

North Carolina EV Policy Landscape

Electrifying Transportation in the Tar Heel State



January 14, 2021

Overview

As North Carolina continues to drive toward an electrified transportation future, which policies, strategies, and partners can help it succeed? The North Carolina EV Policy Landscape outlines how the state can move forward to achieve a more robust EV future. The Electrification Coalition (EC) developed this document to guide the work of the EC State EV Policy Accelerator over the next year, and it features our assessment of the policy opportunities, pathways, messaging, and key players that will be most effective in achieving progress in the near term. It reflects input from a wide range of on-the-ground stakeholders and builds upon the insights of previous roadmaps and guidance documents, including those developed by the EC. It reviews transportation’s current impacts to public health, safety, and the economy. From the collection of policy opportunities we examine here, the EC has identified a set of high-impact areas of engagement where we will dedicate our resources, in partnership with other players. Our goal: Electrify the Tar Heel State.

North Carolina Context for EV Policy Action	2
The Case for EVs in North Carolina	2
Jobs and Economic Development	3
Greenhouse Gas Emission Reductions	3
National and Energy Security	4
Air Quality, Public Health, and Social Equity	5
Key Players	6
Policy Opportunities, Pathways, Messages	6
Acknowledgements	7

North Carolina Context for EV Policy Action

North Carolina has already taken important steps toward an electrified transportation future, with actions by the state government, local governments, non-governmental organizations, and the private sector, including utilities and EV-related companies.

North Carolina Executive Order 80 from 2018 seeks to increase the number of zero emission vehicles (ZEVs) in the state to at least 80,000 by 2025 and to establish interstate ZEV corridors, building upon the strategies laid out in the [North Carolina ZEV Plan](#) and the [North Carolina Motor Fleet ZEV Plan](#).

The state also signed, in July 2020, a [Multi-State Zero Emission Medium- and Heavy-Duty \(MD, HD\) Vehicle Memorandum of Understanding](#), along with 14 other states and the District of Columbia. This agreement

establishes a commitment to 100% MD and HD sales ZEV by 2050, and at least 30% by 2030. North Carolina also has multiple incentives (e.g., tax exemptions, high occupancy vehicle lane access, funding for charging infrastructure) and regulations (e.g., EV goals for fleets, rates for charging) that support ZEV targets and reduce emissions. North Carolina has an EV Fee of \$130 annually, which is approximately equivalent to what a comparable gasoline-powered-vehicle owner would pay in gasoline tax, serving as a disincentive to adoption.

North Carolina's commitment to electric vehicles extends to the local level. The City of Charlotte, a member of the American Climate Cities Challenge, is an ambitious leader. Under its Strategic Energy Action Plan, the city is seeking to [transition its fleet to zero CO₂ by 2030](#), and it is installing [EV charging stations](#) (some 48 as of February 2020, with four that are solar powered).

The Case for EVs in North Carolina

Drivers for EV action in North Carolina include the economic development benefits associated with transportation electrification; the need to reduce greenhouse gas emissions and air pollutants, such as particulate matter (from diesel vehicles) and nitrogen oxides, which adversely impact public health, especially for communities of color; and concerns over the adverse energy security impacts associated with oil dependence.

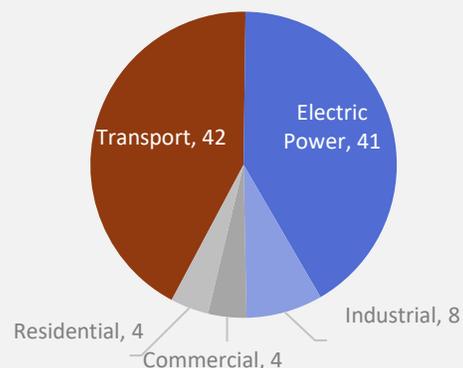
About the State EV Policy Accelerator and the Electrification Coalition

The Electrification Coalition (EC) launched the State EV Policy Accelerator in early 2020, with the goal of advancing state policies to drive widespread transportation electrification. Working with leaders across the government, private-sector and advocacy community, the EC will lead deep-dive policy action in the five priority states of Michigan, Nevada, North Carolina, Pennsylvania, and Virginia from 2020 through 2022. This work will include detailed market assessments, policy blueprints, resource toolkits, and customized bootcamps, alongside targeted implementation programs for bus electrification, fleet transitions, and other local programs to prove out electrification on the ground. In addition, the EC provides rapid response support for states across the country, in the form of targeted analysis, media and communications support, testimony, and policy comments.

