



North Carolina
Motor Fleet ZEV Plan Update
NC Department of Administration
October 28, 2021

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Introduction and Overview

In September of 2019, the NC Department of Administration (DOA) published the Motor Fleet Zero Emission Vehicle (ZEV) Plan as directed by Governor Cooper in Executive Order 80, North Carolina's Commitment to Address Climate Change and Transition to a Clean Energy Economy.

The 2019 Motor Fleet ZEV Plan identified:

- The types of trips for which a ZEV is feasible;
- Infrastructure recommendations necessary to support ZEV use;
- Procurement options and strategies to increase the purchase and utilization of ZEVs; and
- An accounting of each agency's ZEVs and miles driven by vehicle type.

The 2020 Motor Fleet ZEV report provided an update on the state's fleet of electric vehicles a year into the plan's implementation. While 2020 was a challenging year for the Division of Motor Fleet Management (MFM) due to supply chain disruptions and a drop in state vehicles being driven caused by the COVID-19 pandemic, the report provided notable achievements as well as areas for continued focus and investment.

This 2021 Motor Fleet ZEV report provides the latest update on the state motor fleet's ZEV and hybrid inventory. This report also summarizes Sawatch Labs' vehicle telematics analysis, provides updates on MFM's new vehicle procurement contract, and identifies next steps to increase the number of ZEVs in the state's fleet as well as enhance charging infrastructure across the state.

Summary of Highlights

The Department of Administration's Division of Motor Fleet Management has pursued a variety of strategies since the 2020 Motor Fleet ZEV report to increase the number of zero-emission vehicles used by state agencies.

- The National Renewable Energy Laboratory and Sawatch Labs report, outlined in more detail below, identified 3,049 state vehicles that may be suitable for replacement with a zero-emission vehicle (ZEV) at the end of their life cycles, potentially saving the state \$14 million in total cost of ownership over the life of those vehicles.
- The fiscal year (FY) 2021-2022 MFM replacement list identified 143 vehicles eligible for ZEV replacement in the next fiscal year and 330 vehicles as eligible for hybrid

replacement in the next fiscal year. As technologies for zero-emission vehicles and charging infrastructure continues to advance, the state will be able to replace even more vehicles with a ZEV.

- MFM retooled the state vehicle procurement contract to secure more cost-effective ZEV and hybrid options. As a result of the new contract, the state fleet will standardize around hybrid sedans where ZEV sedans are not feasible.
- Hybrid vehicles make up over 75% of MFM total vehicle purchases in FY 2021-2022 as of October, 2021. Adoption of hybrid vehicles is an important step to reducing carbon emissions in the state fleet.
- Increased collaboration and coordination among DOA, the Governor's Office, and cabinet agencies have resulted in a renewed commitment to transition the state's motor fleet to ZEVs where feasible.
- DOA and state agencies can accelerate the transition to zero-emission state vehicles by taking recommended actions to increase ZEV awareness, purchases, and charging infrastructure.

NREL and Sawatch Lab July 2021 Report

In partnership with the National Renewable Energy Laboratory (NREL), Sawatch Labs conducted a study to analyze the feasibility of electric vehicle adoption within North Carolina's state motor fleet. NREL contracted with Sawatch Labs to analyze the impact of increasing state fleet electrification on the charging demand at parking facilities in three states, including North Carolina. The goal of the project was to:

1. Identify vehicles for which an electric vehicle (EV)¹ is a good operational and economic fit;
2. Identify where charging infrastructure will be needed to support broad fleet electrification; and
3. Project charging demand curves to highlight where charging may impact facility peak demand.

Sawatch released its analysis and summary report to DOA in July 2021. Sawatch observed the vehicle use and telematics data of 5,901 state fleet vehicles from February 23, 2018, to January 16, 2020. Each vehicle tracked was scored on four metrics to determine eligibility for EV replacement: energy consumption, the total cost of ownership (TCO), parking location frequency, and data availability. Sawatch Labs determined the potential TCO by factoring in the projected cost of gas, electricity rates, social cost of carbon, ICE

¹ ZEV and EV are used interchangeably throughout this report.

maintenance cost, EV maintenance cost, depreciation value, and other factors. Metrics like the social cost of carbon are not currently accounted for in MFM's determination of TCO. MFM currently calculates TCO based on depreciation, maintenance and repair costs, fuel cost, taxes, insurance, and administrative fees. MFM is required to report any changes in the TCO calculation to the North Carolina General Assembly (G.S. 143-341(8)(i)(4)).

