SemaConnect

April 15, 2019

M. Lynn Jarvis
Chief Clerk
North Carolina Utilities Commission
4325 Mail Service Center
Raleigh, NC 27699-4300
Via email: mjarvis@ncuc.net

Re: SUPPORT for Duke Energy North Carolina Electric Transportation Pilot (NC ETP)
NCUC Docket Nos. E-2 Sub 1197 and E-7 Sub 1195

Dear Chief Clerk Jarvis:

SemaConnect, a national manufacturer of smart, networked electric vehicle (EV) charging solutions, respectfully submits these comments in support of Duke Energy's above-referenced Electric Transportation Pilot.

In brief:

- When managed at scale by utilities, smart networked EV charging can reduce electricity costs for all ratepayers, not just for EV drivers;
- Rapid electrification of the transportation sector is imperative to improve air quality in North Carolina;
- EV charging is essential to electrify the transportation sector;
- Utilities such as Duke Energy have a critically important role to play to deploy and manage EV charging networks at scale; and
- Utility-owned programs along the lines of Duke Energy's proposal are good for the private sector because they spur competition in the marketplace and accelerate the growth of the EV charging industry.

Managed Charging Leads to Ratepayer Savings

When managed properly, EV charging presents an unparalleled opportunity for utilities to manage load and achieve savings that all ratepayers can enjoy. Through incentive-based Time of Use charging, smart charging and other means, utilities can reduce peak electricity demand and smooth out the load curve.

In a paper released in January, the Regulatory Assistance Project (RAP) found:

> "An EV's load is inherently flexible because capacity utilization is low and charging does not need to occur at the same time the vehicle is being used… Just as EV load can be shifted away from system peaks to cheaper hours, it can also be moved to times when variable renewable energy resources are more available. This can reduce the need to curtail renewables, increase the use of non-carbon resources, and save consumers money while still ensuring that their EV is adequately charged when they need it."[1]

Similarly, a 2016 analysis conducted by Energy and Environmental Economics for Public Utilities Fortnightly found "that transportation electrification offers broad societal benefits, and that the resulting load growth can benefit all ratepayers by reducing electric utilities' average cost of service."[2] (emphasis added)

This analysis is backed up by a new analysis just released last month by Illinois' Citizens Utility Board which found that "under any EV adoption scenario, all electricity customers see lower power costs when EVs charge in periods of low electricity demand."[3]

Emissions and Air Quality

In 2016, transportation dethroned electricity generation to claim the dubious distinction as the highest polluting sector in our nation's economy.[4] In fact, transportation was the only consumption sector where carbon emissions increased. It now accounts for more than one-fourth of all U.S. greenhouse gas (GHG) emissions.

In North Carolina, the situation is similar but transportation accounts for an even larger share—over 40 percent—of all carbon emissions in the state.[5] It's not just CO2, either; "on-road non-diesel light duty vehicles" are the state's largest emitter of nitrogen oxides, too—emitting almost 100,000 tons annually, more than twice that of any other sector.[6]

---

[1] Regulatory Assistance Project. 2019. *Beneficial electrification of transportation*. Retrieved from: https://www.raponline.org/knowledge-center/beneficial-electrification-of-transportation/

[2] Public Utilities Fortnightly. 2016, April. *Utilities' Role in Transport Electrification: Capturing Benefits for All Ratepayers*. Retrieved from: https://www.fortnightly.com/fortnightly/2016/04/utilities-role-transport-electrification-capturing-benefits-all-ratepayers

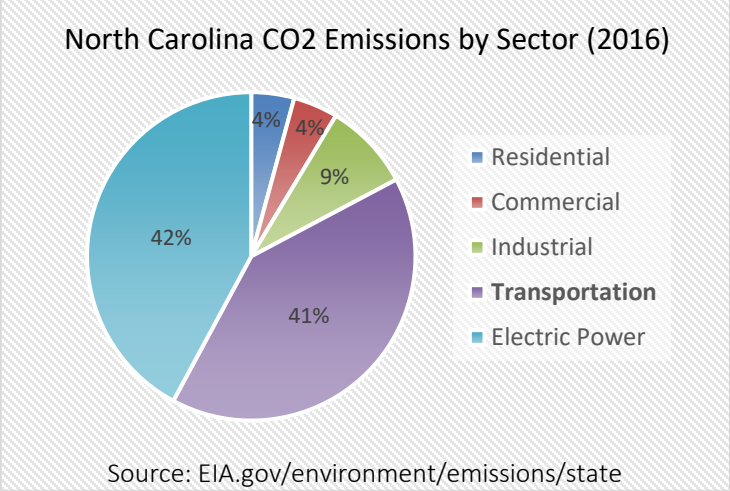
[3] Citizens Utility Board of Illinois. 2019. *Charging Ahead: Deriving value from electric vehicles for all electricity customers.* Retrieved from: https://www.citizensutilityboard.org/blog/2019/03/28/ev-paper/

