



VIRGINIA ELECTRIC VEHICLE INFRASTRUCTURE DEPLOYMENT PLAN

AUGUST 2022



Table of Contents

Introduction	2
Dates of State Plan and Adoption	2
State Agency Coordination	3
Public Engagement	4
Stakeholders Involved in Plan Development	5
Public Outreach.....	6
Plan Principles, Vision and Goals	7
Contracting	8
Existing and Future Conditions Analysis	8
Future Power System Needs & Capabilities	9
Analysis of Utility Infrastructure	11
Virginia's Energy Plan	11
State Geography, Terrain, Climate and Land Use Patterns	12
Travel Patterns, Public Transportation, Freight and Other Needs	13
AFC – Corridor Networks	13
Existing Locations of Charging Infrastructure Along AFCs	15
Known Risks and Challenges	17
EV Charging Infrastructure Deployment	19
Funding Sources	20
2022 Infrastructure Deployments/Upgrades	20
FY23-26 Infrastructure Deployments	24
State, Regional, and Local Policy	25
Implementation.....	26
Strategies for EVSE Operations & Maintenance	26
Strategies for Identifying EV Service Providers and Station Owners	26
Strategies for EVSE Data Collection & Sharing.....	27
Strategies to Address Resilience, Evacuations, Seasonal Needs	27
Strategies to Promote Labor, Safety, Training, and Installation Standards	28
Civil Rights.....	28
Equity Considerations	29
Identification and Outreach to Disadvantaged Communities	29
Identifying, Quantifying, and Measuring the Distribution of Benefits	29
Benefits to Disadvantaged Communities through the Plan	30
Labor and Workforce Considerations.....	33
Cybersecurity	33
Program Evaluation	34
Discretionary Exceptions	34

List of Figures and Tables

Figure 1: Anticipated NEVI Timeline	3
Figure 2: Engagement by Phase	3
Figure 3: VA EV Goals	7
Figure 4: Electric Service Territories	10
Figure 5: AFC Corridor-Ready and Corridor-Pending Routes as Announced (July 2022).....	14
Figure 6: FBO Stations in Virginia.....	17
Figure 7: Virginia Counties' EV Adoption Trend Clusters	20
Figure 8: FBO and Potential FBO Stations.....	23
Figure 9: EV Charging Justice40 Map.....	30
Figure 10: Poverty Rates (%) by ZCTA	32
Figure 11: Uninsured Population (%) by ZCTA.....	32
Figure 12: Exceptions for Three Stations Based on Distance from Exits.....	35
Table 1: Participating Agencies.....	4
Table 2: AFC Round Six Corridor-Pending Designations.....	14
Table 3: Existing Charging Infrastructure*	15
Table 4: Proposed Stations.....	22
Table 5: Equity Variables Used In Analysis.....	31

Acronym Listing

ADA	Americans with Disabilities Act
AFC	Alternative Fuel Corridor
AFV	Alternative Fuel Vehicle
BEB	Battery-Electric Bus
DCFC	Direct Current Fast Charger
DEQ	Department of Environmental Quality
DRPT	Department of Rail and Public Transport
EV	Electric Vehicle
EVSE	Electric Vehicle Supply Equipment
FBO	Fully Built Out
FHWA	Federal Highway Administration
IIJA	Bipartisan Infrastructure Investment and Jobs Act
LEV	Low-Emission Vehicle
NEVI	National Electric Vehicle Infrastructure
NPRM	Notice of Proposed Rulemaking
O&M	Operations and Maintenance
SCC	Virginia State Corporation Commission
VCC	Virginia Clean Cities
VDOT	Virginia Department of Transportation
VEDP	Virginia Economic Development Partnership
ZEV	Zero-Emissions Vehicles

Revision History

This document was initially submitted to FHWA for review on August 1, 2022 and has been revised as indicated below based on feedback from FHWA.

Revision Date	Revision Description
8/8/2022	DELETED references to non-AFC routes and stations per initial feedback from FHWA
9/27/2022	DELETED Exception Request for Cluster of Stations following request disapproval by FHWA

Introduction

On November 15, 2021, the bipartisan Infrastructure Investment and Jobs Act (IIJA) (Public Law 117-58) was signed into law. IIJA includes a total of up to \$5 billion in dedicated funding for the National Electric Vehicle Infrastructure (NEVI) program, and \$2.5 billion for a discretionary Charging and Fueling Infrastructure grant program. These two programs will advance the deployment of electric vehicle (EV) infrastructure throughout the country, enable a convenient, reliable, and equitable charging experience for all users, and set the United States on a path to a nationwide network of 500,000 EV chargers by 2030. The Commonwealth of Virginia is expected to receive approximately \$100 million over 5 years under the NEVI program and is eligible to apply for additional funding under the \$2.5 billion discretionary grant program.

Under the NEVI program, each state is required to submit an EV Infrastructure Deployment Plan (Deployment Plan) that describes how it intends to use its NEVI program funds. The Federal Highway Administration (FHWA) published NEVI program guidance to assist in developing a Deployment Plan that meets the needs and goals of the state. The guidance indicates that states should prioritize the use of NEVI program funding for EV charging infrastructure along Alternative Fuel Corridors (AFCs) within the interstate highway system. To date, Virginia has designated 8 AFCs throughout the Commonwealth to foster a convenient and reliable charging network. When Virginia's AFCs achieve fully built out (FBO) status, funding may be used on any public road or in other publicly accessible locations. This document serves as Virginia's initial 2022 NEVI program plan, with annual plan updates to follow.



<https://m.styleweeky.com/richmond/a-new-age/Content?oid=17343055>

To meet NEVI program requirements, Virginia intends to use its initial funding to prioritize achieving FBO status for its AFCs. FBO designation requires EV charging infrastructure: (1) be installed every 50 miles along the AFCs and within 1 travel mile of the AFCs unless a discretionary exception has been granted; (2) includes at least four 150 kilowatt (kW) Direct Current (DC) fast chargers capable of simultaneously charging four EVs; and (3) has minimum station power capacity at or above 600 kW and supports at least 150 kW per port simultaneously. A state may submit a request for a discretionary exception from the requirements that charging infrastructure is installed every 50 miles along the AFCs and within 1 travel mile of the AFCs.

Virginia's primary vision for its Deployment Plan is to spur economic development and enable seamless EV travel across the Commonwealth for all. Through its competitive procurement process, the Commonwealth will identify prudent and reasonable investments in DC fast charging infrastructure along its existing AFCs. The NEVI funding will offset up to 80 percent of the costs of new public EV charging stations, upgrades to existing stations, and ancillary expenses such as connections to the electricity source, information to EV users about the use of the charging stations, and operations and maintenance of the station. The federal guidance notes that operations and maintenance assistance is expected to be most needed at locations with lower utilization, while other locations may not need this assistance.

The Commonwealth will concentrate on funding projects directly related to the charging of an EV that are accessible to the public or authorized commercial motor vehicle operators from more than one company. According to the federal guidance, publicly accessible means that the equipment

is available to the public without restriction, and may include public parking facilities, parking at public buildings, public transportation stations, Park-and-Rides, public schools, public parks, private parking facilities available for public use, and visitor centers and other public locations on federal lands. Chargers collocated at gas stations and other commercial establishments are considered publicly accessible so long as the charger is regularly maintained and the business does not restrict access to the charger to just customers, tenants, employees, or other affiliates of the business.

In developing this Deployment Plan, the Virginia Department of Transportation (VDOT) participated in numerous stakeholder sessions with public agencies, utilities, developers, non-profit organizations, and others to better understand the existing EV charging infrastructure landscape in the Commonwealth. For example, VDOT led a Cross-Agency Coordination meeting in April, 2022 to provide background on the Deployment Plan, solicit feedback through an EV questionnaire, and respond to questions and concerns. VDOT developed a public NEVI portal site (<https://publicinput.com/VirginiaNEVI>) to provide background on the IJA and the Deployment Plan, to solicit feedback from stakeholders, and to host an online survey about barriers and opportunities for increased EV adoption. In addition, the portal shares resources for public education and awareness, including information regarding purchasing an EV and charging facilities. The EV resources link on the portal includes information on EV fueling station locations, the U.S. Joint Office of Energy and Transportation (Joint Office), the Electric Vehicle Charging Justice40 Map, and links to other relevant resources. VDOT has also designated a NEVI email address for information requests, comments, and other inquiries at NEVI@vdot.virginia.gov.

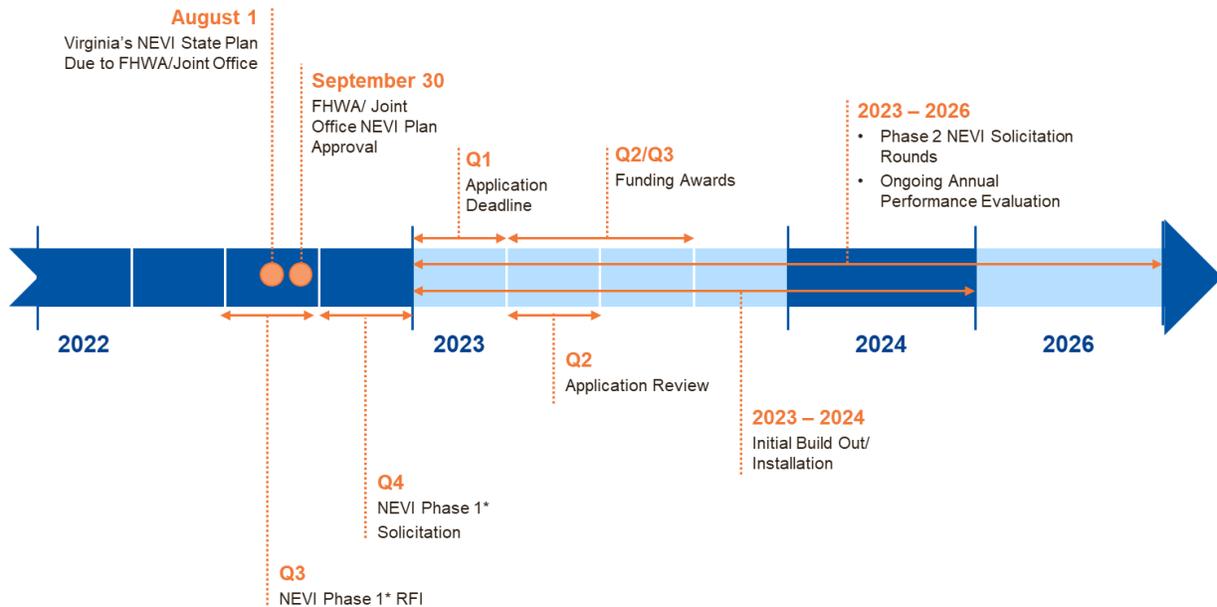
The Deployment Plan will be a living document that will be updated at least annually, and VDOT will continue its outreach strategies throughout the 5-year NEVI program duration to further solicit stakeholder input, refine and adjust strategies, and evaluate whether Commonwealth and national goals are being achieved. The unique, nascent characteristics of the EV industry require regular reappraisal of program goals and outcomes to match the reality on the ground. This is particularly relevant because the business rationale for developing an EV charging station as a stand-alone commercial venture is uncertain due to the limited demand for EV chargers and the uncertainty in predicting future EV adoption rates. VDOT will participate in ongoing engagement and outreach to regularly adjust the Deployment Plan to reflect the market outlook, recent performance of existing stations, best practices throughout the country, new or revised federal guidance, technological developments in the industry, and the progress in achieving program objectives.

Dates of State Plan and Adoption

Following the initial FHWA NEVI program guidance on February 10, 2022, VDOT commenced the development of the Deployment Plan and other ancillary planning documents. After extensive stakeholder and internal agency coordination efforts, VDOT will submit the Deployment Plan to the Joint Office by August 1, 2022. Activities for the remainder of 2022 will include targeted stakeholder outreach and the release of a Request for Information (RFI) to secure feedback from EV charger developers, potential site hosts, and other interested parties. VDOT intends to develop a competitive procurement process with the expectation that a funding opportunity will be released after the plan is approved by the FHWA by September 30, 2022. VDOT intends to use its existing procurement portal (<https://vdot.virginia.gov/business/rfps.asp>) to advertise and promote NEVI competitive funding opportunities. VDOT anticipates NEVI funding application deadlines in the first quarter of 2023. Applications will be evaluated in the second quarter, followed by an awarding process continuing through the third quarter of 2023. The initial build out of EV charging infrastructure is anticipated to occur during 2023 and 2024. During the years 2023 to 2026, VDOT anticipates seeking projects for Phase 2 NEVI funding focused on expanding the charging network beyond AFCs. Annual performance evaluations will also be ongoing during this

period. VDOT is guided by the overarching goals of speed and quality, and seeks to support construction, installation, or upgrading of EV charging infrastructure within six months of reaching agreement with developers and vendors, although dates are likely to be impacted by significant supply chain constraints, site interconnection complexities, and needed infrastructure upgrade work.

Figure 1: Anticipated NEVI Timeline



* NEVI Phase 1 = achieving fully built out status

State Agency Coordination

Virginia understands the importance of statewide coordination and has conducted extensive efforts to that effect during the Deployment Plan’s development. To begin this effort, VDOT led a

Figure 2: Engagement by Phase

	Phase I	Phase II	Phase III	Phase IV
Virginia Cross-Agency Stakeholder Engagement	<ul style="list-style-type: none"> ❖ Cross-agency Coordination Kickoff Meeting ❖ Solicit feedback through EV Questionnaire: <ul style="list-style-type: none"> ▪ Identify primary POC at your agency 	<ul style="list-style-type: none"> ❖ Targeted Agency Engagement 	<ul style="list-style-type: none"> ❖ Incorporate lessons learned and feedback into 5-year NEVI plan 	<ul style="list-style-type: none"> ❖ Ongoing Agency Coordination
Timeline	April 2022	May-June 2022	July 2022	2022 - 2026

Cross-Agency Coordination meeting in April 2022 to provide background on the NEVI Plan, solicit feedback through an EV questionnaire, and address any EV infrastructure related comments and concerns. Respondents reported that a variety of funding sources have already been used to deploy EV supply equipment (EVSE) in Virginia, including several public-private partnerships involving cost-sharing agreements with developers. Respondents also recommended that the

Commonwealth strengthen coordination with utilities to ease the EV charging station deployment process, and drew attention to the need to “future-proof” and increase standardization for charging stations amidst rapidly changing market conditions and technological advancement. Below is a list of participating agencies included in the Cross-Agency Coordination meeting.