From that analysis, Sawatch identified 3,049 vehicles that may be suitable for EV replacement over time, leading to over \$14 million in total estimated savings in cost of ownership for the state based on Sawatch's TCO calculations. Figure 1 illustrates Sawatch's major vehicle replacement findings based on their analysis.

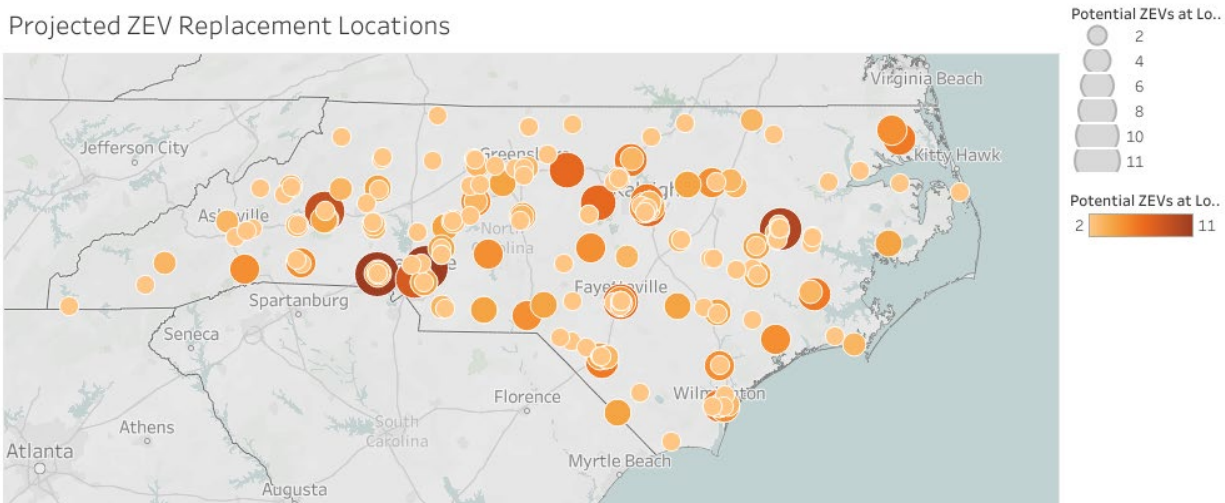
Figure 1. Summary of Sawatch analysis major findings for increasing use of ZEVs in NC's State Motor Fleet.



Sawatch Labs also assessed the potential aggregate charging demand across the state's fleet for all vehicles identified as suitable for an EV replacement, to help the state determine the location of charging infrastructure for optimal utilization. Based on driving data and the assessment of parking locations for potential EV replacements, Sawatch concluded where charging infrastructure would be most beneficial for the fleet and projected peak charging demand.

The below map used Sawatch Labs' data to display all locations where at least two and up to eleven vehicles may be eligible for EV replacement at the end of their lifecycles. The size and darkness of the orange dots represent how many EVs would regularly park at each location. DOA will use this data and state property location data to assess where EV chargers will be the most needed, and the minimum number of chargers that should be installed at each location.

Figure 2. All locations where at least two state vehicles may be eligible for ZEV replacement.



2021 Procurement Contract

The Division of Motor Fleet Management worked with DOA Purchasing and Contracting to develop a new purchase contract to include ZEV and hybrid vehicles. The result was a new state term contract for vehicles with dramatic price decreases and savings. The Division achieved this by developing a contract method that shifted away from a “single winner-takes-all” contract to a “bid your portfolio” contract. This contracting approach attracted traditional dealers like Ford, GM, Chrysler/Fiat, and new dealers such as Toyota, Nissan, Kia, and Hyundai. Dealers bid every vehicle in their portfolio individually, which allowed them to cut costs on some models knowing they could make margins on others. This approach will enable Motor Fleet to purchase a la carte the vehicles that appear to be the best value, as opposed to only contracting with one dealer.

Under the new procurement contract, MFM secured several ZEVs and will look to add more vehicle options as they become available. Through this new contracting approach, Motor Fleet Management also identified that the Toyota Camry Hybrid is the most cost-effective sedan option due to reduced cost and its extended lifecycle. With these findings, Motor Fleet will be standardizing the sedan fleet around the Camry Hybrid wherever ZEV sedans are not feasible.

Stakeholder Engagement

In August 2021, the Motor Fleet Management Division sent the annual replacement list to state agencies. The list is a new initiative by the Division that started in 2020 to streamline the fleet replacement process. Agency secretaries, policy directors, and motor fleet managers received a list of vehicles eligible for replacement in the coming year based on age and how the vehicle was driven.