[4] Energy Information Administration. 2017. *U.S. energy-related CO2 emissions fell 1.7% in 2016*. https://www.eia.gov/todayinenergy/detail.php?id=30712.

[5] Energy Information Administration. 2018. *State carbon dioxide emissions data.* https://www.eia.gov/environment/emissions/state/.

[6] EPA. 2018. *2014 National Emissions Inventory (NEI) Data.* https://www.epa.gov/air-emissions-inventories/2014-national-emissions-inventory-nei-data.

Fortunately, this is the sector that Duke Energy's proposed Electric Transportation Pilot directly targets by seeking to accelerate the shift from light-duty internal combustion engine vehicles to EVs.



The data is clear: to achieve cleaner and healthier air, North Carolina needs to reduce transportation emissions. And to do that, North Carolina needs to electrify transportation for the simple reason that EVs emit far less pollution than gas-powered vehicles. In fact, accelerating EV adoption is likely the only way the state can even have a fighting chance of achieving the targets set forth by Governor Cooper in Executive Order No. 80, to reduce greenhouse gas emissions 40% by 2025 compared with 2005 levels.[7]

A recent Union of Concerned Scientists (UCS) report confirmed that even after taking into account EVs' more electricity-intensive manufacturing process, battery electric vehicles (BEVs) produce less than half the GHG emissions as comparable gas-fueled cars over their full life cycle.[8] What's more, EVs actually get cleaner over time: as a utility incorporates more renewables and other carbon-free sources into its generation mix, each EV it charges will become cleaner as well. This is especially true in a state like North Carolina which is consistently ranked among the top three states for solar installations and is poised to add substantial land-based and offshore wind power capacity in the coming years.[9]

[7] State of North Carolina. *Executive Order No. 80: North Carolina's Commitment to Address Climate Change and Transition to a Clean Energy Economy.* Retrieved April 15, 2019. https://governor.nc.gov/documents/executive-order-no-80-north-carolinas-commitment-address-climate-change-and-transition.
[8] Union of Concerned Scientists. 2015. *Cleaner cars from cradle to grave.* https://www.ucsusa.org/sites/default/files/attach/2015/11/Cleaner-Cars-from-Cradle-to-Grave-full-report.pdf.
[9] Solar Energy Industries Association. 2019. *Solar Market Insight Report.* https://www.seia.org/research-resources/solar-market-insight-report-2018-year-review.

Charging Infrastructure

Charging infrastructure is the *sine qua non*—the essential ingredient—necessary to move EV adoption beyond the early adopters and into the mainstream. Drivers of gas vehicles take for granted their ability to fill up with fuel wherever they go, because gas stations have spread like wildfire since the first "filling station" opened in Pittsburgh in 1905. On the other hand, EV charging stations are sparsely distributed and often inaccessible to the public. The International Energy Administration (IEA) reports:[10]

> "Charging infrastructure, whether at home, at work or at public locations, is indispensable for operating EVs… the availability of chargers [is] one of the key factors for contributing to the market penetration of EVs." (emphasis added)

The International Council on Clean Transportation (ICCT) conducts extensive technical and scientific analysis of the often-inter-related factors impacting electric transportation. In a white paper released last year, ICCT examined 350 metropolitan areas globally and found—not surprisingly—that "public charging infrastructure is a key to growing the [global] electric vehicle market" (emphasis added).[11] ICCT followed up that research by focusing on the U.S.—specifically the 50 most populous U.S. metropolitan areas—and released those results last summer:[12]

> "Electric vehicle adoption and various types of charging infrastructure grow in unison. Public regular, public fast, and workplace charging are each linked with electric vehicle market uptake. These relationships remain complex and multidirectional: Infrastructure increases electric vehicle awareness and driver confidence, and more electric vehicle users increase demand for infrastructure."