The EC is a nonpartisan nonprofit organization that promotes policies and actions to facilitate widespread deployment and adoption of plug-in electric vehicles (EVs) to overcome the national security and economic challenges created by America's dependence on oil.

Transportation is North Carolina's largest source of GHG emissions.

Percent of GHG emissions by sector. Source: Energy Information Administration, [Table 4](#)



Jobs and Economic Development

Electric vehicles provide benefits to economic development, and North Carolina is poised to grow its EV industry. Already, it ranks very high relative to other states on the number of companies involved in the [EV supply chain](#), including those focused on charging stations, batteries, lithium inputs, electronic controls, and electronic devices used in motors and charging (Fig. 1. Also see “Key Players,” p. 6). Economic benefits beyond the supply chain include growth in electricity generation and distribution, grid and infrastructure investments, vehicle sales, and associated advertising and marketing services.

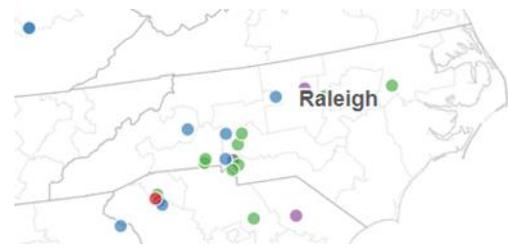


Figure 1. Facilities supporting EV supply chain in North Carolina

A recent analysis of [clean vehicle jobs](#) in North Carolina found that there are already 7,100 clean vehicle jobs (electric vehicles, hydrogen, plug-ins, fuel cell, and natural gas) and 14,500 jobs in vehicle efficiency (Fig. 2). North Carolina’s clean vehicles job growth made up about 1% of the clean energy jobs growth from 2018-19.¹ The total auto workforce (about 198,000²) represents 3% of the state’s workforce. Clean transportation would improve the health of nearly 100,000 workers in transportation, including 28,000 heavy-duty truck drivers, 7,000 delivery drivers, and 3,400 bus drivers, according to a [report by the North Carolina Department of Commerce](#).

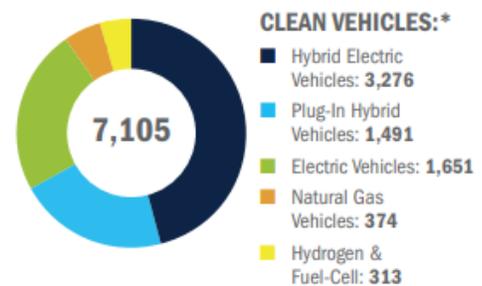


Figure 2. Clean vehicle workers in North Carolina, Q4 2019

North Carolina is attracting new EV industry participants. UK-based EV startup Arrival has selected Charlotte as the location for its North American headquarters and will open its second American Microfactory there as well.

The potential avoided social cost of carbon between 2020-2060 is an incredible \$70-75 billion, and spending on oil is roughly \$12 billion per year.³

Greenhouse Gas Emission Reductions

Transportation emissions are the largest contributor to North Carolina’s greenhouse gas profile at 50 Mt CO₂ per year. There is substantial opportunity to reduce greenhouse gas emissions by electrifying the transportation sector – in total, there are 8 million vehicles in North Carolina. Cumulative CO₂ saved from 2020-2060 is an estimated 740-835 Mt (Fig. 3).

¹ Of the clean jobs growth, 51% was in renewable energy, 41% in energy efficiency, ~5% in grid modernization, ~2.5% in storage, and ~1% in clean fuels