Based on the Sawatch report analysis, the MFM team identified and highlighted which vehicles were suitable for ZEV or hybrid replacement. In coordination with the Governor's Office, the Department of Administration worked to educate agencies on the importance of ZEV adoption in conjunction with the rollout of the replacement list. DOA and the Governor's Office emphasized that the vehicles identified on the replacement list are presumed suitable for replacement with a ZEV based on collected driving data and reiterated the importance of transitioning the state's motor fleet in accordance with Executive Order 80. The Division will continue to work with agency stakeholders to educate and answer any questions about ZEV fleet adoption.

MFM holds two Agency Fleet Coordinator (AFC) meetings annually (October and April). These meetings are training opportunities to get the AFCs up to date on the latest procedures for assignment, maintenance, utilization, and driver management. Executive Order 80 and ZEV electrification are incorporated into the agenda of those meetings. MFM also sends out a monthly service reminder to agency fleet coordinators. This reminder includes information about maintenance services due, maintenance or inspections missed, and manufacturer recalls. Quarterly, MFM uses this monthly email as an instrument to include additional information beyond service. The Division also provides information about compliance, audits, Executive Order 80, and other events/issues regarding fleet vehicle operation in the monthly emails.

DOA has also begun to engage stakeholders within its divisions to develop charging infrastructure solutions for the ZEV fleet. Charging infrastructure is a multi-faceted issue that involves several internal stakeholders, including the State Construction Office, the State Parking Office, and the State Procurement Office.

Motor Fleet Management ZEV and Hybrid Vehicles Inventory

Motor Fleet Management currently has 41 zero-emission vehicles throughout the state fleet. Because of the new replacement process, MFM anticipates a considerable increase in EVs purchased by agencies in the next few years.

Hybrid vehicles are practical alternatives to ICE vehicles in cases where ZEV replacement is not feasible. For long trips that would require a mid-trip charge, driving hybrid vehicles can yield significant emissions savings compared to a similar ICE vehicle. As of October 2021, MFM has ordered 510 hybrid vehicles in FY 2021-2022, making up over 75% of total motor fleet vehicle purchases so far this fiscal year. In FY 2021-2022, Motor Fleet ordered 420 Toyota Camry Hybrids. These models average 52 miles per gallon (mpg) and will replace Ford Fusions, which average 23mpg². The replacement of these vehicles will cut emissions by more than half compared to the vehicle it replaced. MFM is expecting to receive all 420 Camry Hybrids this fiscal year at a rate of 80 Toyota Camry Hybrids per month beginning in November 2021. Deliveries will continue through the end of April 2022.

Motor Fleet Management ordered 60 Ford Interceptor hybrid SUVs in 2021 to be used by law enforcement agencies. These hybrids average 24 mpg, compared to 17 mpg in previous ICE models³. Hybrid SUVs are a positive step in reducing greenhouse gas emissions while the market works towards making all-electric SUVs feasible and affordable.

Motor Fleet Management ordered 30 Toyota Sienna hybrid minivans in 2021. Toyota began offering Siennas exclusively as hybrids starting with the 2021 models. The 2022 Siennas average up to 36 mpg for both highway and city driving⁴. The ICE 2020 Toyota averaged 19 mpg in for city driving and 26 mpg on the highway⁵. The new hybrid minivans in the motor fleet will lead to significant fuel savings and emissions reductions.