Table 1: Participating Agencies

List of Participating Agencies			
Central Virginia Community College	James Madison University	Virginia Clean Cities at James Madison University	Virginia Office of Intermodal Planning and Investment
College of William & Mary	Office of the Secretary of Administration	Virginia Department of Conservation and Recreation	Virginia Space
Community College Workforce Alliance	Office of the Secretary of Commerce and Trade	Virginia Department of Emergency Management	Virginia State Parks
Department for the Blind and Vision Impaired	Office of the Secretary of Transportation	Virginia Department of Environmental Quality	Virginia State Police
Department of General Services	Patrick and Henry Community College	Virginia Department of Health	Virginia Tourism Corporation
Department of Housing and Community Development	Port of Virginia	Virginia Department of Motor Vehicles	Virginia Transit Association
Department of Rail and Public Transportation	Southwest Virginia Community College	Virginia Department of Energy	
Eastern Shore Community College	Tidewater Community College	Virginia Museum of Natural History	

VDOT also conducted targeted agency collaboration with the Virginia Department of Energy (Virginia Energy) and the Virginia Department of Environmental Quality (DEQ), drawing on the experience of both agencies in planning and implementing EV charging programs and soliciting feedback on VDOT’s Deployment Plan. VDOT will continue to coordinate with DEQ in its role as administrator of the Commonwealth’s \$93 million Volkswagen Environmental Mitigation Trust (VW Trust), including with regard to the siting of any charging stations deployed pursuant to settlement funding. DEQ held several meetings with interested stakeholders and the public to gather more information on the best use of the settlement funds, and received over one hundred written comments. DEQ continues to seek public input for plan revisions and provides various documents on its VW Trust website, including draft and final plans, timelines, solicitation requirements, semi-annual reports, and DEQ contact information (<https://www.deq.virginia.gov/get-involved/topics-of-interest/volkswagen-settlement-agreement>).

Public Engagement

Virginia has engaged with a variety of groups during the Deployment Plan’s development, including the general public, government agencies, non-profits, and industry representatives. Coordinated planning across private and public investments is necessary to facilitate the identification of market opportunities and challenges and to ultimately provide a seamless,

convenient and equitable charging network. Virginia held public engagement activities, including with the VDOT Environmental Stakeholder Engagement Group, the Commonwealth Transportation Board Environmental Subcommittee, and the State Cross-Agency Coordination meeting. Virginia anticipates additional engagement and outreach throughout the Deployment Plan's implementation to build awareness of its EV charging infrastructure efforts and the NEVI Program. Annual online surveys and public outreach will assess the outcomes and impacts of the Deployment Plan's implementation. VDOT will schedule public meetings and listening sessions as needed to gauge customer satisfaction and guide future charger deployment. After NEVI's 5-year duration is over, the Virginia NEVI website will continue to provide information on the Commonwealth's EV charging infrastructure and applicable programs.

Stakeholders Involved in Plan Development

Since the passage of the IIJA in November 2021, VDOT has been conducting ongoing outreach with stakeholders, including local agencies, private sector groups, utilities, advocacy groups, community-based organizations, and other interested parties. During these meetings, stakeholders like Dominion Energy, Appalachian Power (APCo), Old Dominion Electric Cooperative (ODEC), the Virginia, Maryland, Delaware Association of Electric Cooperatives (VMDAEC), EVgo (which has current EVSE sites in Virginia), and Virginia Clean Cities (VCC), had the opportunity to ask questions about VDOT's approach to the NEVI program, provide suggestions for program planning and implementation, and share lessons learned from their previous experience. Many of these groups have also provided valuable input and feedback on NEVI's Justice40 requirements. The section below provides more detail on these groups and activities.

VDOT Environmental Stakeholder Engagement Group

This group includes leaders across the Commonwealth that are regularly consulted to identify, represent, and disseminate information to smaller or more regionally focused groups. The group is composed of non-governmental organizations, advocacy groups, tribes (federally recognized and state-recognized), and government agencies who have expressed interest in environmental concerns. VDOT staff presented to the group on May 13, 2022, to solicit feedback on the NEVI program and to share Virginia's approach to the planning and deployment of EV charging infrastructure.

Commonwealth Transportation Board Environmental Subcommittee

The subcommittee is a subset of the Commonwealth Transportation Board that meets regularly to discuss various environmental topics of interest within Virginia's transportation agencies. Members of the public can attend in person and provide public comments, and meeting presentations and minutes are publicly available following the meeting. VDOT staff presented to the subcommittee on June 21, 2022 to address Virginia's approach to the planning and deployment of EV charging infrastructure, solicit feedback, and respond to questions from subcommittee members.

Prior Outreach

VDOT is also drawing from other prior stakeholder outreach efforts to inform the Deployment Plan. For example, the January 2021 Virginia Transportation Electric Vehicle Readiness Study was developed to prepare Virginia for various future EV deployment scenarios and ensure it remains a leader in EVSE deployment. The study included conducting research, surveying existing and prospective EV owners, and holding stakeholder meetings with various public agencies, industry representatives, and environmental advocates on EV deployment. Stakeholders provided information regarding EV barriers and Virginia's current level of EV readiness. The study also included a consumer survey to better understand the perceptions of

current and future EV owners, which revealed the differences related to charging infrastructure and the costs and benefits of ownership. Stakeholder groups that participated in the study included:

- Alliance for Automotive Innovation
- Electrification Coalition
- Electrify America
- Nissan
- Southern Environmental Law Center
- Virginia Association of Counties
- Virginia Center for Inclusive Communities
- Virginia Clean Cities
- Virginia DEQ, Department of Energy, Department of Motor Vehicles, Department of Rail and Public Transportation, and Office of Intermodal Planning and Investment
- Volkswagen

VCC has long served as a leader in engaging and collaborating with EV stakeholder groups and communities throughout Virginia. On November 27, 2017, the VCC requested information from municipalities through an online survey on their current permitting process for EV charging installations to support Virginia's Volkswagen Settlement allocation. The information requested included:

- The type of permit required for installing level 2 or DC fast chargers
- Any incentives or expedited permit processes for installing EVSE
- The length of time from an inspection request to having an inspector on site

Lessons from this outreach will continue to inform EVSE deployment in Virginia. VCC also hosted the Inaugural Drive Electric Virginia Forum on November 17, 2021, to raise awareness of available resources to help support the deployment of EV chargers in the Commonwealth. State agencies and other entities like Drive Electric Richmond, EVNoire, Rappahannock Electric Cooperative, and Dominion Energy, spoke at the forum. EVNoire, for example, provided resources on how to engage disadvantaged communities in the transition to EVs.

Public Outreach

VDOT has developed the resources described below for the public and other stakeholders to provide input and receive information on the Deployment Plan and EV policies in general. VDOT will continue to promote the Deployment Plan through stakeholder meetings, public presentations, and other methods to ensure that the NEVI funding efficiently spurs economic development, enables seamless EV travel, and provides a convenient, reliable, and equitable charging experience for all Virginians.

NEVI Portal

VDOT developed a NEVI web portal to provide the public with background on the NEVI program, the Deployment Plan, and to share resources to build public awareness. As of July 19, 2022, the NEVI webpage had 3,814 views. The NEVI portal also includes a survey to solicit public feedback, targeting both EV and non-EV drivers, urban, rural, and underserved or disadvantaged communities, private businesses with an interest in hosting EV charging stations, and the general public. VDOT received 1,141 responses, including respondent preferences for public EV chargers at public parking facilities and garages, retail and shopping centers, gas stations, and parks and recreational areas. Respondents also encouraged VDOT to engage community organizations in

determining appropriate sites, to build chargers in or near urban, rural, and underserved or disadvantaged communities, and to hire minority and women-owned organizations for EV-related work. Respondents expressed a variety of concerns including accessibility of charging stations, the high price of EVs, and a lack of familiarity with EVs and charging technology (<https://publicinput.com/VirginiaNEVI>).

Email

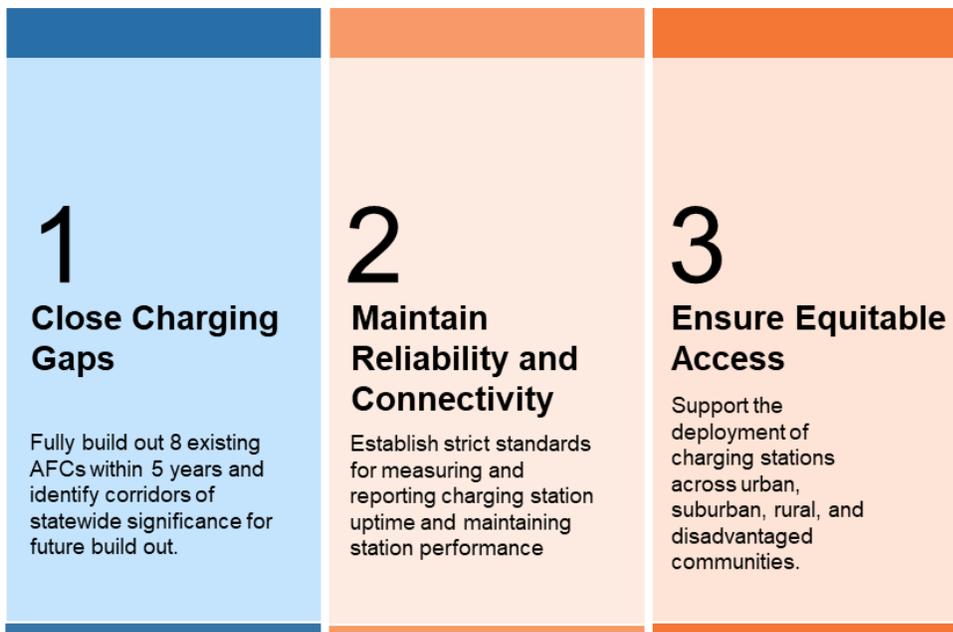
VDOT designated a NEVI email for inquiries and comments to which VDOT staff respond regularly (NEVI@vdot.virginia.gov).

Plan Principles, Vision and Goals

Virginia envisions an EV charger network that facilitates convenient, reliable, and equitable access to fast charging stations throughout the Commonwealth, while spurring growth in this promising industry. The Commonwealth will identify prudent and reasonable investments in new DC fast charging stations or upgrades of existing infrastructure along the Commonwealth’s AFCs to enable an interconnected network and seamless customer experience for all EV users. This vision requires a statewide EV infrastructure network that will connect Virginia’s major population centers and rural areas with charging stations at least every 50 miles along interstate highways. A statewide EV network may also benefit low-income households and rural areas who pay a higher share of income on transportation costs.

In support of this vision, the Commonwealth has identified the following goals:

Figure 3: VA EV Goals



A statewide EV charging network will also support existing Commonwealth emissions and air quality policies and goals that include the following:

Clean Energy Policy

Net-zero carbon emissions in the electric power, transportation, industrial, agricultural, building, and infrastructure sectors by 2045.

(<https://lis.virginia.gov/cgi-bin/legp604.exe?212+ful+CHAP0327>)

Advanced Clean Cars Rule

Directs the State Air Pollution Control Board to implement a low-emissions and zero-emissions vehicle (ZEV) program for motor vehicles with a model year of 2025 and later. ZEV regulations will require manufacturers to ensure that an increasing proportion of the light- and medium-duty vehicles they sell to Virginia dealers are electric, fuel cell or plug-in hybrid.

(<https://lis.virginia.gov/cgi-bin/legp604.exe?ses=212&typ=bil&val=hb1965>)

Virginia's Transportation Plan (VTrans) Goal E

Support a variety of community types promoting local economies and healthy lifestyles that provide travel options, while preserving agricultural, natural, historic, and cultural resources. Reduce transportation related nitrogen oxides, volatile organic compounds, particulate matter, and carbon monoxide emissions.

(https://vtrans.org/resources/VTrans_Policy_Guide_v6.pdf)

Contracting

The purpose of public funding is to encourage additional private investment in EVSE that will fill gaps in the statewide EV charging network, with the ultimate goal of providing a convenient, reliable, and equitable EV driving experience for all. Third parties will be used for the acquisition, installation, upgrading, and operations and maintenance of publicly accessible EV charging infrastructure under the program. VDOT will develop an initial competitive funding opportunity that seeks developers to install or upgrade DC fast charging infrastructure along Virginia's AFCs in accordance with federal guidelines. Future funding opportunities will be focused on installations beyond the AFCs. NEVI program funds will offset up to 80% of project costs while the third-party entity will be responsible for the non-federal share. A scorecard will be developed that describes the minimum standards criterion which applicants will need to satisfy, including public access, charger power levels, number of chargers, maximum distance between charging stations, cost of acquisition and installation, and expected user cost of operation. Completed applications will be scored by an evaluation team, with the highest scoring eligible applications proposed for an award.

Additional minimum standards may be included in the procurement, including minimum operating hours, acceptance of multiple forms of payment, customer support services, adequate lighting and visibility at the site, and Americans with Disabilities Act (ADA) compliance. Applicants will be responsible for identifying and securing specific installation sites within the AFCs that meet the requirements defined in the solicitation. Applicants may also propose upgrading existing charging stations that do not currently meet NEVI program guidelines. Virginia will ensure that contractors are engaged in communities where EV charging infrastructure is expected to be installed by requiring prospective developers to outline their engagement strategy. Small businesses will be afforded equal and fair opportunities to participate in Virginia contracting, consulting, and procurement opportunities, as provided in 23 U.S.C. 304. Ownership of the EV charging infrastructure is not intended to revert to the Commonwealth after the five-year duration of the program expires.