State context

North Carolina faces a significant gap in publicly available charging infrastructure. According to the U.S. Department of Energy's Alternative Fuels Data Center, North Carolina currently has 586 publicly accessible Level 2 and DC Fast Charge charging locations totaling 1,346 charging ports

[10] IEA. 2017. *Global EV Outlook 2017*. https://www.iea.org/publications/freepublications/publication/GlobalEVOutlook2017.pdf#page=31
[11] ICCT. 2017. *Emerging best practices for electric vehicle charging infrastructure.* https://www.theicct.org/publications/emerging-best-practices-electric-vehicle-charging-infrastructure
[12] ICCT. 2018. *The continued transition to electric* vehicles in US cities. https://www.theicct.org/publications/continued-EV-transition-us-cities-2018

statewide.[13] This equates to only one publicly accessible charging port for every 2,878 households.[14]

This severe lack of publicly-available charging infrastructure is symptomatic of a broader market failure: private investment alone has been inadequate to meet the need for publicly-available charging, and this in turn has hindered EV adoption. Utility leadership and action—such as the Electric Transportation Pilot proposed by Duke Energy—is sorely needed.

Utility leadership

Utilities have a critical role to play in advancing vehicle electrification. For one thing, the business case does not yet exist for private companies to deploy charging stations at scale; there simply aren't enough EVs yet to provide a return on investment. Even efforts that stem from the Volkswagen diesel settlement such as Electrify America (EA)'s infrastructure investment plan and the state-led Appendix D Beneficiary Mitigation Plan will provide only a fraction of what's needed; EA's CEO estimated its network would provide a mere 10 percent of what the country needs.

Utilities are uniquely positioned to deploy and manage charging networks. What other entity already has an established service territory that connects electric service to every property, a fleet of field technicians, and trusted—often generational—relationships with its customers? And once the stations are deployed, who will manage their impact on the grid? The technical capacity of utilities is ideally suited to address the emerging challenges that arise from EV charging on a mass scale; these include managing electricity supply and demand and keeping prices down for all ratepayers, not just the EV drivers.

Utility ownership supports a competitive market

EV charging companies take different approaches with their business models. SemaConnect is both a network service provider and a charging station manufacturer; we provide both the software and the hardware. (We design our product as an integrated solution, but we can also provide either one or the other.) Other charging companies focus solely on one or the other but not both.

SemaConnect and many of our competitors in the industry welcome the prospect of utility-owned charging infrastructure because it directly supports our business models. When a utility issues an RFP to procure charging infrastructure, companies such as SemaConnect compete to

[13] U.S. Department of Energy Alternative Fuels Data Center. 2019, April 15. *Electric Vehicle Charging Station Locations.* https://afdc.energy.gov/fuels/electricity_locations.html#/analyze?fuel=ELEC&region=US-NC

[14] U.S. Census Bureau. 2018. *Quick Facts; North Carolina.* https://www.census.gov/quickfacts/fact/table/nc,US/PST045218

sell the utility our stations, our network management platform or both. In other words, utility programs such as Duke Energy's proposed Electric Transportation Pilot directly support private-sector competition in the EV charging sector and accelerate the growth of the industry.

The majority of EV charging companies fall into one of these three categories, namely, as a network provider, a station manufacturer, or both. However, a handful of EV charging companies are seeking to prove the viability of a fourth business model: to own and operate their own proprietary network of charging stations. These companies often argue against utility ownership of charging stations even though their own business model remains unproven. The market does not support—and might never support—a business model in which the sale of electricity to EV drivers would provide enough revenue to cover a charging station operator's significant capital investment and operating expenses, and ultimately return a profit.

For context, it may be worthwhile to consider the experience of the gas station sector. Even for gas station operators, the sale of the gasoline provides only a slight marginal return at best. As Zacks Investment Research notes:

> "From a financial perspective, gas doesn't matter much at most gas stations… most stations make their money on the sales in their convenience stores or through add-ons of additional services, such as car washes."[15]

No proven business model yet exists for the private sector to deploy, own and operate a network of EV charging stations at scale. On the other hand, utility ownership of EV charging stations directly supports private sector businesses and fosters competition within the industry.