² https://www.fueleconomy.gov/feg/bymodel/2022_Toyota_Camry.shtml

³ <https://www.ford.com/police-vehicles/hybrid-utility/>

⁴ https://www.fueleconomy.gov/feg/bymodel/2022_Toyota_Sienna.shtml

⁵ https://www.fueleconomy.gov/feg/bymodel/2020_Toyota_Sienna.shtml

Figure 3. MFM ZEV Inventory as of October 2021

#	Vehicle-Number	Vehicle Year	Vehicle-Make	Vehicle-Model	Vehicle-Fuel-Type	LastLog-Mileage	Agency Name	Division Name	VehicleStatus Desc	VehicleCategory Desc	Assignment Start Date
1	261278	2014	Nissan	Leaf FWD	Non-Fuel	22642	UNV NC State University	N C State University	Assigned	Agency Purpose	May 24, 2016
2	261279	2014	Nissan	Leaf FWD	Non-Fuel	31628	DHHS Central Administration	Central Administration	Assigned	Agency Purpose	August 8, 2016
3	261277	2014	Nissan	Leaf FWD	Non-Fuel	27436	UNV UNC-Asheville	Unc At Asheville	Assigned	Agency Purpose	August 24, 2016
4	261381	2015	Nissan	Leaf FWD	Non-Fuel	21364	DHHS Health Benefit	Div Of Medical Assistance	Assigned	Public Safety	March 21, 2017
5	261275	2014	Nissan	Leaf FWD	Non-Fuel	22026	DHHS Blind Services	Blind Services	Assigned	Agency Purpose	June 14, 2017
6	261383	2015	Nissan	Leaf FWD	Non-Fuel	14500	UNV UNC-Chapel Hill	Unc At Chapel Hill	Assigned	Agency Purpose	August 20, 2018
7	261384	2015	Nissan	Leaf FWD	Non-Fuel	15110	UNV UNC-Chapel Hill	Unc At Chapel Hill	Assigned	Agency Purpose	August 20, 2018
8	264431	2019	Chevrolet	Volt AWD	Regular Un-leaded	17268	Dept Of Environmental Quality	DAQ	Assigned	Agency Purpose	May 15, 2019
9	264517	2019	Chevrolet	Volt AWD	Regular Un-leaded	11802	UNV Appalachian State U	Appalachian State Univ	Assigned	Agency Purpose	July 17, 2019
10	264764	2019	Chevrolet	Volt AWD	Regular Un-leaded	3620	UNV UNC-Charlotte	Unc At Charlotte	Assigned	Agency Purpose	September 17, 2019
11	264761	2020	Chevrolet	Bolt	Non-Fuel	3751	UNV UNC-Asheville	Unc At Asheville	Assigned	Agency Purpose	January 21, 2020
12	264762	2020	Chevrolet	Bolt	Non-Fuel	4337	UNV UNC-Asheville	Unc At Asheville	Assigned	Agency Purpose	January 21, 2020
13	264741	2020	Chevrolet	Bolt	Non-Fuel	7500	DHHS Child Development	Div Of Child Development	Assigned	Agency Purpose	January 23, 2020
14	264742	2020	Chevrolet	Bolt	Non-Fuel	1750	Dept Of Natural & Cultural Resources	Zoological Park	Assigned	Agency Purpose	February 11, 2020
15	264746	2020	Chevrolet	Bolt	Non-Fuel	7570	Dept Of Natural & Cultural Resources	Zoological Park	Assigned	Agency Purpose	March 12, 2020
16	264745	2020	Chevrolet	Bolt	Non-Fuel	555	UNV Appalachian State U	Appalachian State Univ	Assigned	Agency Purpose	May 21, 2020
17	264750	2020	Chevrolet	Bolt	Non-Fuel	1036	UNV Appalachian State U	Appalachian State Univ	Assigned	Agency Purpose	May 21, 2020
18	264763	2019	Chevrolet	Volt AWD	Regular Un-leaded	3562	UNV UNC-Charlotte	Unc At Charlotte	Assigned	Agency Purpose	June 23, 2020
19	264759	2020	Chevrolet	Bolt	Non-Fuel	711	UNV Appalachian State U	Appalachian State Univ	Assigned	Agency Purpose	June 29, 2020
20	264756	2020	Chevrolet	Bolt	Non-Fuel	741	UNV Appalachian State U	Appalachian State Univ	Assigned	Agency Purpose	June 30, 2020
21	264743	2020	Chevrolet	Bolt	Non-Fuel	266	Dept Of Public Safety	Safety Office	Assigned	Agency Purpose	August 13, 2020
22	264752	2020	Chevrolet	Bolt	Non-Fuel	566	Dept Of Public Safety	Prisons	Assigned	Agency Purpose	August 25, 2020
23	264748	2020	Chevrolet	Bolt	Non-Fuel	2076	Dept Of Public Safety	State Capitol Police	Assigned	Law Enforcement Purpose	September 22, 2020
24	264749	2020	Chevrolet	Bolt	Non-Fuel	4109	Dept Of Public Safety	ABC Commission	Assigned	Agency Purpose	November 3, 2020
25	264757	2020	Chevrolet	Bolt	Non-Fuel	116	Dept Of Public Safety	State Capitol Police	Assigned	Law Enforcement Purpose	February 18, 2021
26	266405	2021	Chevrolet	Bolt	Non-Fuel	In use	Dept Of Administration	Mail Service Center	Assigned	MFM General-Pilot Program	May 25, 2021
27	264753	2020	Chevrolet	Bolt	Non-Fuel	7008	Dept Of Public Safety	State Capitol Police	Assigned	Law Enforcement Purpose	June 10, 2021
28	264747	2020	Chevrolet	Bolt	Non-Fuel	446	Dept Of Public Safety	Juvenile Justice	Assigned	Agency Purpose	July 8, 2021
29	266406	2021	TOYOTA	CAMRY HYBRID	Regular Un-leaded	1224	Dept Of Natural & Cultural Resources	Administration	Assigned	Agency Purpose	August 30, 2021
30	261276	2014	Nissan	Leaf FWD	Non-Fuel	35486			Available	MFM General	
31	261280	2014	Nissan	Leaf FWD	Non-Fuel	34154			Available	MFM General	
32	261281	2014	Nissan	Leaf FWD	Non-Fuel	26208			Available	MFM General	
33	261380	2015	Nissan	Leaf FWD	Non-Fuel	20022			Available	MFM General	
34	261382	2015	Nissan	Leaf FWD	Non-Fuel	12808			Available	MFM General	
35	261385	2015	Nissan	Leaf FWD	Non-Fuel	15135			Available	MFM General	
36	264744	2020	Chevrolet	Bolt	Non-Fuel	511			Reserved at DPS	MFM General	
37	264751	2020	Chevrolet	Bolt	Non-Fuel	35			Reserved at DPS	MFM General	
38	264754	2020	Chevrolet	Bolt	Non-Fuel	0			Reserved at DPS	MFM General	
39	264755	2020	Chevrolet	Bolt	Non-Fuel	0			Reserved at DPS	MFM General	
40	264758	2020	Chevrolet	Bolt	Non-Fuel	0			New	MFM General	
41	264760	2020	Chevrolet	Bolt	Non-Fuel	0			New	MFM General	