Existing and Future Conditions Analysis

A number of state agencies and organizations have worked to expand EV charging in Virginia over the past decade. VCC, in partnership with Virginia Energy, nominated the first Alternative Fuel Corridors in Virginia in 2016, accelerating efforts to build a statewide EV charging network and providing ongoing coordination and support to stakeholders and the public. In 2018, DEQ

contracted with EVgo to leverage \$14 million in funding from Virginia's Volkswagen Diesel Emissions Environmental Mitigation Trust to install 50-150kW chargers along heavily traveled roads, with 44 sites now operational. These sites were made ready to accommodate additional charging ports and faster charging speeds, and will be candidates for upgrades as part of the Deployment Plan. In 2021, VCC, in partnership with DEQ and Virginia Energy, launched Drive Electric Virginia, a statewide initiative to increase EV awareness and availability, and expand EV infrastructure. As of July 2022, Virginia ranked 11th in the nation for total number of EV charging stations, with 1,099 public stations providing 3,016 charging ports across all charging speeds.¹ The 2021 State Transportation Electrification Scorecard published by the American Council for an Energy Efficient Economy named Virginia as the leader in the southeast for efforts to incentivize, integrate, and reduce the impacts of EVs by decarbonizing the grid.

As of December 31, 2021, 30,660 EVs are registered in Virginia, accounting for approximately 1.0% of the 3,057,254 total vehicle registrations.² By total number of registered EVs, Virginia is currently ranked 13th and by percentage is ranked 18th in the nation. EV registrations are currently concentrated in urban parts of the state, primarily Northern Virginia but also Richmond and the Virginia Beach area.³ A 2019 Transportation Funding Sustainability report conducted by the Virginia Secretary of Transportation predicted that EVs may represent 12% of annual new car sales by 2030.⁴ Virginia has passed a number of policies supporting the adoption of EVs in recent years, summarized in the State, Regional, and Local Policy section below.

Future Power System Needs & Capabilities

EV charging stations across the Commonwealth are powered by both investor-owned and cooperative utilities. APCo covers much of the southwest region of the state while Dominion Energy serves parts of the eastern section. Electric co-ops serve much of the rest of the Commonwealth. A variety of EV charging providers, including Electrify America, service the existing public EV charging stations across Virginia.

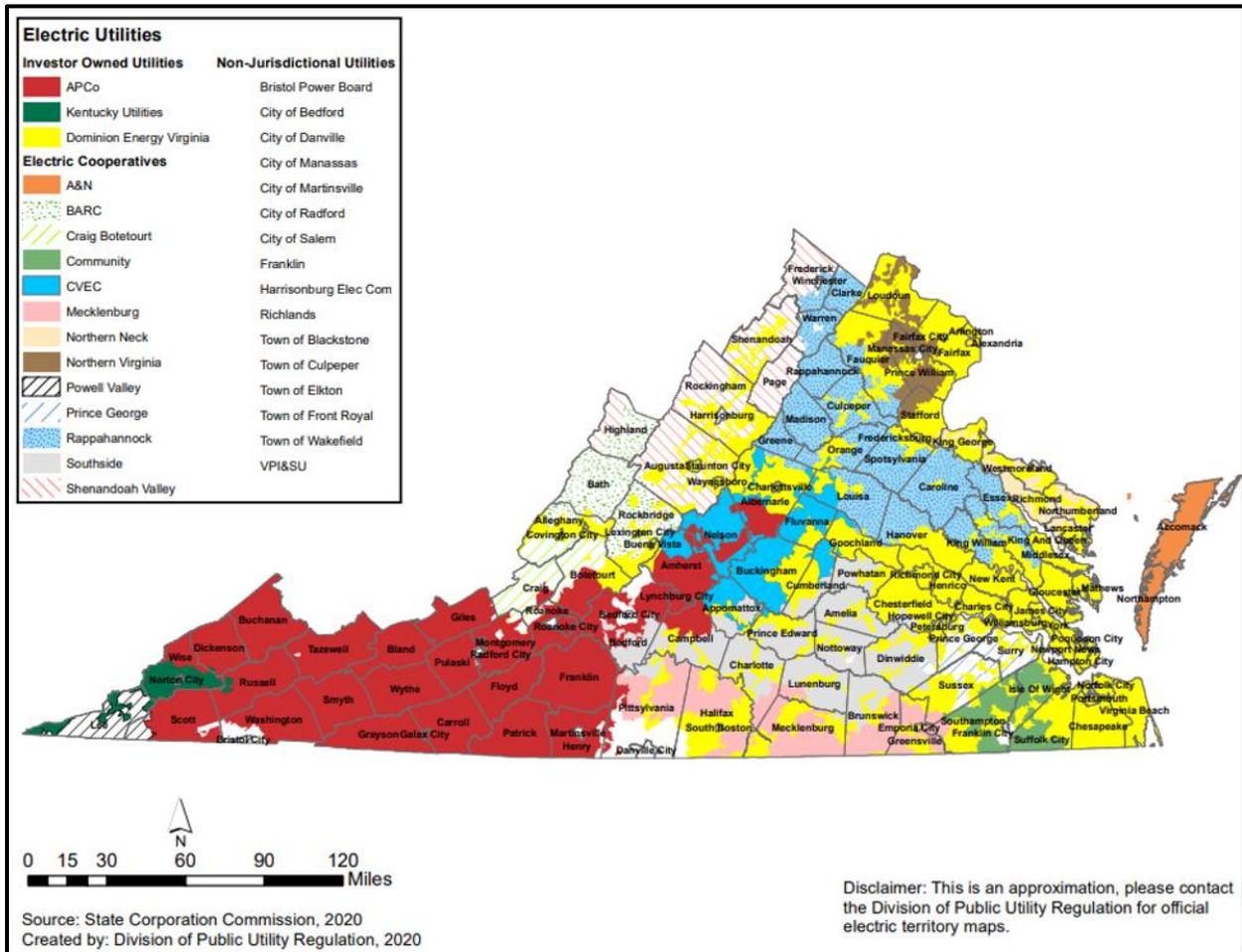
¹ <https://afdc.energy.gov/stations/states>

² US Dept of Energy (2021); Automobile registrations by state: US Dept of Transportation, Federal Highway Administration (2020).

³ https://driveelectricva.org/why-drive-electric/ev-dashboard/#/analyze?region=US-VA&show_map=true&country=US&access=public&access=private&fuel=ELEC&lpg_secondary=true&hy_nonretail=true&ev_levels=all

⁴ Virginia Office of Intermodal Planning and Investment (2019); Transportation Funding Sustainability (2019).

Figure 4: Electric Service Territories



Coordination between power generation, transmission, and distribution planning will become increasingly important as EV adoption rates rise in Virginia and power demands increase. VDOT has been collaborating with Virginia’s utility companies and other stakeholders to evaluate the implications of the NEVI program on the power sector. VDOT is working with these stakeholders to review the Commonwealth’s existing and planned power supply infrastructure, including identifying gaps in the grid architecture that could impact both the cost and timing of NEVI Program deployments.

VDOT expects the scaling up of the EV market to add momentum to Virginia’s ongoing grid modernization strategy. By planning for a high level of future power and transport system integration, Virginia will be able to reduce emissions, lower renewable energy curtailment, and manage system demand for future infrastructure investments across the Commonwealth. Planning and implementation of the infrastructure needed for a more capable and flexible transport and energy system will require the full participation of all utilities. This transition will also create the need for new functions and services which will offer new opportunities for small businesses to create high-skilled jobs across Virginia. With integrated planning efforts such as these, Virginia’s power grid can serve the Commonwealth’s future EV load reliably, with resilience and at a reasonable cost.

Chapter 268 of the 2021 Virginia Acts of Assembly directs the Virginia State Corporation Commission (SCC) to file a report recommending policy proposals to accelerate widespread transportation electrification in the Commonwealth. The SCC conducted five stakeholder meetings involving approximately 85 stakeholders to assist in the preparation of the report. Participants had expertise on issues relevant to utility regulation and transportation electrification, including EV technologies, utility rate and policy design, renewable energy and energy storage, and specific transportation sectors. On April 29, 2022, the SCC published the “Report: Policy Proposals Governing Public Electric Utility Programs to Accelerate Widespread Transportation Electrification in the Commonwealth Pursuant to Chapter 268 of the 2021 Virginia Acts of Assembly (Special Session I) (HB 2282)” (SCC Electrification Report) which recommends, among other things, that regulated utilities file transportation electrification plans regularly with the SCC detailing its forecasts, potential impacts, planned utility offerings, anonymized transportation electrification data, and potential rate structures. The SCC requires, from 2023 onward, that regulated utilities file transportation electrification plans that include how the utility efforts complement private sector charging infrastructure. (<https://www.scc.virginia.gov/getattachment/94cafe4e-3091-4e53-ae30-29d469a013a0/2022-APR-Report-on-Transportation-Electrification.pdf>)

Analysis of Utility Infrastructure

VDOT is working with Virginia’s utilities to develop a high-level assessment of how EV adoption may create grid capacity and congestion issues within selected parts of the grid. VDOT is also working collaboratively with Dominion, APCo, ODEC, VMDAEC, and others to understand and assess their expectations for future infrastructure needs. As part of this process, VDOT is also learning more details about the utilities’ EV programs and any grid modernization initiatives that will support the emergence of the integrated power and mobility infrastructure Virginia will require with widescale EV adoption. This process will communicate to Virginia’s utilities and businesses the need to invest in EV technology and consumer behavior-based products to address potential grid impact issues. Virginia’s utilities have emphasized the need to manage future EV load in a way that reduces upward pressure on power costs.

Although state regulation does not presently require utilities to include EV forecasts in their long-term resource plans until 2023, Dominion and the larger electric co-ops have been incorporating EV projections into their proprietary load models. However, no long-term formal EV forecasts are currently available in the public domain. VDOT will coordinate with utilities and other stakeholders to assess and incorporate projections as they become available to inform planning efforts.

Virginia’s Energy Plan

Virginia last published an Energy Plan in 2018, which provided a set of recommendations to support technological advances, create new business opportunities, and allow the Commonwealth’s energy markets to expand. Virginia issued the Energy Plan after a robust stakeholder engagement process that included six public listening sessions, a 60-day written comment period with almost one thousand filed comments, and a series of facilitated stakeholder engagement meetings. The 2018 Energy Plan focused on five specific policy tracks: solar and onshore wind, offshore wind, energy efficiency, storage, and EVs. Recommendations included adopting the Advanced Clean Cars program, developing a comprehensive EV transportation plan, and setting targets for both EV charging infrastructure and vehicle fleets. The Energy Plan noted that the Commonwealth’s existing programs to promote alternative fuel vehicles have worked well and should continue with additional technical support.

VDOT is coordinating with Virginia Energy to ensure that this Deployment Plan aligns with the

goals and strategies of the next Energy Plan. Virginia Code § 45.2-1710 establishes the following objectives for the 2022 Energy Plan:

- Establish sufficient supply and delivery infrastructure to enable widespread deployment of distributed energy resources;
- Maximize energy efficiency programs in order to produce electricity cost savings and to create jobs and revenue from the energy efficiency service sector;
- Establish greenhouse gas emissions reduction goals across Virginia's economy to reach net-zero emissions by 2045 in sectors like electric power, transportation, industrial, agricultural, building, and infrastructure;
- Include an inventory of all greenhouse gas emissions for the four years preceding the issuance of the next Energy Plan;
- Require that pathways to net-zero greenhouse gas emissions be established;
- Enable widespread integration of distributed energy resources into the grid;
- Mitigate the negative impacts of climate change and prioritize investment in disadvantaged communities;
- Develop carbon-free energy resources required to fully decarbonize the electric power supply of the Commonwealth including deployment of 30 percent renewables by 2030 and realizing 100 percent carbon-free electric power by 2040; and
- Ensure that decision-making is transparent and includes opportunities for full participation by the public.

State Geography, Terrain, Climate and Land Use Patterns

The Commonwealth has a diverse terrain that includes mountains, cities, beaches, and approximately 40,000 square miles of land. The Commonwealth is the 35th largest state in the United States with a humid, subtropical environment with four distinct seasons and five distinct climate regions: tidewater, piedmont, northern Virginia, western mountain, and southwestern mountain.⁵ The tidewater region, which is in the southeastern part of the state and includes coastal land, experiences temperatures that are approximately 10 degrees warmer than the piedmont region in the middle of the state and the northern region.⁶ Conversely, the western mountain and southwestern mountain regions experience temperatures that are approximately 10 degrees cooler than the piedmont and northern Virginia regions.

Precipitation patterns follow similar regional distributions. The southwestern mountain region gets the most annual precipitation, averaging 47.33 inches.⁷ Piedmont averages 43.37 inches,

⁵ <https://www.virginia.org/plan-your-trip/seasons-and-climate/#:~:text=Virginia%27s%20weather%20has%20been%20described,region%20due%20to%20winter%20frost>

⁶ <https://planthardiness.ars.usda.gov/>

⁷ <https://www.virginia.org/plan-your-trip/seasons-and->

followed by tidewater and the western mountain region, which average 41.31 and 40.74 annual inches, respectively. Northern Virginia gets the least annual precipitation, with 38.29 annual inches. The tidewater region experiences some hurricanes, but the northern latitude and cooler coast water (compared to southern coastal states) quells the intensity of the storms. However, rising sea levels may increase storm surges and subsequent flood damage in the Chesapeake Bay area, which presents uncertain climate risks to the area.⁸ More broadly, an increase in variable weather events threatens to erode beaches, submerge lowlands, and increase coastal flooding in Virginia.⁹ Increased saltwater intrusion could negatively impact agriculture, wells, and septic systems in coastal rural areas.¹⁰ Taken together, these evolving disruptions in historical weather and climate patterns present significant risks to the existing economy and community.

Travel Patterns, Public Transportation, Freight and Other Needs

Virginia has the third largest state-maintained highway system in the country behind only North Carolina and Texas.¹¹ Its 57,867 miles of highways are divided into four main categories: interstate, primary, secondary, and frontage. The 1,118 miles of interstate highway includes four-to-ten lane roads that connect states and major cities. The 8,111 miles of primary two-to-six lane roads connect cities and towns with each other and with interstates. The 48,305 miles of secondary roads include local connector or county roads. Finally, the 333 frontage roads run parallel to higher-speed, limited-access roads. In addition to the major roads, VDOT is also responsible for nearly 12,000 bridges and 7,550 culverts, six underwater crossings and two mountain tunnels, three toll roads, and one toll bridge. VDOT also operates three ferry services and maintains 43 safety rest areas, four welcome centers, and over 100 commuter parking lots.

