effects of charging multiple types of EVs on the Companies' bulk electric system," isolating data on EV energy use is critical to the success of this pilot.

Education and Outreach

Duke Energy's Application describes thorough market education and outreach, which EDF supports. The Application describes the outreach as similar to that used for energy efficiency and demand response programs. However, using a new vehicle and fuel type as with the EV programs require more changes in a customer's behavior and knowledge than such programs. EDF suggests that Duke Energy explain in more detail in the Application what training and information they will provide to pilot participants.

The education and outreach associated with this pilot needs to be carefully and thoughtfully designed. Customers need to have full understanding of which rate they will be on during the pilot period in order to mitigate incorrect charging patterns that can unnecessarily inflate the bill. Part of this process can be developing and testing a wide range of outreach materials, through focus groups or other testing opportunities, to support the launch of the pilot, and ensure that the approaches to reaching customers is effective. One very effective education and outreach program as part of a pilot was implemented by Consolidated Edison in its Innovative Pricing Pilot (see Appendix E of the footnoted document);[14] this can be used as a manual for a carefully thought-out education and outreach implementation process.

Another important outreach procedure is surveys. Surveys provide insight into the customers' actions apart from what the pilot results produce. For example, pre-pilot surveys asking the customer which rate they will be on and what they think their bill will be each month would provide insight into the customer's understanding of the rate they will face and their charging patterns. Post-pilot surveys are also key in identifying what worked well, what went

[14] Robert Hoglund, *Innovative Pricing Pilot, ConEdison*, July 6, 2018 (Appendix E) https://www.coned.com/_external/cerates/documents/elec/pending/innovative-pricing-pilot-filing.pdf.

wrong, and what other actions the customer may have taken in response to various rates and usage situations.

In addition, the Application says that environmental non-governmental organizations will play a role in customer communications and information delivery. As one such organization, EDF requests that Duke Energy specify the efforts it will expect from North Carolina environmental non-governmental organizations.

Additional Recommendations

EDF has the following additional specific recommendations concerning Duke Energy's EV proposal:

- The Commission should convene a working group with the electric utility companies and all interested stakeholders to study how to remove barriers to a robust deployment of EV charging services for light-, medium- and heavy-duty vehicles. The working group should include state transportation and economic development officials and planning officials in major cities, who can provide input on high volume transportation corridors, tourism, economic development and disadvantaged communities' needs. The working group should ensure that charging services are available in the appropriate areas and at the appropriate speeds.
- Utilities should conduct load research studies on the impact of EV charging loads – including from medium-and-heavy duty vehicles - on the grid and should incorporate EV charging loads in their integrated resource planning and distribution system design planning.

- Utilities should use a stakeholder process to study and develop a pilot program for EV owners to sell electricity and ancillary services back to the grid (V2G).
- Utilities should use a stakeholder process to continue to develop and test EV optimized rate designs as part of this pilot program and long-term transportation electrification strategy.

EDF thanks the Commission for the opportunity to provide these comments on Duke Energy's proposed pilot program.

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 Petition to Intervene by first class United States mail, postage prepaid, or by email transmission with the party's consent.

This 5th day of July, 2019.

/s/ Daniel J. Whittle