Charging Infrastructure

Accessible charging infrastructure is essential for a successful EV transition, and the Department of Administration is pursuing a variety of strategies to expand existing EV infrastructure. DOA is working to identify adequate funding sources to support the cost of building and maintaining new chargers. DOA is also identifying potential locations for new chargers to maximize utilization by state agencies. Identifying the optimal location for charging infrastructure will include a survey on the technical aspects of charger installation, including but not limited to, parking infrastructure, secured access, and electric load capacity required by chargers. DOA is exploring additional innovative solutions to rapidly increase the number of available chargers for the state's fleet.

Existing Chargers in State Parking

The Parking Office currently maintains 27 EV chargers in Lot 77 to support personal-use charging for state employees with electric vehicles. The Parking Office is exploring options for increasing the utilization of those existing charging stations to support electric vehicles in the state's fleet.

Charging with ChargePoint Chargers

Motor Fleet Management provides a ChargePoint EV charging credit card to state employees that drive state-assigned ZEVs. The card is supplied with each EV and gives drivers the option to charge their vehicle at over 720 ChargePoint locations across North Carolina. Access to ChargePoint sites mitigates the uncertainty some new EV drivers face when seeking accessible charging options. In addition, the billing system for the ChargePoint credit card is seamless and leverages the existing system used by client agencies.

Governor's Budget Request

Governor Cooper's 2021-2023 Recommended Budget requested one million dollars each year to fund charging infrastructure for zero-emission vehicles owned or used by state agencies to support the fleet's transition to ZEVs. The new infrastructure would be funded by the Energy and Environment reserve. Neither the House nor the Senate versions of the budget include funds for charging infrastructure. As of October 20, 2021, the final budget package had not been approved. DOA will continue to monitor the progress of the budget and follow the Governor's request for charging infrastructure.

Volkswagen Settlement Phase Two Funds

In 2015, the US Environmental Protection Agency (EPA) found that the Volkswagen Group of America, Inc. (VW) violated Section 203(a)(3)(B) of the Clean Air Act (CAA), 42 U.S.C. §75229(a)(3)(B). The EPA found VW manufactured and installed emissions defeat devices in certain diesel engine light-duty vehicles to circumvent EPA's nitrogen oxide (NOx) emissions standard.⁶ The EPA referred the notices of violation to the Department of Justice in November 2015, resulting in a \$14.7 billion settlement.⁷ As a part of the settlement, \$2.9 billion will be used to fund projects across the US to reduce NOx emissions where the diesel engines operate, including North Carolina. Over \$92 million was allocated to North Carolina to be administered by the North Carolina Department of Environmental Quality (DEQ). Phase 1 of the mitigation plan (from 2019 to 2021) provided \$30.68 million for ZEV infrastructure programs. The Phase 2 draft plan, released in July 2021, outlines the state's strategy for distributing its remaining \$68 million in VW settlement funds.

The draft DEQ Phase 2 VW Mitigation Plan set aside \$1,009,068 in settlement dollars for state government Level 2 charging infrastructure. State agencies will be able to apply for these funds once they become available. The public comment period for the draft plan ended on September 7, 2021. As of the publishing of this October 2021 ZEV report, DEQ has not released the final mitigation plan. DOA plans to coordinate with cabinet agencies on potential applications for level 2 charging infrastructure.