The Department of Rail and Public Transportation (DRPT) operates all freight and passenger rail services in the State. DRPT works with the two major Class I railroads operating in Virginia, CSX and Norfolk Southern, in addition to the nine short line railroads that provide local and switching services across the state. Rail passengers in Virginia are served by Amtrak and Virginia Railway Express.

AFC – Corridor Networks

The Commonwealth views its interstate highways as the backbone of a robust network serving communities and commerce to facilitate strong interconnectedness across industry, sectors, and people. Strengthening our ability to serve the growing EV driver-base is a critical step to ensuring that the broader economy continues to thrive and evolve. As such, the Commonwealth views EV infrastructure investment as a facilitator of increased growth of trade and commerce, with the private sector driving the evolution and direction of the ultimate network. The economic outcome-

[climate/#:~:text=Virginia%27s%20weather%20has%20been%20described,region%20due%20to%20winter%20frost](#)

⁸ <https://ascelibrary.org/doi/10.1061/%28ASCE%29NH.1527-6996.0000505>

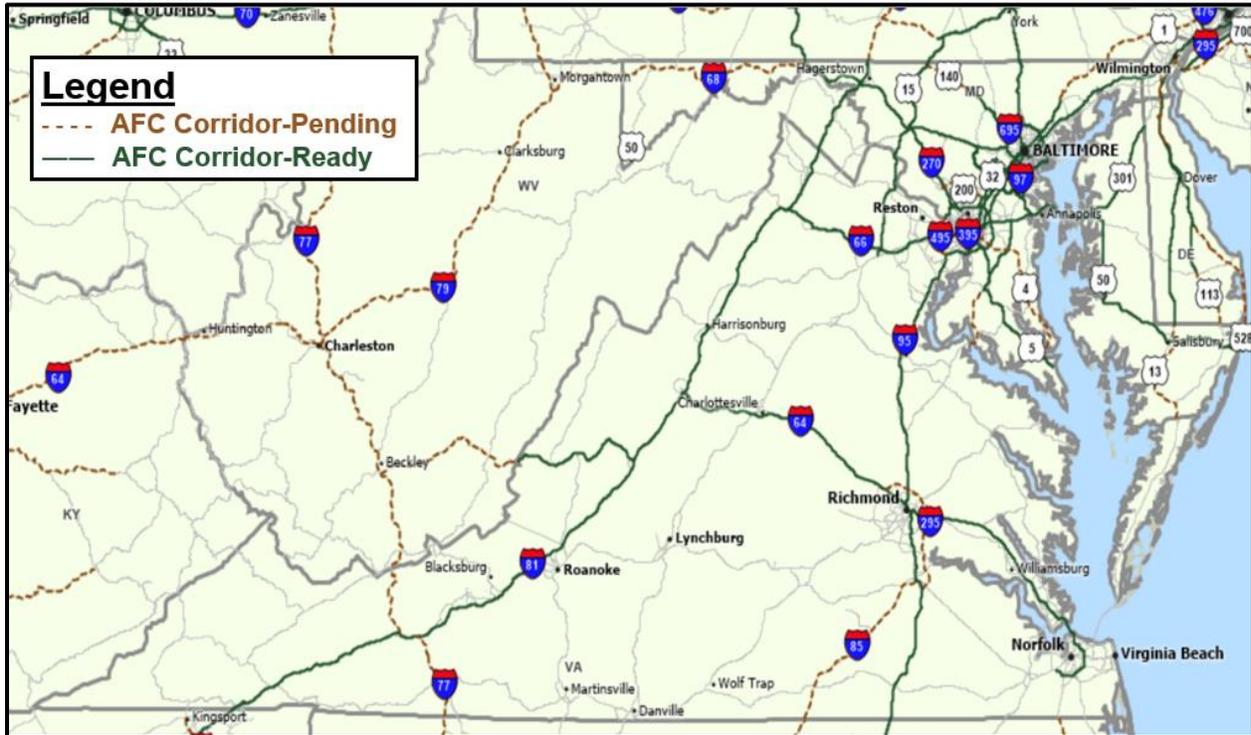
⁹ <https://19january2017snapshot.epa.gov/sites/production/files/2016-09/documents/climate-change-va.pdf>

¹⁰ http://www.vasem.org/wp-content/uploads/2021/08/VASEM_VirginiasCoastalAreasReport_FINAL.pdf

¹¹ https://www.virginiadot.org/about/vdot_hgwy_sys.asp

driven approach to leveraging these public investments frames our overall strategy on the buildout of Virginia’s AFC network, which is to achieve FBO status as early as possible. As of the conclusion of AFC Round 6, Virginia has 8 designated AFCs that are either corridor-ready or corridor-pending. They include over 985 miles of interstate along I-64, I-66, I-77, I-81, I-85, I-95, I-295, and I-495, as shown in the map below.

Figure 5: AFC Corridor-Ready and Corridor-Pending Routes as Announced (July 2022)



Source: US Department of Transportation Federal Highway Administration website.

Prior to Round 6 of the AFC designation process, the Commonwealth achieved corridor-ready status along I-64, I-66, I-81, and I-95, while I-77, I-85, I-295, and I-495 are corridor-pending at this time. After Round 6 of the AFC designation process, I-295, I-77, and I-495 were added to the corridor-pending status. The chart below identifies the planned investments to be pursued through the allocation of NEVI program funding in the first year.

Table 2: AFC Round Six Corridor-Pending Designations

Corridor	Interstate	Distance of Interstate Segment	Exit Options	Designation Request
1 – Short Pump to I-95	295	53 Miles	1, 3, 9, 15-16, 22, 25, 28, 31, 34, 37-38, 41, 43, 45, 49, 51, 53	EV Corridor Pending
2 – WV/VA Border to VA/NC Border	77	65 Miles	1, 8, 14, 19, 24, 32, 40-41, 47, 52, 58, 62, 64, 66	EV Corridor Pending

Corridor	Interstate	Distance of Interstate Segment	Exit Options	Designation Request
3 – Springfield to VA/MD Border	495	22 Miles	43-45, 46A-46B, 47A-47B, 49, 49A-49C, 50A-50B, 51, 52A-52B, 54A-54B, 57A-57C	EV Corridor Pending

The initial focus of the Commonwealth’s allocation of NEVI funds will be dedicated to building out station access to fill the identified gaps along its AFCs. Once fulfilled, VDOT will pursue statewide FBO certification from FHWA. While the NEVI guidance on FBO status outlines the parameters for siting charger stations (i.e., every 50 miles and within 1 mile of the exit), the identification of specific locations will be driven by market demands and third parties. The NEVI funds will be allocated according to the criteria of the program to broadly identify areas of potential, with the private sector developing specific options within those parameters. The potential private sector operators will have the flexibility to propose specific sites based on business acumen and market forces.

Existing Locations of Charging Infrastructure Along AFCs

VDOT’s analysis of the existing network of 134 public charging stations equipped with DC fast charging capacity in Virginia has revealed that just 17 locations may meet the NEVI criteria, and even in these cases it is currently unclear whether their minimum of four ports with at least 150 kW charging capacity each can charge simultaneously. Nonetheless, these stations are the foundation for the Commonwealth’s efforts to achieve FBO status in the first years of the NEVI program. The table below provides more detailed information on these 17 stations.

Table 3: Existing Charging Infrastructure*

State EV Charging Location Unique ID**	Charger Level	Route	Location	Number of Ports	EV Network
169947	DCFC	I-64	12401 Jefferson Ave Newport News, VA 23602	10	Electrify America
167049	DCFC	I-64	135 Market St Zion Crossroads, VA 22942	4	Electrify America
155888	DCFC	I-66	6530 Trading Square Haymarket, VA 20160	4	Electrify America
198597	DCFC	I-66	3713 Langston RD Arlington, VA 22207	4	EVgo
167892	DCFC	I-81	1028 Richmond Ave C Staunton, VA 24401	4	Electrify America
122837	DCFC	I-81	13249 Lee Highway Bristol, VA 24202	4	Electrify America
168007	DCFC	I-81	1340 North Fourth St. Wytheville, VA 24382	4	Electrify America

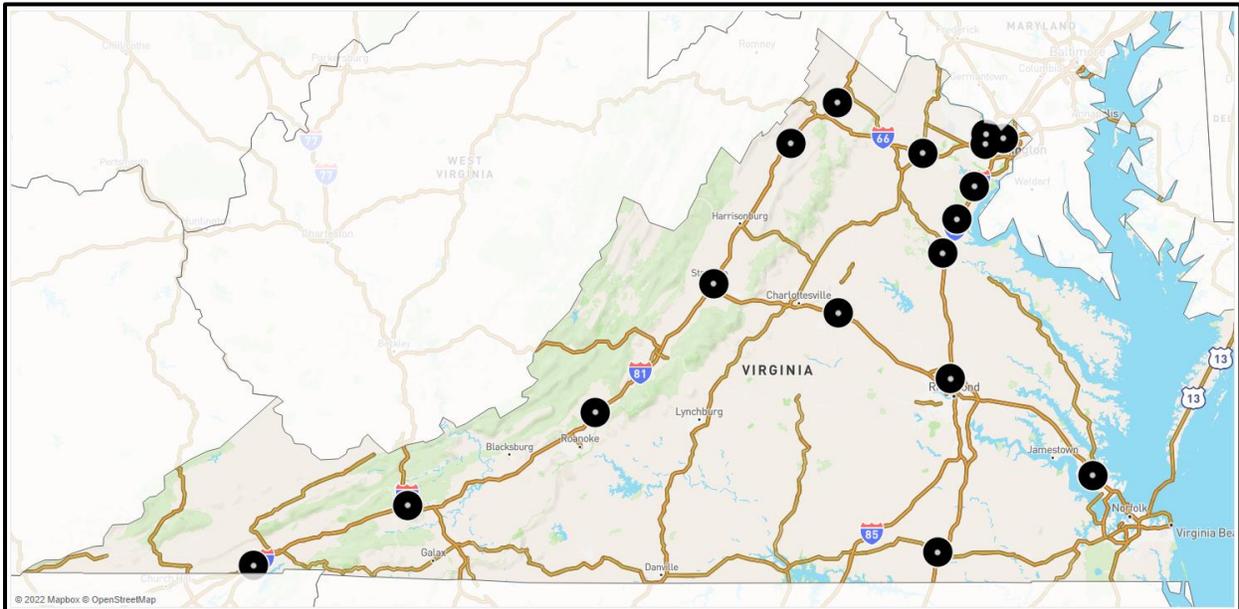
State EV Charging Location Unique ID**	Charger Level	Route	Location	Number of Ports	EV Network
170318	DCFC	I-81	345 Brugh Mill Rd. Fincastle, VA 24090	4	Electrify America
167891	DCFC	I-81	747 Fairfax St Stephens City, VA 22655	19	Electrify America
168490	DCFC	I-81	461 W. Reservoir Rd Woodstock, VA 22664	4	Electrify America
166857	DCFC	I-95	7901 Brooke Rd Richmond, VA 23227	8	Electrify America
167146	DCFC	I-95	303 Market Dr Emporia, VA 23847	4	Electrify America
163740	DCFC	I-95	137 Spotsylvania Mall Dr Fredericksburg, VA 22407	4	Electrify America
167503	DCFC	I-95	217 Garrisonville Rd Stafford, VA 23602	10	Electrify America
190762	DCFC	I-95	2700 Potomac Mills Cir Woodbridge, VA 22192	4	Electrify America
190384	DCFC	I-495	8000 Tysons Corner Center McLean, VA 22102	4	Electrify America
198185	DCFC	I-495	8130 Arlington Blvd Falls Church, VA 22042	4	EVgo

* As of 07/25/2022

** Defined by the Commonwealth which should match the unique ID in the applicable GIS databases.

The map below shows existing FBO-compliant stations in black. As the map indicates, there exists a series of FBO-compliant stations serving the I-81, I-64, and I-95 corridors in isolation. The Northeast section of the Commonwealth presents four clusters of stations that also meet this criterion. The cluster of two stations in the northernmost tip of Virginia are two stations meeting FBO criteria that serve I-81. The cluster of three stations closest to Washington DC serve I-495 and I-66 respectively. The cluster of two stations just south of the DC cluster serves I-66 and I-495, while the cluster of two stations south of the DC cluster serves the I-95 corridor.

Figure 6: FBO Stations in Virginia



Known Risks and Challenges

Recognizing risks and identifying potential mitigation strategies during the development and refinement of the Deployment Plan will be vital to the long-term success of Virginia's NEVI program. VDOT will monitor and document risks related to the location and geography of charging infrastructure, operations and maintenance, grid limitations, power supply, and cybersecurity, among others. Identified risks will be validated with relevant stakeholders and will be assessed for the ability of stakeholders to respond to and mitigate them. A few of the most important risks are outlined below.

Hardware Risks

Because DC fast charging is a relatively new technology, hardware has a short track record and few standards. The past decade has been filled with examples of global manufacturing companies entering and exiting the EVSE space to satisfy its burgeoning demand. DC fast charging is prone to malfunctions, in part because of surging power levels that stress the components, rough handling by users of the equipment, and exposure to the elements. Equipment previously installed privately in Virginia has had a high failure rate shown in user comments and reports on social media tools like PlugShare. The cooling systems are complex, whether air-based with a series of fans and filters, or liquid-based with pumps, reservoirs, and fluids. Spare parts and trained technicians, along with a robust supply chain, are essential to operating a reliable network of chargers. Even compatibility with credit card readers has been unexpectedly complicated. Finally, the charger manufacturers must perform integration testing with every new vehicle that comes to market to ensure reliability for all drivers, and predict future market changes like larger batteries. VDOT will seek continued federal guidance on approved equipment and further evaluate proposed EVSE manufacturers and equipment to assess whether NEVI investments will last through the full expected service life of the equipment.