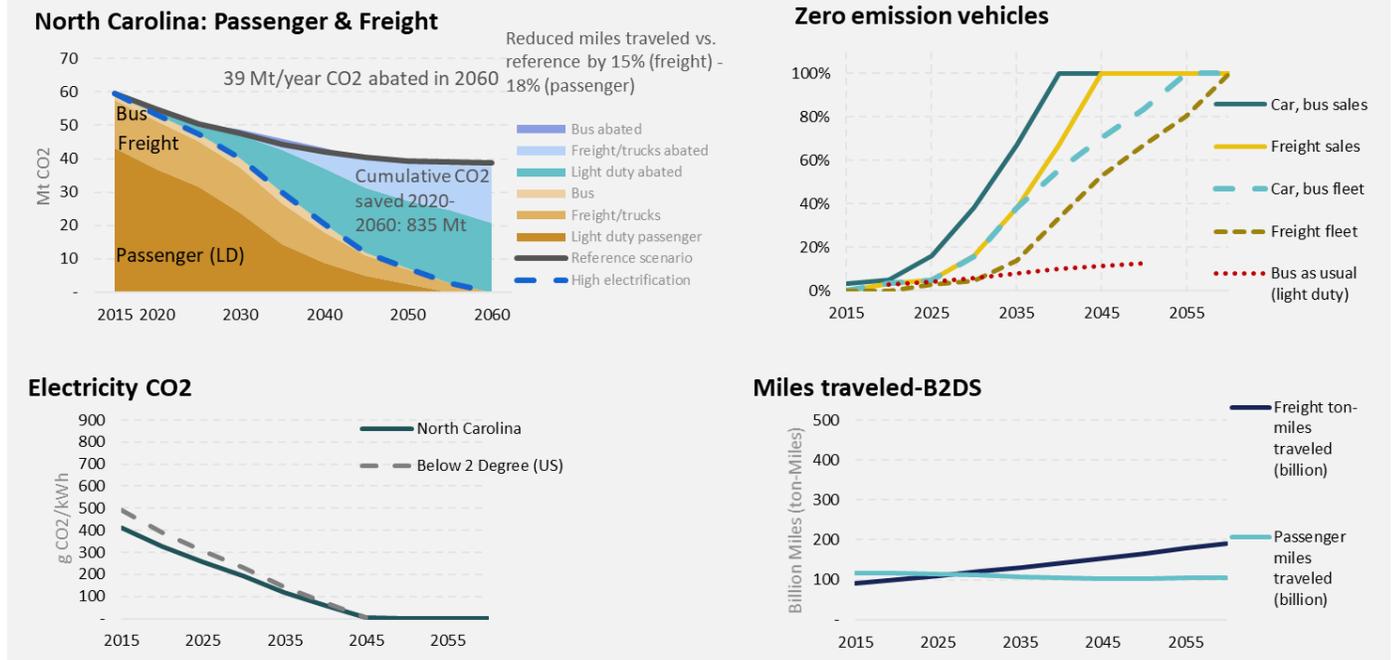
² Auto Alliance, <https://autoalliance.org/in-your-state/>

³ *Ibid* reference 1

Figure 3. GHG reductions possible with aggressive electrification

Mt CO₂ reductions: ~40 Mt/year avoided in 2060; cumulative CO₂ saved from 2020-2060 is 740-835 Mt. Low range reflects reference travel patterns (flat passenger, increasing freight travel); higher range reflects 15-18% reduction in miles traveled consistent with a Below 2 Degree Scenario (B2DS) (bottom right). Electricity CO₂ intensity specific to North Carolina, following an assumed decarbonization pathway to 0 g CO₂/kWh in 2045 (bottom left).

Source: Hovland Consulting estimate (2020), with inputs from [IEA Energy Technology Pathways \(2017\)](#) & other sources.



National and Energy Security

About 91% of transportation in the United States is powered by oil, and this dependence has bound the United States’ national, economic, and energy security to a highly volatile, cartel-influenced global oil market. Every year the [U.S. military spends roughly \\$81 billion](#) to safeguard global oil supplies. Ninety percent of conventional crude oil reserves are held by OPEC member states or national oil companies that don’t share U.S. strategic values or interests. Some economists have estimated that the financial resources spent by the military equates to an implicit [subsidy of up to \\$0.70 per gallon](#) of gasoline. While the U.S. has gone to great lengths to secure supply and reduce volatility globally, not all supply disruptions can be predicted or prevented – and no matter where supply is disrupted, prices everywhere are affected.

The recent collapse of the oil market is just the latest such disruption, which has not only damaged the domestic oil production sector but has also undermined innovation and investment in electrified transportation. If the U.S. is to ever attain real energy security, we must accelerate the transition away from petroleum-dependent transportation to electric vehicles.

North Carolina imports 168 million barrels of oil per year – translating into spending roughly \$12 billion per year on oil.⁴

⁴ US Energy Information Administration State Energy Data System (SEDS) - Petroleum consumption, <https://www.eia.gov/state/seds/seds-data-complete.php?sid=US> and \$2.30/gallon (<https://www.fueleconomy.gov/feg/gasprices/states/NC.shtml>)