⁶ Draft North Carolina Phase 2 VW Mitigation Plan. [NC-Draft-Phase-2-VW-Mitigation-Plan-2021.pdf](#) (July 1, 2021., page 2)

⁷ Draft North Carolina Phase 2 VW Mitigation Plan. [NC-Draft-Phase-2-VW-Mitigation-Plan-2021.pdf](#) (July 1, 2021., page 2)

Next Steps

The following tables detail actions that DOA plans to undertake, or is already in the process of implementing, to increase ZEV adoption in the state's motor fleet in compliance with Executive Order 80. The plan will be adjusted over time to address changes in EV and infrastructure technologies, vehicle demand, and infrastructure needs.

Achieve Awareness and Adoption of Motor Fleet ZEV Plan

Promote ZEV Motor Fleet Adoption Across Agencies

Lead Agency: Governor's Office, DOA Policy Office, Motor Fleet Management

Timeframe: During agency replacement cycles

The state will coordinate messaging from DOA and the Governor's Office to ensure agencies are aware of the directives in EO 80 and have the tools they need to adopt electric vehicles when the annual replacement list is released. Messaging may come from MFM, DOA Policy Office, or the Governor's Office. DOA will also host interagency coordination meetings with cabinet secretaries and executive leadership as necessary.

MFM will continue to host two Agency Fleet Coordinator (AFC) meetings annually (October and April). These meetings are training opportunities to update AFCs on the latest procedures for vehicle assignment, maintenance, utilization, driver management, and ZEV implementation. MFM will continue to send out a monthly service reminder to agency fleet coordinators. This reminder will include reminders about ZEV adoption.

DOA/EO 80 Webpage Management

Lead Agency: DOA Communications

Timeframe: Ongoing

DOA Communications will continue to maintain DOA's Executive Order 80 web page covering DOA's initiatives, including the Motor Fleet ZEV Plans and other ZEV information. DOA Communications will add additional resources to the webpage with more information about ZEV basics.

EO 80 Public Promotion

Lead Agency: DOA Communications

Timeframe: Ongoing

DOA Communications will continue to promote EO 80 and the Motor Fleet ZEV plan through the DOA newsletter, digital e-boards, social media campaigns, and dynamic website content, and coordinate with the Governor's Communications Office and other cabinet agency communications offices on EO 80 public promotion.

EO 80 State and Local Government Promotion

Lead Agency: MFM

Timeframe: Presentation development October 2021 and then ongoing

Motor Fleet Management will develop a standardized PowerPoint presentation that will give an overview of Executive Order 80 and DOA's Motor Fleet Management ZEV Plan. MFM will present the overview to all MFM division staff and will use the PowerPoint for presentations with internal and external stakeholders, including state agencies and local governments.

ZEV Trends Tracking

Lead Agency: Agencies, MFM

Timeframe: Annually or per replacement cycle

All agencies and MFM will track ZEV trends and benefits of agencies transitioning to ZEVs to the extent practicable and explore methods for recognizing increased ZEV utilization among state agencies, universities, and local governments. This work will include updating the state procurement contract as appropriate to take full advantage of increasing vehicle diversity and affordability.

ZEV Replacement Implementation

ZEV Recommendations Review

Lead Agency: MFM, Agencies

Timeframe: September 2021 – Ongoing

MFM will review ZEV replacement recommendations from the Sawatch Lab report with agencies as scheduled replacements of current vehicles are due. These recommendations are included in the 2021 replacement list, and MFM will be a resource to agencies as to why specific vehicles were recommended for EV replacement.

ZEV Transition

Lead Agency: Agencies, MFM

Timeframe: September 2021 – Ongoing

Agencies and MFM will strengthen the process for transitioning more vehicles to ZEVs. Moving forward, using Sawatch's data, MFM will recommend ZEVs where feasible. If range or charging is an issue, MFM will offer a hybrid alternative where feasible. Agencies will need to evaluate whether the purpose and use of a vehicle will require the assignment of a mid-large SUV or truck. If the vehicle can be a sedan, an EV or hybrid sedan will be the replacement. If the vehicle type is unsuitable for existing hybrids on contract, MFM will offer the lowest emission suitable ICE vehicle. State agencies will also be encouraged to adopt ZEVs where they have identified vehicles suitable for ZEV replacement, even if a ZEV was not recommended on MFM's replacement list.