Proprietary Hardware or Software

As required by the IIJA, open standards and interoperability are critical to the success of NEVI because they foster competition, protect consumers' investments by preventing vendor-lock, and

reduce overall EV ownership costs. There is currently a lack of agreement in the industry over standardization. If operators can agree upon a standardized approach to provide universal access to charging stations, the range anxiety that limits consumer's interest in EVs will lessen because drivers can rely on more public stations as a charging source. When drivers are uncertain whether all public chargers along their route work for their vehicle, their trust in the network is eroded. Standardization could also reduce the costs of station construction and maintenance.

VDOT will require developers to comply with all applicable standards promulgated by the U.S. Department of Transportation. This will include the outcome of FHWA's Notice of Proposed Rulemaking (NPRM) on June 9, 2022, to establish minimum standards for EV charging infrastructure, including interoperability, traffic control devices or on-premises signage, data, and network connectivity. The NPRM proposes that all non-proprietary charging connectors must meet applicable industry standards, and that each DCFC charging port must have a permanently attached Combined Charging System (CCS) Type 1 connector and must charge any CCS-compliant vehicle. For NEVI projects using Fiscal Year 2022 funds, one or more DCFC charging ports may also have a permanently attached CHAdeMO connector (www.chademo.com). DCFC charging ports may also have a permanently attached proprietary connector.

The NPRM also requires chargers to conform to ISO 15118 to communicate with CCS-compliant vehicles that have implemented ISO 15118, and have the ability to receive and implement secure, remote software updates and conduct real-time protocol translation, encryption and decryption, authentication, and authorization in their communication with charging networks. Charging networks must perform and chargers must support remote charger monitoring, diagnostics, control, and smart charge management, and securely measure, communicate, store, and report energy and power dispensed, real-time charging-port status, real-time price to the customer, and historical charging-port uptime. Chargers must also be capable of using Open Charge Point Protocol to communicate with any network provider.

Financial Stability and Commitment to the U.S. Market

EV charging is a nascent market with an uncertain demand trajectory. Even large charging companies have, in recent years, left the U.S. market due to this uncertainty. There will inevitably be continued churn amongst manufacturers and service providers until an equilibrium is established between the supply of EV chargers and the demand from EV drivers.

Real Estate

EV chargers are typically deployed at retail commercial locations due to the presence of amenities such as food, shopping, and restrooms. However, due to issues such as the high value of parking spaces, limited access to power, future development at a site, minimum parking ratios, and no-build zones, some locations are relatively undesirable for charging from planners' or drivers' perspectives.

Operations and Maintenance

A reliable EVSE network requires routine maintenance and technicians trained in EV specialties. Because chargers are spread widely but generally with little density, repair technicians must cover large service areas. Establishing a network of qualified individuals and a system for distributing parts quickly is critical to ensuring a reliable EV charger network.

Utility Costs

The costs of the utility equipment needed to supply EV chargers and the rates charged for the electricity are major components of the EV charger business case and its future viability. Extending the grid to supply an EV charging station would likely entail a major up-front expense

for a developer unless the utility subsidizes such requests. Rates for electricity usage can also hamper the profitability of a charging station. Demand charges, which are billed based on the peak usage of a facility over a certain time period, threaten the viability of stations with low-utilization rates, which include most of the existing EV charging stations in Virginia. Charging stations' demand for electricity is unpredictable and volatile, which could lead to high demand charges that would need to be recovered from few customers, at least early on.

Stranded Assets

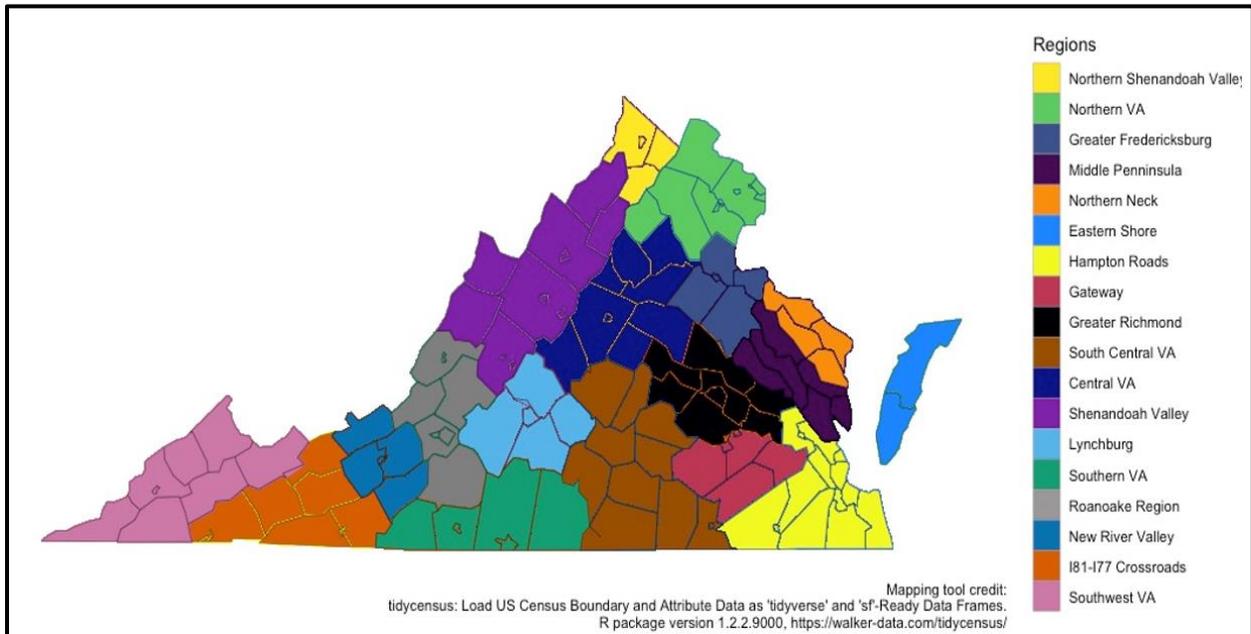
Because EV chargers have a challenging business case presently, NEVI funds used to purchase EVSE may be allocated inefficiently if a developer is unable to continue the business until the equipment's service life expires. Such stranded assets would reduce the overall effectiveness of the NEVI program.

EV Charging Infrastructure Deployment

VDOT has engaged in robust data analysis regarding EV ownership trends within the Commonwealth and nationwide. The data analytics are built off the census tract and zip code tabulation areas to produce county profiles. VDOT has considered how commuting trends may influence the interconnectedness of counties to create distinct regions within Virginia where the demand for charging station infrastructure may be stronger. Understanding these trends and relationships is key to knowing when and where EV adoption trends will vary so that each year's NEVI funding strategically targets the regions where charging infrastructure will meet demand and achieve other policy goals. The Commonwealth is committed to a private sector-driven approach that funds new stations in high-demand areas, fosters the growth of industry opportunities in urban, rural, and underserved or disadvantaged communities, and builds out a resilient, broad-reaching EV charger network. While the NEVI criteria explicitly mandate the build-out of the interstate highways within the pre-existing AFC network, Virginia seeks to meet that criterion as early as possible in order to maximize the flexibility of funding allocations. It is the Commonwealth's goal that these NEVI funds be directed by the evolution of the private sector in its mission to support the growth of a strong and competitive market for EVs. It is the goal of this plan that these public funds act as a private sector stimulant for the growth of the overall EV industry and its ancillary markets.

VDOT's overarching goal is to align NEVI funding of projects with the evolution of the EV industry, in line with Virginia's EV adoption forecasts. Adoption data is most efficiently clustered according to the Virginia Economic Department Partnership (VEDP) maps of the state. Shown below, this mapping divides the Commonwealth into 18 regions. This clustering strategy is partly driven by the identification of common EV demand and commuting trends. Virginia's goal is to leverage NEVI funds to increase the growth of jobs and the Commonwealth's economy. In that spirit, this plan does not seek to be overly prescriptive in determining the precise locations for chargers.

Figure 7: Virginia Counties' EV Adoption Trend Clusters



The clustering of counties in the map aligns with the data observed on adoption trends at the county-level, which have demonstrated roughly similar EV adoption trends. This imperfect alignment of counties and trends helps to organize Virginia into regions that can be targeted more precisely to facilitate the regional alignment of networks. This mapping strategy also aligns with existing resources focused on economic development. By aligning the EV charging infrastructure construction strategy with these pre-existing regions identified by the VEDP, better intergovernmental coordination will be facilitated. This alignment will also leverage pre-existing private sector relationships, knowledge of brown/greenfield site development needs, and the communities they may serve to promote strong industry and job growth. This mapping strategy also loosely aligns with utility coverage areas, which may help mitigate the coordination challenges needed for infrastructure upgrades.

Funding Sources

VDOT will develop a competitive funding opportunity that seeks developers to install or upgrade DC fast charging infrastructure along Virginia’s AFCs in accordance with federal guidelines. NEVI program funds will offset up to 80% of project costs while third parties will be responsible for the non-federal share of costs. VDOT’s expectation is that EV charging companies will be the primary applicants, but funding opportunities will be open to all businesses and public sector organizations that meet the program requirements. Completed applications will be scored by an evaluation team with the highest scoring eligible applications proposed for an award. The purpose of public funding is not to discourage private investment, but to catalyze it to supplement and fill gaps in the existing EV charging network.

2022 Infrastructure Deployments/Upgrades

VDOT’s analysis of the existing DC fast charging stations that may currently meet NEVI criteria has revealed several gaps in interstate coverage, with an additional 26 EV charging stations needed. VDOT has identified three stations where upgrades to existing stations would bring them into FBO-compliant status, and two stations have been identified as candidates for exceptions as

outlined in the Discretionary Exceptions section below. VDOT therefore plans to use 2022 NEVI program funding to support the construction of 19 to 26 new stations along several interstates (I-64, I-77, I-81, I-85, I-95, and I-295), with exceptions requested along I-77 and I-95 in addition to exceptions requested and potential upgrades along I-64. No apparent upgrade or exception candidates exist along I-81, I-85, or I-295, so VDOT anticipates that stations along these routes will be new construction. Two interstate corridors (I-66 and I-495) appear to have already met the FBO criteria. Analysis of stations along I-66 has identified no gaps, with two stations (ID 155888 and 198597) providing the minimum service for EV drivers along this corridor. Stations 190384 and 198185 bring I-495 into FBO compliance.

Interstate 64 runs roughly east to west across the Commonwealth, starting in the southeast corner of the state in the Hampton Roads region and ending in the Allegheny Highlands region along the Virginia/West Virginia state line. It is currently served by two stations that meet the FBO criteria (ID 169947 and ID 167049). Our analysis has identified three distinct gaps in coverage with one of those gaps potentially covered through an upgrade to an existing station (ID 198938). The remaining two sections span approximately 120 miles and 60 miles, respectively, with the first span providing potential station sites around the city of Williamsburg and the second around the city of Charlottesville.

Interstate 77 is a short span of road approximately 65 miles long in the western region of the Commonwealth. There are currently no stations serving this corridor and it is forecasted that at least two stations will be funded through the NEVI program. Interstate 81 runs west to east across the Commonwealth beginning in Bristol and ending at the northernmost tip of Virginia at the West Virginia border near Martinsburg, West Virginia. It is currently served by five stations (IDs 167891, 170318, 168007, 122837, and 167892) that are FBO-compliant with four gaps of 50 miles or more where the construction of an additional charging station should be funded. Those four gaps center around the areas of Chillhowie, Christianburg, Natural Bridge, and New Market.

Interstate 85 begins at the North Carolina state line running about 70 miles up to Petersburg, with no DCFCs along this route. Interstate 95 runs roughly north to south for about 170 miles from the Maryland border to the North Carolina border. The route is currently served by 5 FBO-compliant stations (IDs 190762, 167503, 163740, 167146, and 166857) with two identified gaps. The first gap is in the Springfield, VA area where an exception request has been made later in this document for a station to be identified as NEVI-FBO compliant based on the aggregate level of service provided by a cluster of stations within 1 mile of the highway exit. The second gap is a station-less segment spanning approximately 65 miles between Richmond and Emporia with potential siting options within the Petersburg area. Interstate 295 is a short span of road measuring approximately 20 miles that serves as an eastern bypass of Petersburg and Richmond for I-95 and a northern bypass for I-64, with no NEVI-compliant DCFCs along this route.

The table below identifies the new station construction or potential upgrades. Note that for new construction, the State EV Charging Location Unique ID is approximated with the AFC corridor (I-##) the start to the ID and the station count (001, 002, etc.) following. For example, the first proposed station along I-64 would be identified as I-64001.