Air Quality, Public Health, and Social Equity

Transportation electrification is also motivated by the opportunity to improve public health and enhance social equity. Beyond greenhouse gas emissions, the transportation sector is a significant source of other harmful air pollutants – particularly in areas of high population density – that can be lowered substantially through a move to EVs. Traditional internal combustion engine vehicles (ICEVs) have long been leading mobile-source emitters of criteria pollutants considered by the U.S. Environmental Protection Agency to be harmful to public health. They include particulate pollution (PM_{2.5} and PM₁₀), carbon monoxide (CO), volatile organic compounds, and nitrogen oxides (NO_x). Globally, PM_{2.5} from fossil fuel emissions is responsible for nearly [9 million premature deaths per year](#), amounting to nearly one in five deaths worldwide. Transportation emissions are linked to health impacts including asthma, heart attacks, reduced lung capacity, chronic pulmonary and heart disease, and cancer. North Carolina child and adult asthma cases are estimated at 9.4% of the population – that means 760,000 North Carolinians have asthma. In Charlotte, about 23 deaths per year can be attributed to PM_{2.5} and ozone from on-road vehicles.⁵

Of additional concern, particularly in the era of COVID-19, pollutant exposure disproportionately affects Black, Latinx, Indigenous, and low-income communities. In North Carolina, these populations are substantial – 36% of residents are people of color, and one-third have incomes below 185% of the poverty line.⁶ Recent studies suggest that higher exposure to PM_{2.5} increases the COVID-19 mortality rate: An increase of only 1 µg/m³ in PM_{2.5} is associated with an 8% increase in the COVID-19 death rate.⁷

Battery electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEVs) in electric drive mode have zero tailpipe emissions, thus drastically improving ambient air quality and health outcomes. A [study by the Denver Colorado Department of Environmental Health](#) found that BEVs charged on the city's 2016 grid mix produced 38% lower NO_x and 99% lower VOC emissions than a new gasoline vehicle. Across North Carolina, the benefits of widespread vehicle electrification would be substantial. Each year, the state could avoid 140 premature deaths, \$1.6 trillion in health costs, 2,380 asthma attacks, and 10,525 lost work days.⁸

⁵ Anenberg, S.C., J. Miller, D. Henze, R. Minjares, P. Achakulwisut (2019) The global burden of transportation tailpipe emissions on air pollution-related mortality.

⁶ GIS analysis using Census data. <https://www.census.gov/geographies/mapping-files/time-series/geo/tiger-line-file.html>

⁷ Harvard (2020), *COVID-19 PM2.5: A national study on long-term exposure to air pollution and COVID-19 mortality in the United States*. <https://projects.iq.harvard.edu/covid-pm/home>. See also *Can exposure to PM2.5 particles increase the incidence of coronavirus disease 2019 (COVID-19)?* Elsevier Public Health Emergency Collection (Nov 2020). <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7308784/>.

⁸ American Lung Association (2020), *The Road to Clean Air: Benefits of a Nationwide Transition to Electric Vehicles*. <https://www.lung.org/getmedia/99cc945c-47f2-4ba9-ba59-14c311ca332a/electric-vehicle-report.pdf>

Key Players

Many organizations, agencies, and individuals play a role in EV policy action in Nevada.

Key Players

Player	Description
Governor	With strong high-level leadership in Governor Roy Cooper, North Carolina is poised to emerge as a leader in transportation electrification. Executive Order 80 committed the State to reduce statewide greenhouse gas emissions to 40% below 2005 levels by 2025.
State Agencies	The NC Department of Environmental Quality (DEQ) and the NC Department of Transportation (DOT) developed the ZEV Plan. The NC Department of Administration (DOA) developed the Motor Fleet ZEV Plan to identify the first opportunities for ZEV deployment first and strategies for charging. The DEQ Division of Air Quality directs the use of VW settlement funding and has financial incentives (grants, tax exemptions) for using alternative fuels.
State Legislature	The legislature has enacted some foundational rules that help support EV deployment (e.g., EVSE providers are not to be considered utilities and EVs are exempt from HOV lane restrictions. EV registration fees are approximately equivalent to what gasoline-powered-vehicle owners pay in gas taxes.
Utilities	Utilities in North Carolina have invested some funding into EV charging infrastructure and are positioning to do more. Duke Power has a rate case partially approved that seeks to invest about \$76 million and develop 160 public Level 2, 80 multifamily dwelling Level 2, and 40 public DC fast charging stations. Duke will seek to aid with the deployment of 30 electric school buses and the viability of vehicle-to-grid technologies. As part of this pilot, the NC Utilities Commission has ordered Duke to convene a collaborative stakeholder process to gather community input on potential future pilot programs. Duke is instructed to file any pilot programs developed through this process within six months of this order. Randolph Electric Membership Corporation and Cape Hatteras Electric Co-Op offer charging installation rebates and discounted time-of-use rates. Other parties involved in power and EVs include the NC Utilities Commission, which promotes renewable energy development and energy efficiency through implementation of a renewable portfolio standard, and the NC Clean Energy Technology Center, a state agency that promotes the development and adoption of clean energy to businesses and individuals.
EV Supply Chain	Many companies are engaged in EV production and deployment in North Carolina. Siemens, Volvo, ABB, Thomas Built Buses, and Arrival all have headquarters locations in the state. Others with a North Carolina presence include EVgo, Charge Point, Nissan, Tesla,(charging stations), Texmac, ABT Power Management, Saft America, Livent Corp, Albemarle, Piedmont Lithium and Polypore (batteries and lithium inputs), Keihin Carolina System Technology (electronic controls), Xtrac (transmissions), Wolfspeed (SiC devices used in motors and charging).
Local Governments	Charlotte, as detailed above, is a clear leader, aiming for 100% ZEVs by 2030 in its fleet. Other interested cities include Raleigh, which recently completed an EV roadmap. The City of Durham and Durham County have an Electric Vehicle and Charging Station Plan . The Town of Chapel Hill offers same-day permitting for residential installations of electric vehicle charging stations.