Achieve High Rate of ZEV and Hybrid Adoption from Agencies

Lead Agency: Agencies, DOA, Governor's Office

Timeframe: September 2021 – Ongoing

The FY 21-22 replacement list identified 143 vehicles eligible for ZEV replacement in the next fiscal year and 330 vehicles as eligible for hybrid replacement in the next fiscal year. Replacing 473 ICE vehicles in a single year with lower emission alternatives would significantly impact the fleet's overall emission output. DOA will work to maximize feasible ZEV replacement in upcoming fiscal years through actions such as identifying and troubleshooting identified agency barriers for ZEV adoption and working with fleet managers and others in preparation for the release of upcoming replacement lists.

Require Written Justification for Not Adopting ZEVs Where Feasible

Lead Agency: Agencies, MFM

Timeframe: September 2021 – Ongoing

In instances where an agency determines that a ZEV is suitable despite MFM and Sawatch's determination, the agency is required to provide a written justification, signed by the agency head, to MFM addressing why an electric vehicle is not a feasible option. This step encourages more communication between MFM and agencies, as well as proactively facilitates the identification of ZEV adoption barriers. MFM will record and maintain these justification notices and track the rate of agency adoption compared to MFM replacement recommendations. MFM will work with agencies to identify a comparable hybrid vehicle for purchase and adoption where an EV is not feasible.

Ensure Infrastructure Supports the Expansion of ZEV Usage

Location Suitability

Lead Agency: State Parking, State Construction, State Property, MFM

Timeframe: September 2021- December 2021

DOA divisions will analyze charging location suitability data from the Sawatch Labs analysis to determine where new charging infrastructure will be most effectively utilized for current and future EV adoption. DOA is also exploring contracting options to include charging infrastructure in new building construction, leasing, and purchasing.

Minimizing Infrastructure Costs

Lead Agency: State Construction, State Parking, State Property

Timeframe: September 2021 - December 2021

State Construction, State Parking, and State Property will work to clarify and minimize the cost of installing new charging infrastructure identified in the location suitability analysis.

Identify Funding Opportunities

Lead Agency: DOA Policy Office, Fiscal Management, Governor's Office

Timeframe: Ongoing

DOA and the Governor's Office will continue to pursue funding opportunities to increase EV charging infrastructure. DOA will coordinate with cabinet agencies to take advantage of EV charging grants through VW Phase 2 funds. DOA will also identify and pursue opportunities for federal funding to boost charging infrastructure for state vehicles. DOA will consider additional funding and grant opportunities as they become available.

Charging Stations on New State Parking Construction

Lead Agency: State Property, State Construction, State Parking

Timeframe: Ongoing

All new building construction that includes new parking lots will have at least two EV chargers where feasible. State Property, State Construction, and State Parking will determine how many chargers are needed and feasible at each site. When assessing the construction costs for new projects, State Construction will include the costs of EV charging infrastructure in the project.

Expanding Infrastructure

Lead Agency: DOA Policy Office, State Parking, State Construction, Agencies

Timeframe: Ongoing

The DOA Policy Office, State Parking, State Construction, and other pertinent divisions will build on existing infrastructure by establishing collaboration and partnerships with the NC Department of Transportation (DOT), NC Department of Natural and Cultural Resources (DNCR), NC Department of Public Safety (DPS), NC Department of Environmental Quality (DEQ), local municipalities, universities, agencies, and other identified potential partners. Partnerships may include reciprocal agreements for sharing charging stations and sharing of best practices. To support this work, DOA will also explore procurement options for new charging infrastructure to support the state fleet ZEV transition.

Leased Space

Lead Agency: State Property

Timeframe: Ongoing

State Property will explore incentive options for leased office space that includes ZEV charging infrastructure. Future Request for Proposals (RFPs) for leased office space will include a request for details on the availability of charging stations and/or the feasibility of charging station installation prior to lease renewals and agreements. DOA may collaborate with cabinet agencies to promote efforts to expand EV charging at leased sites where feasible.

Conclusion

With increased market availability for affordable, long-range ZEVs and hybrid vehicles along with increased public buy-in, the state has an unprecedented opportunity to substantially increase the number of ZEVs and hybrids in North Carolina's motor fleet. Motor Fleet Management's new procurement contract makes ZEV and hybrids more cost-effective than they have ever been, resulting in 480 new hybrids purchased in 2021. In coordination with the Governor's Office, DOA has recommended 143 ZEVs and 330 hybrid vehicles to replace ICE vehicles in state agencies during FY 2021-2022. Agencies will provide written justifications if they believe ZEVs are not suitable where recommended. This replacement recommendation process will result in higher adoption rates than previous years and provide information about challenges agencies face in the transition to ZEVs. DOA will also engage in intentional executive-level interagency coordination with the DPS, DOT, DNCR, and DEQ to swiftly adopt and improve shared ZEV and charging infrastructure best practices.