Table 4: Proposed Stations

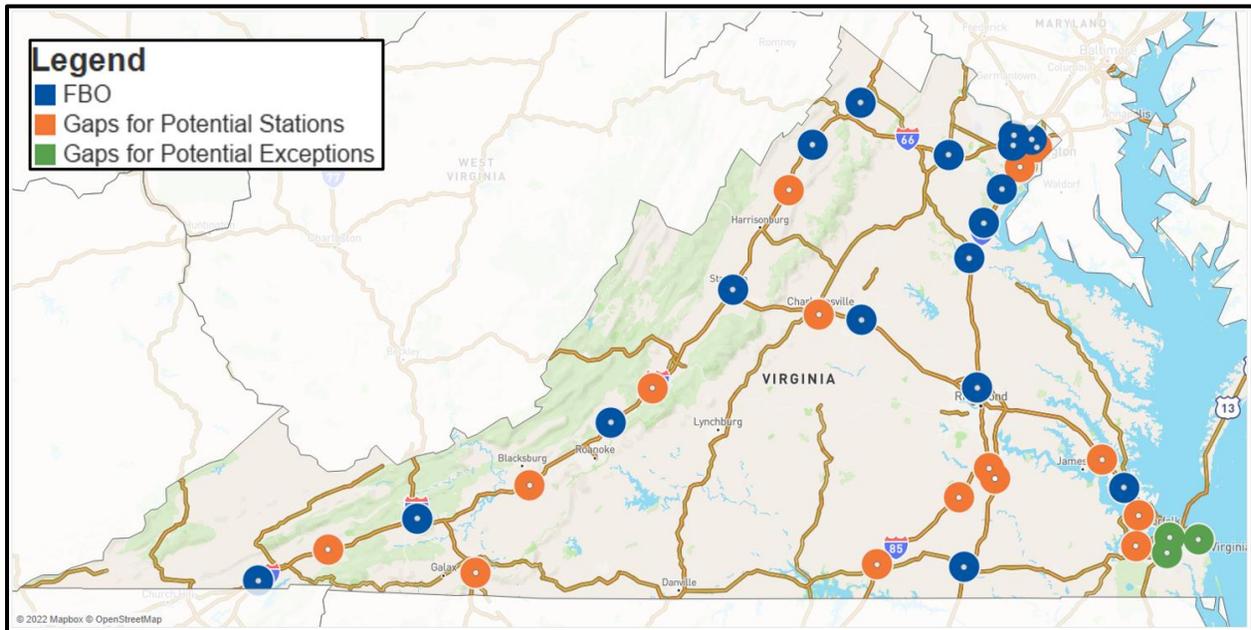
State EV Charging Location Unique ID*	Route	Location	Anticipated Network	Utility Territories	Anticipated Station Ownership	FY22 Funding Amount	FY23-FY26 Funding Amount
I-64001	I-64	Williamsburg, VA Region	New	Dominion	Unknown	TBD	TBD
I-64002	I-64	Charlottesville, VA Region	New	Dominion	Unknown	TBD	TBD
198938	I-64	1401 Greenbrier Pkwy Chesapeake, VA 23320	EVgo	Dominion	Unknown	TBD	TBD
I-81001	I-81	Chillhowie, VA Region	New	Appalachian Power Company	Unknown	TBD	TBD
I-81002	I-81	Christianburg, VA Region	New	Appalachian Power Company	Unknown	TBD	TBD
I-81003	I-81	Natural Bridge State Park Region	New	City of Radford/ Dominion	Unknown	TBD	TBD
I-81004	I-81	New Market, VA Region	New	Shenandoah Valley/ Dominion	Unknown	TBD	TBD
I-85001	I-85	Dinwiddie, VA Region	New	Co-op	Unknown	TBD	TBD
I-85002	I-85	South Hill, VA Region	New	Dominion or Mecklenburg	Unknown	TBD	TBD
I-95001	I-95	Petersburg, VA Region	New	Dominion	Unknown	TBD	TBD
I-29501	I-295	Richmond, VA Region	New	Dominion	Unknown	TBD	TBD
I-29502	I-295	Petersburg, VA Region	New	Dominion	Unknown	TBD	TBD
I-77001	I -77	Carroll County VA	New	Appalachian	Unknown	TBD	TBD

* Defined by Virginia, which should match the unique ID in the Commonwealth’s applicable GIS databases. The Unique IDs correspond to general locations for proposed installations rather than precise geocoordinates.

** TBD: to be determined due to uncertainty over inflation in the EV charger supply chain.

The map below illustrates the combination of stations that currently meet the NEVI FBO criteria as well as the upgrades and new stations listed in the previous chart. Locations in blue indicate the existing stations that potentially meet FBO criteria while the stations in orange and green indicate the potential station upgrades/new construction that would bring the Commonwealth’s AFC corridors to FBO status.

Figure 8: FBO and Potential FBO Stations



Note that the proposed locations of upgrades and new construction projects are illustrative only and merely identify broadly where gaps exist in AFC corridors.

Upgrades of Corridor Pending Designations to Corridor Ready Designations

Proposed station upgrades listed earlier for I-64 (ID 198938) require an upgrade to increase the number of ports from two to four, and an upgrade in capacity for existing ports from 50 kW to at least 150 kW to bring them into FBO compliance.

Increases of Capacity/Redundancy along Existing AFC

Increasing EV charger capacity and redundancy along existing AFC corridors will be critical in Virginia’s plan to build a robust network of charging infrastructure. The Commonwealth has evaluated baseline data around EV registration trends and potential patterns, and plans to act responsively to determine the need for redundancy along AFC corridors to minimize the effects on existing stations with low utilization rates. In many areas, the minimum requirements to achieve FBO status along the Commonwealth’s AFC corridors, including the need to have sufficient power to charge four 150 kW chargers simultaneously, may be insufficient to meet forecasted future demand. Many regions in the Commonwealth presently have strong inter- and intra-regional commuting patterns that signal the likely potential for strong EV charger demand in the future. Coupled with the forecasted EV price decline trajectory and the regular cycle of car replacements among consumers, increasing EV charger capacity and redundancy may be warranted in certain areas with higher levels of current and projected adoption. The Commonwealth will consider future-proofing new and upgraded EV charger stations by requiring the designing of new and upgraded stations to allow for future upgrades and updates to power levels and number of chargers, to the extent possible and within reason. FHWA guidance encourages the installation of chargers with higher power levels where appropriate to support industry efforts to ensure a consumer’s time to charge is at least comparable to filling a gas tank. The Joint Office is expected to publish best practices for EV charging infrastructure construction that will seek to allow flexibility in future upgrades, which VDOT will consider for possible incorporation into solicitation requirements.

Electric Vehicle Freight Considerations

Heavy-duty and rail vehicles are responsible for 28 percent of the state's transportation-related greenhouse gas emissions.¹² Low income and minority communities are more likely to be located near transportation facilities like bus depots that are a major source of air pollution. To decrease the emissions of these vehicles, in 2021 Virginia signed onto the Multi-State Medium- and Heavy-Duty Zero Emission Vehicle Memorandum of Understanding. This agreement pledged that at least 30 percent of all new trucks and buses sold in the Commonwealth will be zero-emission vehicles by 2030 and 100 percent by 2050. According to the American Lung Association, the agreement would result in annual estimated savings of \$1.3 billion in health costs in Virginia by 2050, as well as preventing over 1,700 asthma attacks and over 8,000 lost workdays per year.

Public Transportation Considerations

Though electric public transportation will not directly impact NEVI-funded EV charging stations, a comprehensive electric infrastructure network across Virginia is crucial to meeting the objectives of the IIJA. VDOT will coordinate with the DRPT, various Metropolitan Planning Organizations, and other partners to maximize the impact that NEVI funding can have on transit electrification efforts. NEVI funded initiatives will augment those already in progress, like the Federal Transit Administration's Low or No Emission Vehicle Program, which will distribute \$5.5 billion over five years to assist transit agencies in the purchase or lease of U.S.-built low or no emission vehicles. DRPT and local transit authorities have initiatives to electrify public transit that VDOT will also consider when making NEVI decisions. There are currently 26 battery-electric buses (BEBs) operating in Virginia, with an additional 31 BEBs that have been ordered or are waiting to be ordered. The Alexandria Transit Company received \$5.1 million from the VW Trust and statewide transit capital funding to acquire six BEBs and fast chargers. Blacksburg Transit, Fairfax Department of Transportation, and Greater Roanoke Transit are also using VW Trust funds to replace 24 diesel public transit buses with BEBs. Similarly, Hampton Roads Transit (HRT) recently added six BEBs to its fleet. HRT also recently received a \$5 million grant that will contribute to the renovation of an obsolete bus operations and maintenance depot in Virginia Beach. When completed in 2025, the depot will accommodate over 100 buses and 14 seasonal trollies and will be central to HRT's bus electrification plan.

FY23-26 Infrastructure Deployments

The initial priority of the Commonwealth will be to achieve the baseline FBO status along interstate corridors. Recognizing that the Commonwealth enters the first year of the NEVI program with a head start in achieving FBO status, Virginia plans to maximize the impact of these infrastructure investments across all five years of the program. This plan includes building out a resilient, broad-reaching charger network, investing in community-driven stations that meet rising demand, and fostering the growth of industry opportunities in urban, rural, and underserved or disadvantaged communities. However, the ability to achieve these goals is dependent upon the achievement and timing of FBO status.

Should the FHWA choose to grant FBO status to states based on the allocation of NEVI funds rather than on the completion of construction, then Virginia will pursue the buildout of a statewide EV charging network as early as FY 23 and 24 with the goals of meeting future consumer demand, facilitating the growth of the EV charging industry within the Commonwealth, and meeting the needs of our diverse communities. However, if the FHWA waits to grant FBO status until after the

¹² <https://www.deq.virginia.gov/home/showpublisheddocument/12633/637725680592630000>

completion of construction, then supply chain issues and the normal planning and permitting process will lessen the ability of the Commonwealth to pursue a forward-looking plan.

The Commonwealth would prefer flexibility in this process, but the specific pathway of FY 23-26 deployments will be dictated by the FHWA's decision on the timing of FBO certifications. Maximum flexibility and the ability to meet community needs would likely be achieved if FBO declarations are to be released at the point of NEVI funding awards. Based on current supply chain issues, FHWA certification for FBO status that wait for construction to be completed would likely restrict deployment to the interstate highways through Fiscal Year 2026 and year five of the NEVI program.

State, Regional, and Local Policy

Virginia is a leader in promoting the widespread adoption of alternative fuel vehicles, after having enacted several policies in recent years to support increased adoption of EVs. Virginia Code § 45.2-1727 establishes the Electric Vehicle Rebate Program, which provides a purchaser or lessee of a new or used EV with a \$2,500 rebate (the program is currently unfunded). A customer with an annual household income that does not exceed 300 percent of the federal poverty level would be entitled to an additional \$2,000 rebate for a new EV and \$500 for a used EV, beginning in tax year 2022.¹³ Virginia Code § 10.1-1307 directs the State Air Pollution Control Board to create both a low-emissions vehicle (LEV) and zero-emissions vehicle (ZEV) program for new cars beginning in model year 2025.¹⁴ ZEV regulations will require manufacturers to ensure that an increasing proportion of the light- and medium-duty vehicles they sell to Virginia dealers are electric, fuel cell or plug-in hybrid. Among the southeastern states, Virginia is the first state to adopt such standards. Virginia Code § 46.2-1219.3 prohibits non-electric vehicles from parking in a space clearly marked for EV charging, and imposes penalties on violators.¹⁵ Finally, Virginia Code § 2.2-1176.2 requires the Department of General Services to utilize a total cost of ownership calculator prior to purchasing or leasing light-duty vehicles and to purchase EVs unless the calculator clearly indicates that an internal combustion-engine vehicle has a lower cost of ownership.¹⁶

VDOT is working closely with regional and local entities to ensure that NEVI funding supports existing policies and programs. For example, the DRPT Making Efficient and Responsible Investments in Transit (MERIT) program provides funding for various capital improvement projects, including the purchase or lease of new electric, hybrid, or propane vehicles. As part of the MERIT program, the Clean Transportation Voucher Program offers grants of up to 100% of the incremental cost for transit agencies to replace model year 2009 or older Class 7 and 8 diesel transit buses with all-electric buses and to purchase the associated charging infrastructure.

¹³ <https://law.lis.virginia.gov/vacode/title45.2/chapter17/section45.2-1727/>

¹⁴ <https://law.lis.virginia.gov/vacode/10.1-1307/>

¹⁵ <https://law.lis.virginia.gov/vacode/46.2-1219.3/>

¹⁶ <https://law.lis.virginia.gov/vacode/2.2-1176.2/>

Virginia Energy administers a program in collaboration with VDOT to offer up to \$10,000 to support the incremental costs for state and local agencies purchasing new or converted alternative fuel vehicles (AFVs) who meet certain standards. Virginia Energy also offers a rebate program for individuals purchasing eligible EVs. AFVs displaying the Virginia Clean Special Fuel license plate may use High Occupancy Vehicle lanes on a number of major highways, regardless of the number of passengers. The Virginia Port Authority, the Virginia Department of Agriculture and Consumer Services, and the Virginia Department of Taxation also offer inventive programs to encourage AFV adoption. Many local utilities also offer incentives like EV charger station rebates to multi-family, workplace, and transit customers purchasing Level 2 and DC fast chargers, and preferential rate structures like time of use rates that encourage charging at certain times of the day.

Implementation

VDOT’s overall implementation strategy is to require station owners and operators to adhere to NEVI standards and rules. VDOT will incorporate NEVI requirements in project agreements, including requirements on the operations and maintenance (O&M) of EV charging stations and for data collection and sharing.

Strategies for EVSE Operations & Maintenance

A reliable EV charging network requires routine maintenance as well as technicians trained in EV infrastructure. VDOT will use NEVI requirements to establish minimum performance criteria and will expect station owners to reflect NEVI requirements in any agreements signed with third party vendors. VDOT will utilize usage data reported by station owners and operators to monitor station uptime and will use its public outreach web portal to solicit information from EV owners about their experiences using charging infrastructure deployed using NEVI funds.

Developers will be required to submit an O&M plan to demonstrate EV charging station performance. The goal of this plan will be to improve reliability, reduce unnecessary costs, and train staff. The plan will describe the components of operations, maintenance, and inspection of the EV charging stations, and include maintenance processes, minimum repair downtime, and charging station site host training. The plan will identify the party responsible for the maintenance of charging stations, utility companies within the vicinity, and the third party responsible for operating costs.

Strategies for Identifying EV Service Providers and Station Owners

VDOT is using multiple strategies to identify EV service providers and potential hosts in order to create an environment that is conducive to competitive bidding. These initiatives include:



- Speaking with EV charger service providers who already have assets in Virginia to learn about their experiences and perspectives and glean any information that VDOT can use to create competitive funding opportunities.
- Soliciting initial interest from possible site hosts on VDOT's public outreach portal (<https://publicinput.com/VirginiaNEVI>).
- Releasing an RFI to secure feedback from EV service providers, site hosts, and other interested parties on NEVI procurements.
- Performing market sounding activities to inform potentially interested bidders of the opportunities the NEVI program offers, and to understand how they would like to see procurements structured.

VDOT intends to use its existing procurement portal to advertise and promote NEVI opportunities and to post competitive funding opportunities (<https://vdot.virginia.gov/business/rfps.asp>).