Policy Opportunities, Pathways, Messages

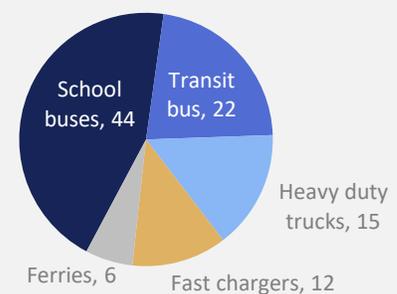
North Carolina has a rich set of policy opportunities to pursue, with some groundwork already laid.

Key policy levers will be playing out in the next couple of years, including decisions in utility rate cases that impact EVs, additional decisions on how to allocate the \$87 million awarded to North Carolina through the VW Settlement, with opportunities to devote funding to EVs and charging infrastructure, and legislative decisions on purchase incentives, building codes and more. Phase 1 of the [VW mitigation fund](#) (July 2020) was distributed with buses (school and transit), heavy trucks, and charging as priorities (Fig. 4).

North Carolina signed the Multi-State Zero Emission Medium- and Heavy-Duty Vehicle Memorandum of Understanding; the state will need to consider adopting and aggressively pushing associated policies that will enable the MD/HD ZEV market to thrive and

Figure 4. Buses, heavy trucks, and charging have been priorities for VW funding

Percent of Phase 1 [VW funds](#), total \$27.7M



eventually meet or exceed the goals set in the MOU. Such policies include financial incentives (e.g., rebates and tax credits) for vehicle and charging infrastructure purchases, rebates and grants for public charging, workplace charging programs, EV-ready building codes, PUC processes, and ratemaking.

As a follow up to a recent decision in a Duke Energy transportation electrification filing, the North Carolina Utilities Commission has ordered Duke to convene a collaborative stakeholder process to gather community input on potential future pilot programs. That effort wraps up in May 2020, with a number of potential new tariffs and pilot programs under consideration for future filings.

EV advocates should emphasize economic development opportunities in the state, particularly as EV supply chain manufacturing grows in neighboring states of South Carolina, Tennessee, Georgia, and Alabama. North Carolina also has significant lithium reserves in Gaston. EV advocates should also illustrate the national security and energy security benefits of electrification, which should resonate with the military communities in the state. It's also important to communicate EVs' contributions to improved resiliency from natural disasters in the wake of hurricane threats. Equity issues are also a key consideration for North Carolina.

EV policy success depends on an alignment of players, strategic pathways and messages. Based on our assessment to date, there are leading policy opportunities with respect to the following:

1. Implementation of EO 80
2. Implementation of the MHD MOU, including for freight, transit buses and school buses
3. Defending against inequitable EV fees
4. Increasing access through EV-ready building codes and direct-to-consumer EV sales
5. Ambitious statewide targets on transit bus electrification
6. New EV tariffs and pilots.

Acknowledgements

This landscape assessment was made possible through a grant from Bloomberg Philanthropies to the Electrification Coalition. Special thanks to the following EC staff for providing input: Ben Prochazka, Executive Director; Sue Gander, Managing Director, Policy; Aaron Viles, Campaigns Manager; Will Drier, Senior Policy Analyst; Brad Nelson, Policy Analyst; Julie Sutor, Communications Director. Additional research, analysis and design support was provided by [Hovland Consulting](#).