Charging infrastructure remains the most significant barrier to transitioning the state's fleet to ZEVs. The agency continues to evaluate opportunities to expand access to ZEV charging infrastructure. Adequate charging availability is critical to support the influx of ZEVs that DOA expects to be purchased during this fiscal cycle. DOA will continue to work in partnership with the Governor's Office, state government agencies, and external stakeholders to implement the goals defined in Executive Order 80.

Appendix

NREL and Sawatch Labs Executive Summary Data and Tables and Graphs.

Table 1. Fleet Summary

Category	Stats
Vehicles	5901
Telematics Provider	Geotab
Period of Analysis	2/23/2018 – 1/16/2020
Miles Analyzed	64,000,000
Total Trips Analyzed	2,990,000+

Table 2. Custom Settings

Input Category	Custom Setting
Gas Price	\$2.00/gallon
Electricity Rate	\$0.11/kWh
GHG Emissions Factor for Electricity Generation	360 g/kWh
Social Cost of Carbon	\$36/ton
ICE Maintenance Cost	\$969 /15,000 miles
EV Maintenance Cost	\$360/15,000 miles
Vehicle Life Cycle	8 years

Table 3. EV Suitability Assessment Results Summary

Vehicle Class	# of Vehicles Analyzed	EV Candidates (in class)	EV Candidates (Allowing SUVs ⁷)
Cargo-van	25	5	5
Minivan	687	235	411
Pickup	170	30	90
Sedan	3968	2020	2020
SUV	1051	514	514
<i>TCO Savings</i>	-	<i>\$13,000,000</i>	<i>\$14,000,000</i>
<i>GHG Emissions Reductions</i>	-	<i>66,000 metric tonnes</i>	<i>68,000 metric tonnes</i>

Figure 2. Projected Peak Charging Demand at 3824 Barrett Dr (40% Electrification)

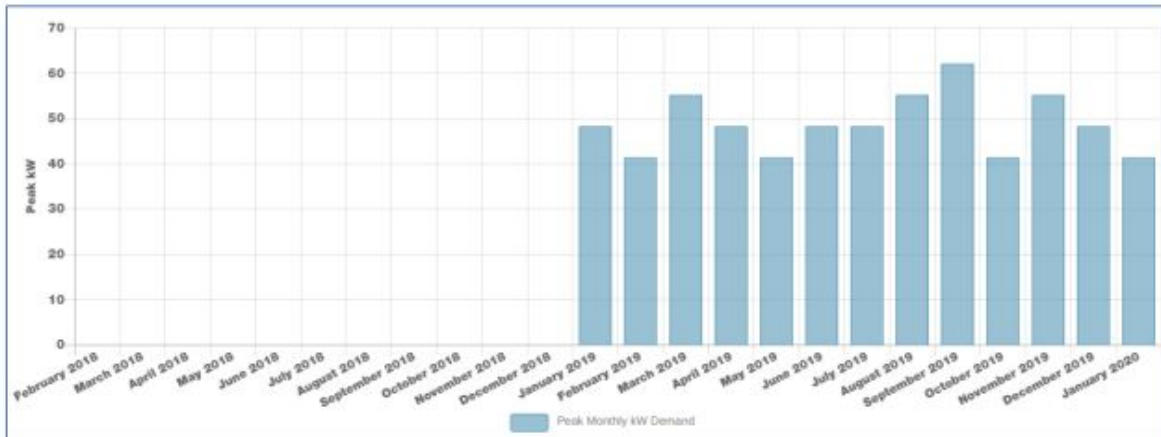


Figure 3. Projected Daily Demand Curve at 3824 Barrett Dr, September 2019 (40% Electrification)



Appendix Figures 2 and 3 illustrate from Sawatch Labs executive summary report illustrate examples of measurement of projected peak charging demand and the projected daily demand curve for locations where vehicles park overnight. For these particular examples, Sawatch shows projected demand for 3824 Barrett Dr., Raleigh. The models account for the assumption that ZEVs will replace the top 40% of vehicles in the fleet. At this location, the projected peak charging demand would be 62.1kW if nine (9) vehicles were to charge simultaneously at a standard 6.7 kW Level 2 charging power (Figure 2). Using the 2019 levels of projected charging demand, the peak demand would have occurred between 3:00 pm and 3:30 pm (Figure 3). If this is coincident with the facility’s peak demand, charging at this time could result in an increased demand charge from the utility. This analysis will help inform where and how chargers would be utilized most effectively to minimize added utility costs.

END OF REPORT