Strategies for EVSE Data Collection & Sharing

VDOT is cognizant of the value EVSE data can provide, both for users and for program managers looking to maximize NEVI's impact. VDOT will increase awareness of charging infrastructure funded using NEVI dollars by requiring charging network providers to share data describing charging station location, type of equipment available, price (to the extent possible), status, and other useful information via an Application Programming Interface. VDOT will work with EV service providers and station owners to provide useful, non-personally identifiable information available to third parties, including government entities, in accordance with the FHWA's proposed minimum standards and requirements for data sharing. VDOT will also encourage site owners or hosts to upload pertinent data to the Department of Energy's Alternative Fuel Data Center's Station Locator. VDOT will require EVSE companies to provide data describing charging usage, cost, and reliability, and will share this data with the U.S. Department of Transportation and Department of Energy so they are in receipt of information that they can utilize to strengthen and adapt the program. VDOT will use the Fiscal Management Information System to track project data for each NEVI-supported station.

Strategies to Address Resilience, Evacuations, Seasonal Needs

It is essential that EV infrastructure is resilient to natural disasters and extreme weather events so it remains accessible and reliable for continued travel and aids in facilitating emergency evacuations. According to the U.S. Environmental Protection Agency, Virginia's climate is changing, with most of the state having warmed about one degree (F) in the last century, and sea level rising one to two inches every decade. Higher water levels are eroding beaches, submerging lowlands, exacerbating coastal flooding, and increasing the salinity of estuaries and aquifers. As such, EVSE may be vulnerable to different forms of flooding due to high tides and coastal flooding, and river and surface water flooding, among other natural threats and hazards. To increase EVSE resilience and minimize the disruption caused by extreme weather, consideration should be paid to the risks associated with locating EVSE in floodplains, as required by FHWA regulations at 23 CFR 650 Subpart A. Other siting considerations such as proper weatherization and proper height installation of EVSE should be made. For existing infrastructure located in such areas, the operators shall provide and clearly outline appropriate mitigation and recovery measures to address these risks.

VDOT is also considering further measures to support maximum uptime and availability of its charging networks so EV drivers have access to a reliable network, including:

- Mandating performance specifications that mitigate common reasons for charger downtime.

- Encouraging bidders to consider the feasibility of co-locating photovoltaic systems and battery energy storage systems with EVSE capable of operating in “islanded mode”, or when the grid is off-line.
- Evaluating the potential business cases for mobile charging stations.

Strategies to Promote Labor, Safety, Training, and Installation Standards

VDOT promotes strong labor, safety, training, and installation standards for all its programs and projects. VDOT is particularly focused on these issues across the EVSE industry, as effective strategies in each area can lower the cost of EV ownership. The Commonwealth will engage with small, disadvantaged, and minority EVSE business enterprises, and will require developers to contract a portion of the EVSE infrastructure to small, disadvantaged, and minority businesses. In its NPRM of June 9, 2022, the FHWA establishes minimum standards for EV charging infrastructure, including interoperability, traffic control devices or on-premises signage, data, and network connectivity. VDOT will enforce these requirements and standards and will implement them in the competitive funding opportunities. VDOT is also reviewing the Open Charge Point Protocol, which is an application protocol used to communicate between EV charging stations network and a network management system. VDOT is exploring collaboration with partner agencies and other stakeholders on the following strategies to promote labor, safety, training and installation standards.

- Working with community colleges to develop apprenticeship programs that offer students accreditation required to service EVSE in Virginia.
- Leveraging national and peer programs and connecting with related equipment installers including solar and battery storage.
- Seeking opportunities to offer accreditations that are recognized in neighboring states.
- Encouraging utilities to maintain a list of vendors qualified to service and repair EVSE.
- Requiring developers in NEVI competitive funding opportunities to submit EVSE workforce plans that would be evaluated based on areas such as training, workplace safety, and workforce engagement.

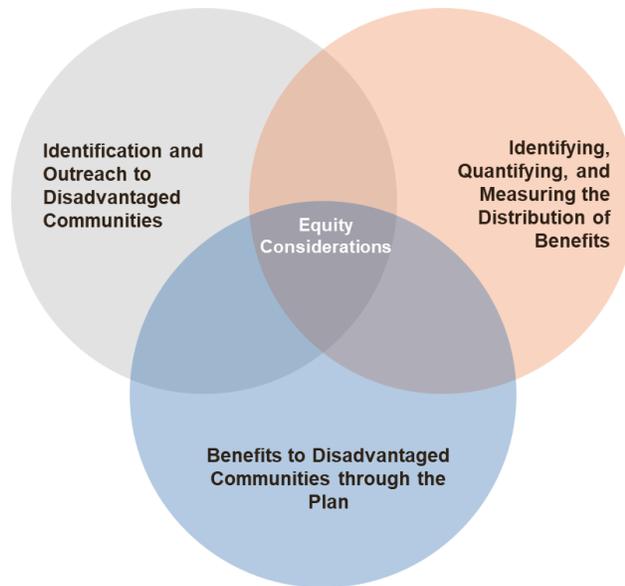
Civil Rights

VDOT is an existing direct recipient of Federal financial assistance and therefore can ensure compliance with state and federal civil rights laws by following existing program plans for Title VI of the Civil Rights Act of 1964 and accompanying Department of Transportation regulations, the ADA, and Section 504 of the Rehabilitation Act of 1973. Below is a list of some of the ADA compliant requirements applicable to EV charging stations:

- Accessibility
- Ease of use
- Disabled drivers’ safety
- Adequate spacing between vehicles and charging stations
- Open access to the charging stations
- Number of spaces

Equity Considerations

The recent introduction of Justice40 (J40) has challenged agencies across government to carefully consider how to equitably serve communities by broadening the focus from focusing strictly on what benefits are provided to also estimating where those benefits accrue. VDOT is committed to allocating NEVI program funds toward the construction of an economical and resilient network of EV charging stations in a manner that engages urban, rural, underserved or disadvantaged communities and fosters opportunities for minority and disadvantaged businesses to compete in the procurement process such that benefits accrue to these communities across multiple dynamics.



Increasing access to charging infrastructure should increase access to EVs, with direct and indirect benefits for disadvantaged communities. These include increasing access to transportation options and new economic opportunities, and decreasing the negative environmental impacts of local air pollution and the likelihood of negative health outcomes such as asthma, heart disease, and short term infections. Potential health and workforce benefits resulting from EVSE investments can facilitate local economic growth and decrease social inequities for rural, underserved, and disadvantaged communities. Specific benefit measurements include but are not limited to improved local air quality, increased job/economic growth, the higher incidence of local business formation, increased sales tax revenues in rural charging locations from new customer bases, and decreased transportation costs for EV drivers.

Identification and Outreach to Disadvantaged Communities

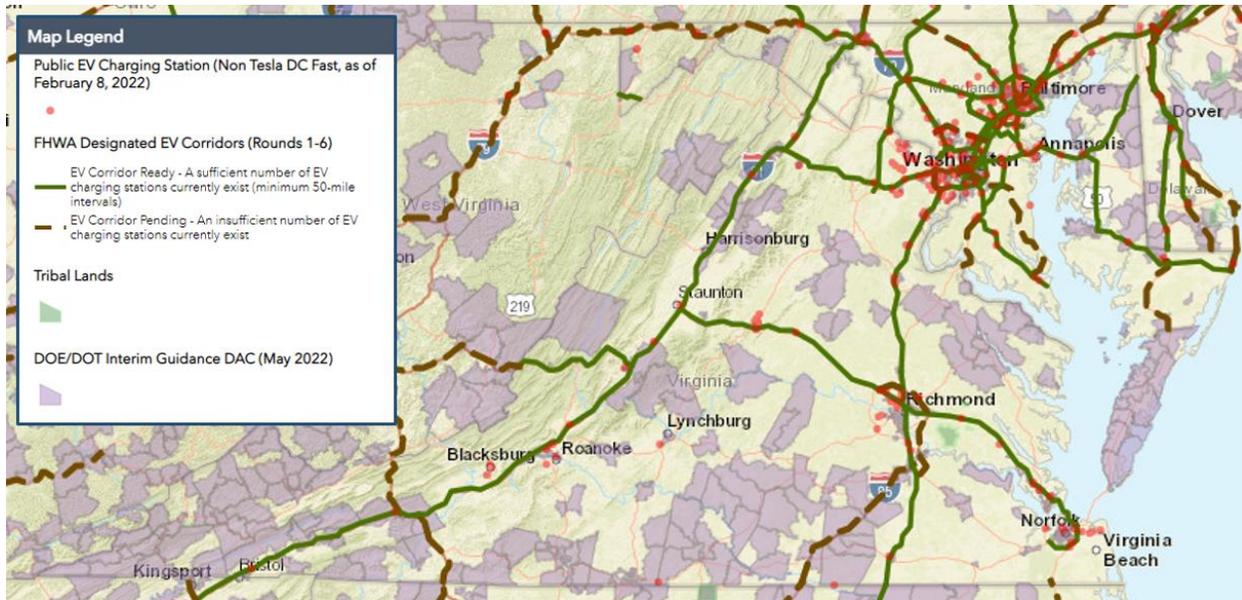
VDOT will partner with state agencies, stakeholder groups, and community organizations to identify disadvantaged communities and plan and implement meaningful public outreach. To support these efforts, VDOT will leverage ongoing collaborations, such as the inter-agency Community Outreach and Engagement Coordination Group and the connections of partner organizations such as VCC. VCC has partnered with VDOT’s Civil Rights Division, the Virginia Environmental Justice Working Group, EVNoire, and the VA Environmental Justice Collaborative in support of the Mid-Atlantic Electrification Partnership. This group has worked with urban, rural, and disadvantaged communities to identify equity partners. VCC hired electric mobility best practice and equity organization EVNoire to lead project outreach efforts focused on improving air quality in these communities. With funding from the Department of Energy Vehicle Technologies Office, VCC will conduct a consumer engagement survey to identify essential information and resources to support EV adoption. The lessons learned from this project will be incorporated into the NEVI program, informing outreach, implementation, and future plan revisions. Program information and funding opportunities will be widely disseminated to all communities of the Commonwealth through existing stakeholder networks and public engagement tools.

Identifying, Quantifying, and Measuring the Distribution of Benefits

VDOT will use the Electric Vehicle Charging Justice40 Map developed by the Department of

Energy’s Argonne National Laboratory to identify disadvantaged communities to measure and support the equitable distribution of benefits in line with the J40 goals (screenshot of map shown below).

Figure 9: EV Charging Justice40 Map



Many disadvantaged areas of Virginia lack charging and a well-designed network that could service both the local and traveling public. A number of AFCs run through or adjacent to disadvantaged communities, including I-64, I-77, I-81, and I-85. VDOT will explore the potential to locate charging stations in these communities and the potential benefits that could result. However, potential locations and benefits to urban, rural, and underserved or disadvantaged communities will be further clarified through dialogue with those communities, and may not include the direct placement of a DCFC EV charger. VDOT will solicit input on what a reasonable service area is for an EV charging station, a crucial issue in determining the equitable distribution of benefits. The accrual of benefits from a charging station are not restricted to the property lines of the charger itself, but the range of benefit accrual beyond those borders is currently unclear. A standardized, data-driven consensus as to the size and scope of the footprint a station is expected to serve will support the development of a procurement process aligned with the J40 goals by accurately planning for and measuring the accrual of EV charging station benefits to targeted communities. VDOT will update methods for identifying, quantifying, and measuring benefits of the NEVI program based on updated Office of Management and Budget (OMB) and FHWA guidance, as outlined in the Interim Implementation Guidance for the Justice40 Initiative.¹⁷

Benefits to Disadvantaged Communities through the Plan

VDOT will measure the distribution of benefits of charging infrastructure deployment in accordance with the 2021 OMB guidance on the J40 Initiative. As mentioned earlier, those benefits can be accrued directly as a result of investments and can include increased access to transportation options, decreased transportation cost burden and travel time, reduced community

¹⁷ <https://www.whitehouse.gov/wp-content/uploads/2021/07/M-21-28.pdf>

health costs from respiratory ailments related to local air pollution, and less noise pollution for local communities. Indirect benefits may include a higher incidence of business formation near charging sites which in turn, raise local property values and sales tax revenues while facilitating an expansion of jobs in industries supporting the development of this tech-driven industry. Local communities that are provided a voice in the decision-making process also ensure that the benefits accrued in rural, underserved, and disadvantaged communities reflect their priorities and the march of the economy while promoting stronger community cohesion and resilience.

One of Virginia’s primary concerns in the procurement process is the economic risk charging stations will face. NEVI formula funds are intended to build charging stations in anticipation of a mature EV consumer market. In economic terms, this means that supply will come before demand. The economic risks of this are low utilization of NEVI-funded charging stations overall, and even lower utilization of NEVI-funded charging stations in urban, rural, and underserved or disadvantaged communities due to historical wealth and income inequalities. Low charger utilization rates result in low charging station revenues. This risk is pronounced in urban, rural, and underserved or disadvantaged communities which could limit the private sector’s interest in these critical areas and could undermine the convenience and resilience of the overall charging network. To supplement the Electric Vehicle Charging Justice40 Map, VDOT anticipates the following equity variables will provide additional insights for future procurement strategies to identify areas where utilization may lag and present unsustainable revenue shortfalls that risk project viability. This information will also be informed by future engagement with disadvantaged community groups and other stakeholders, and will be further refined in annual updates to the Deployment Plan.

Table 5: Equity Variables Used In Analysis

TRANSPORTATION		ECONOMY	
Commute time		Unemployment rate	
No vehicle at household		Population receiving food stamps	
		Rental burden (30%+ of income)	
HEALTH		Poverty rate	
Uninsured rate		Income (per capita)	
Population of disabled and elderly		Renter population	
Veteran population		Average household size	
Disabled population		Housing stock worth <\$50,000	
No kitchen, no plumbing, no electricity		No high school diploma	
RESILIENCE		SOCIAL EQUITY	
FEMA National Risk Index		Elderly population	
		Population of kids that do not speak English	
ENVIRONMENT		Single parent households	
EPA Air Quality Index		Households with grandparents as primary caregivers	

Source: ACS

Following the methodology in many J40 estimation tools, the variables comprising each category would be mapped geospatially across the Commonwealth. An example is provided in the maps below where the poverty rates are mapped across Zip Code Tabulation Areas (ZCTA), followed by percentage of the population that is uninsured is followed by and the number of households without access to any car. Note that most J40 tools measure the distribution of disadvantaged communities by census tract. This map was created in coordination with analyzing EV registration data that is provided at the zip code level. Looking at the ZCTA helps to approximate the reach potential benefits might provide across an EV charging station’s reasonable service areas.