Other considerations

Those of us in the clean energy community tend to live and breathe all things EVs, but our country is still in the very early stages of transportation electrification. Battery and plug-in EVs comprised just 1.02% of car sales in North Carolina last year;[16] EV charging companies are taking different approaches with their business models; and prospective buyers often have little to no awareness about how and where to charge. In this evolving context, *how* Duke Energy and North Carolina decide to procure and deploy EV charging infrastructure is arguably as important as *how much* they invest. The right approach can not only future-proof Duke Energy's and its ratepayers'

[15] Zacks Investment Research. Retrieved April 15, 2019. *Are Gas Stations Good Investments?* https://finance.zacks.com/gas-stations-good-investments-10481.html

[16] Alliance of Automobile Manufacturers. Retrieved March 22, 2019. *U.S. Light-Duty Advanced Technology Vehicle Market Share (2013-2018).* https://autoalliance.org/energy-environment/advanced-technology-vehicle-sales-dashboard/.

investments, it can accelerate greater EV adoption by providing drivers with a more customer-friendly charging experience.

To help guide EV charging policy and investment decisions, a broad coalition of industry stakeholders has established a set of guiding principles called the Transportation Electrification Accord.[17] SemaConnect is a signatory to the Accord and recommends it for the NCUC's consideration. Its principles include the following:

- Open standards and interoperability: public sector- and utility-provided EV charging infrastructure should be based on platforms of open standards and true interoperability. This will create a better experience for EV drivers, who will be able to charge up without needing to subscribe to a proprietary charging platform. In addition, it will help future-proof ratepayer-funded investments by minimizing the risk of stranded assets and vendor lock-in.

- Open data: utilities, drivers, charging companies and the NCUC itself are all in the same boat in that none of us know with certainty how EV usage and charging will evolve, and how it will impact our economy, transportation sector and electric grid. We all will benefit from sharing information and learning from each other's experiences. In this vein, utility investments should incorporate robust data collection and reporting; make the anonymized data publicly accessible; and use it to analyze charging patterns, identify infrastructure gaps, and inform future investment decisions.

- Smart Infrastructure: EVSE functionality is advancing rapidly, as are the expectations of EV drivers. It makes little sense to invest in equipment that will be obsolete shortly after it is installed. For drivers, this means that utility investments should embrace the future and allow drivers to manage their charging remotely, much like we can control our home environment on our smartphone with cloud-based smart thermostats. For the utilities, this means anticipating and ensuring support for Vehicle-Grid Integration (VGI) and Vehicle-To-Grid (V2G) capabilities.

About SemaConnect

An American success story, SemaConnect is a national provider of smart, networked electric vehicle (EV) charging solutions. We support collaboration both within the industry and with external stakeholders; to that end we are active members of associations such as the Alliance for Transportation Electrification, the Southeast Energy Efficiency Alliance (SEEA) and others.

[17] Transportation Electrification Accord. 2018. https://www.theevaccord.com.

SemaConnect exemplifies the economic promise of vehicle electrification: our founder Mahi Reddy started SemaConnect in 2008 when mass market EVs were still just a dream. In 2011 we deployed our first charging station as the first EVs were hitting dealer showrooms. Now, just eight years later, SemaConnect has deployed thousands of charging stations across North America.

SemaConnect's flagship product, the Series 6 Smart EV Charging Station, is integrated with our cloud-based network. Our platform is based upon open standards and full interoperability, and supports the latest protocols such as Automated Demand Response and network roaming. This approach, combined with our robust back-end functionalities that include data analytics, reporting and dynamic pricing, make our solution ideal for public utilities and other entities that want to manage and operate their own charging networks.

In summary, SemaConnect strongly supports Duke Energy North Carolina's proposed Electric Transportation Pilot and respectfully recommends favorable adoption by the NCUC.

Thank you for your consideration of these comments, and please contact me if I can provide additional information or answer any questions. I hope you consider SemaConnect as a resource as we all navigate this transition towards an electrified transportation future together.

Sincerely,

Josh Cohen
Director of Policy and Utility Programs