Figure 10: Poverty Rates (%) by ZCTA

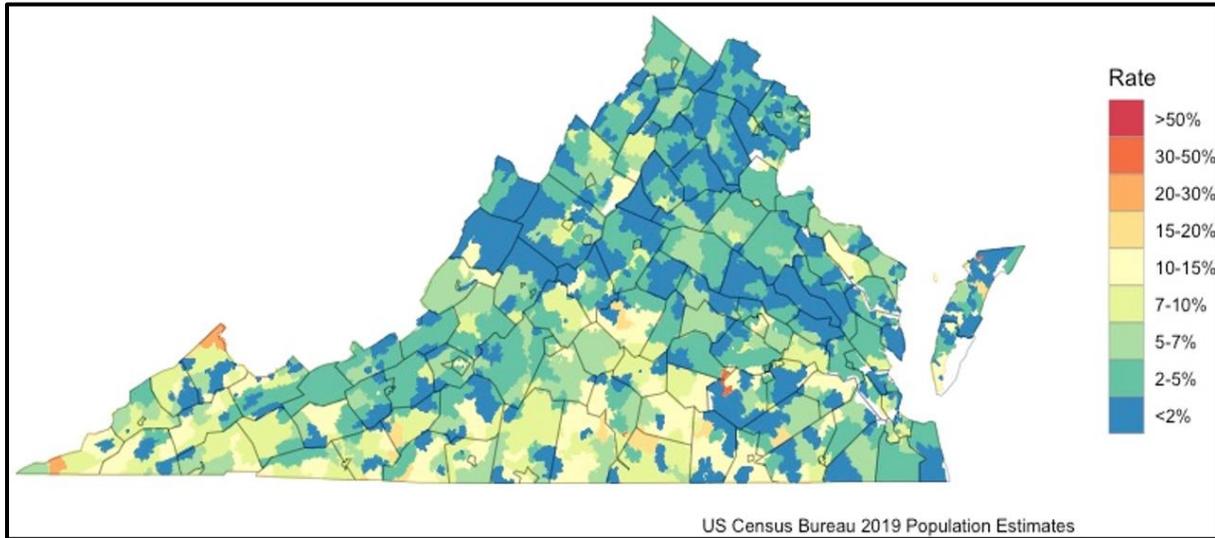
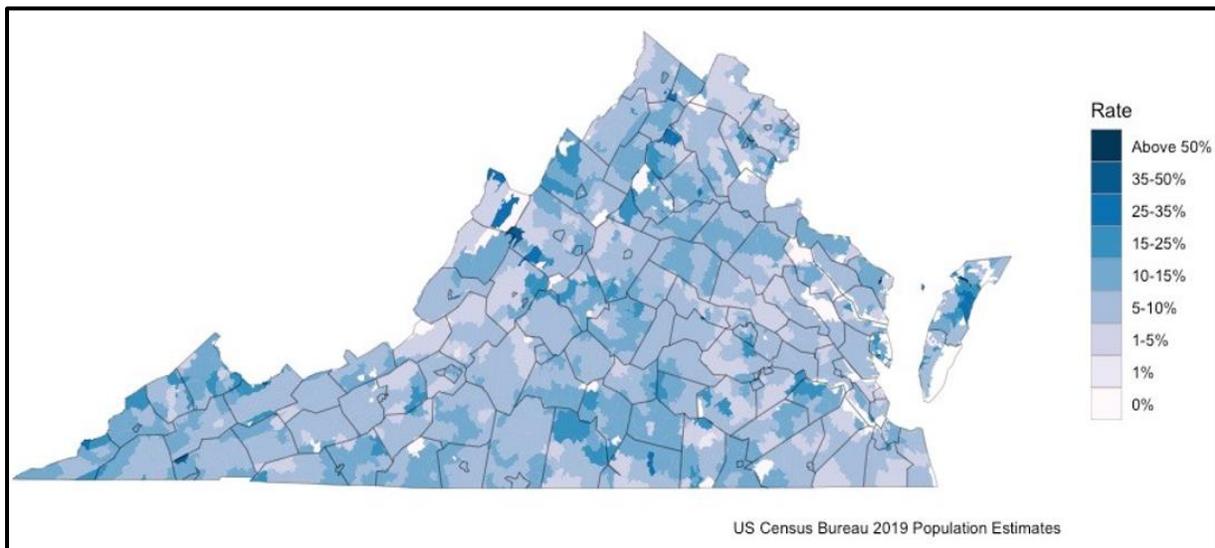


Figure 11: Uninsured Population (%) by ZCTA



Labor and Workforce Considerations

Installing, operating, and maintaining EV charging infrastructure will create new opportunities for workers in the electrical and other construction trades, while also creating work for the skilled incumbent workforce. VDOT will consider the training and experience level of the workforce that is installing and maintaining EV charging infrastructure, and collaborate with state agency partners and other labor and education stakeholders to support job creation and economic benefits for local communities, including disadvantaged groups. A 2020 analysis of clean vehicle jobs found that Virginia is in the top 10 states of clean energy employment overall (with Richmond a top metro area), with 5,245 clean vehicle jobs (electric vehicles, hydrogen, plug-ins, fuel cell, and natural gas).¹⁸ According to the Virginia Economic Development Partnership, “Virginia’s 179 automotive companies employ over 21,500 people in Virginia, and its top-ranked educational institutions offer world-class engineering programs that are training the workforce of the future to provide a pipeline of skilled workers to the automotive industry.”¹⁹ Many of the current workers in the EVSE sector have worked in similar roles with internal combustion engine vehicles. Specialized training and unique skillsets are crucial to continue to expand this workforce as EVs become more prevalent. High quality national certifications like the Electric Vehicle Infrastructure Training Program (EVITP) have been developed to support these efforts. VDOT will coordinate with the Virginia Board of Workforce Development to explore including EVSE-related roles in the list of high-demand Virginia occupations. VDOT will also identify opportunities for the Virginia Community College System to include EVSE certifications in the Fast Forward program, which meets growing workforce demand by providing trainings targeted to working adults.

Cybersecurity

As EV charging grows more technologically advanced and interconnected, exploitable cyber vulnerabilities are a greater threat to networked charging station operations. Physical or remote tampering with charging stations could cause disrupted operations at stations, unauthorized access to administrative systems, financial fraud (including billing manipulation and leakage of banking information), firmware manipulation and bot recruitment, and theft of charging data and records. VDOT will require developers to be proactive in protecting cybersecurity and will require a cybersecurity plan that details a cyberattack mitigation strategy as well as a plan for crisis management in the event that a cyber-incident does occur. Developers will be required to describe how charging stations will protect consumers against skimming and how financial and personally identifiable information will be collected and protected. Strategies may address intrusion and malware detection, event logging and reporting, identity and access management, and secure operational plans during communication outages. Funding recipients will be expected to periodically refresh their plans to reflect changing best practices and security measures available. Awardees will also be required to comply with all Commonwealth cybersecurity policies, including that all data must reside in the U.S. Awardees will be required to comply with both the Code of Virginia Breach of Personal Information requirements (<https://law.lis.virginia.gov/vacode/18.2-186.6/>) and NIST 800 series standards

¹⁸ <https://e2.org/wp-content/uploads/2020/04/E2-Clean-Jobs-America-2020.pdf>

¹⁹ <https://www.electrificationcoalition.org/wp-content/uploads/2021/07/Virginia-EV-Policy-Landscape-Dec-2020.pdf>

(<https://csrc.nist.gov/publications/sp800>) before, during, and after completion of NEVI station construction.

VDOT will explore the potential of implementing cybersecurity testing to ensure protection. This examination might include fuzz testing, penetration testing, code and binary analysis, and conduction of a vulnerability assessment. VDOT will comply with all further guidance regarding cybersecurity measures upon issuance by the Joint Office.

Program Evaluation

The Deployment Plan will be a living document, with VDOT continuing its outreach strategies through the 5-year NEVI program duration to further solicit stakeholder input, refine and adjust strategies, and evaluate whether Commonwealth and national goals are being achieved. The evolving EV industry necessitates regular reappraisal of program goals and outcomes to match the reality on the ground. This is particularly relevant because the business rationale for developing an EV charging station as a stand-alone commercial venture is uncertain due to the limited demand for EV chargers and the lack of visibility in the EV adoption rate going forward. VDOT will participate in ongoing engagement and outreach to regularly adjust the Deployment Plan to reflect recent performance, best practices, new or revised federal guidance, and developments in the industry to ensure that program objectives are being accomplished.

Virginia will annually evaluate the implementation of the Deployment Plan to assess the performance in achieving the Commonwealth's goals, including monitoring performance metrics such as EV charging infrastructure usage, EV charging infrastructure reliability, customer satisfaction, and equitable distribution and access to EV charging infrastructure. Such metrics will be reported to the Joint Office on an annual basis. This data-driven program evaluation will ensure accountability and program success, and will include an evaluation of the Commonwealth's efficient use of federal funding as measured by the amount of charging leveraged per federal dollar. Virginia will also monitor the progress of EV charger construction and operations through status meetings, reporting requirements, and invoices. The performance of contractors will be monitored and evaluated to inform future solicitations and ensure the efficient use of federal funds.

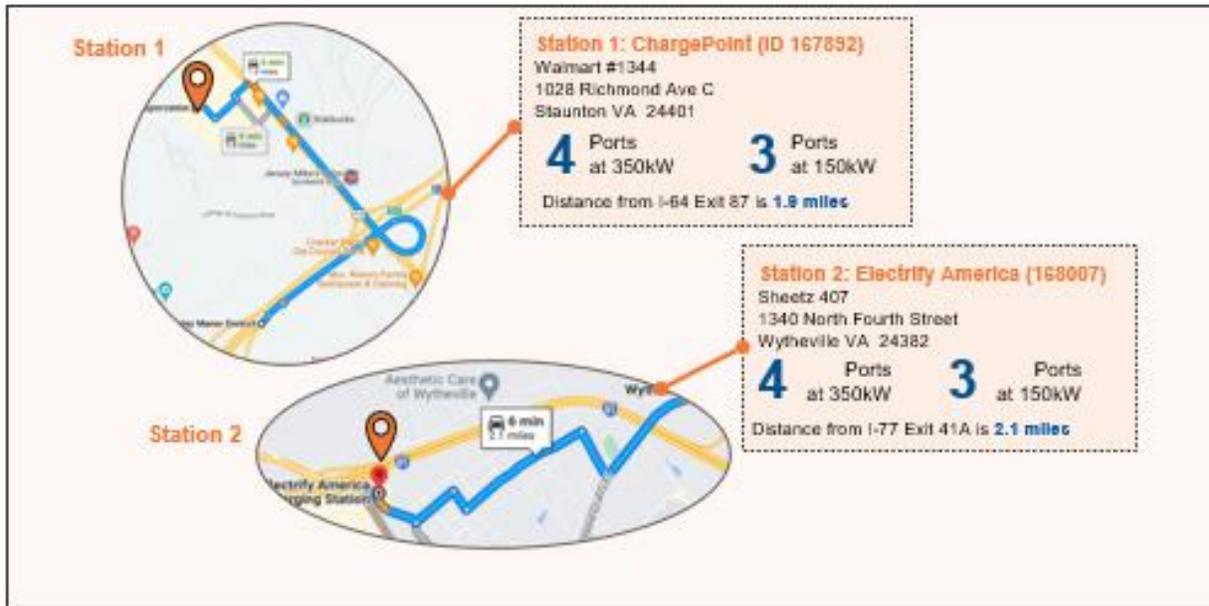
Discretionary Exceptions

VDOT has considered the NEVI guidance carefully and two overarching concerns compel VDOT to request exceptions for three stations and one cluster of stations along three of the AFCs within the Commonwealth. First, VDOT is concerned that some existing stations will face an unnecessary solvency risk due to their inability to meet NEVI interstate proximity requirements. In cases where existing stations are within a reasonable service area near the exit, building new stations will not serve new customers. Rather, they will simply choke demand off at a strategic point closer to the exit that the existing stations already serve. Second, VDOT is similarly concerned that solvency risks will be introduced in areas where clusters of existing stations are within one mile of an AFC exit, but do not individually meet the NEVI requirements of four ports with 150 kW capacity. However, when considered as a cluster of stations, they do meet the NEVI requirements.

The fundamental issue is that the NEVI funding supports the large-scale supply of EV charging stations in anticipation of the demand for charging stations by EV owners catching up. As current data shows that less than 1% of the Commonwealth's drivers have an EV registered in their name, this indicates that existing DCFC stations may already face inadequate charger utilization rates of less than 5%. VDOT is concerned that using NEVI funds to support the construction of new stations on a limited number of existing highway corridors that meet FBO criteria could potentially

introduce unfair competition with existing charging stations that already serve customers in the area but are just outside the 1-mile limit. Because these new charging stations are being built in anticipation of sufficient demand and not to meet existing demand, siting a new station closer to the exit could limit demand at strategic access points. The construction of new stations in these areas to meet NEVI guidance could be construed as unfair competition given the low levels current demand for charging stations.

Figure 12: Exceptions for Two Stations Based on Distance from Exits



This motivates VDOT to request exceptions for stations that currently do not meet the criterion of being within 1 mile of an exit. Station ID 167892 (Walmart 1344 in Staunton, VA) is operated by ChargePoint and provides drivers at exit 87 along I-64 with 4 ports at 350 kW capacity and 3 ports with 150 kW capacity, but is 1.9 miles from the exit. Station ID 168007 (Sheetz 407 in Wytheville, VA) is an Electrify America station providing 4 ports with 350 kW capacity and 3 ports with 150 kW capacity, but is 2.1 miles from Exit 41 serving I-77.