2021 BIENNIAL REPORT

Surface Transportation Performance in Virginia

Office of
INTERMODAL
Planning and Investment

The Honorable Ralph Northam

Members of the General Assembly

Members of the Commonwealth Transportation Board (CTB)

Dear Governor Northam, Members of the General Assembly, and Members of the CTB:

I am pleased to submit the Office of Intermodal Planning and Investment Biennial Report for 2021.

Section 33.2-232 of the ***Code of Virginia*** directs the Office of Intermodal Planning and Investment (OIPI), an Office of the Secretary of Transportation, to provide a Biennial Report that illustrates how the Commonwealth's transportation agencies remain transparent and accountable in the use of transportation funds.

To meet the requirements of the legislation, this report includes information on the current performance of our multimodal surface transportation system, targets for future performance and progress toward those targets, and examples of projects and programs that will advance a reliable, efficient, safe, equitable, and sustainable transportation system. The report also provides insight into the Six-Year Improvement Program, the results of SMART SCALE project evaluations, and the status of the Virginia Transportation Infrastructure Bank and the Toll Facilities Revolving Account.

Throughout this report, we acknowledge the significant impacts of the COVID-19 pandemic on transportation system performance and revenues and recognize the unique responses by Virginia's transportation agencies to keep travelers safe in these unprecedented times.

The Biennial Report is available on the CTB and OIPI websites, and as an official Report to the General Assembly on the Legislative Information System.

If you have any questions or comments, please do not hesitate to contact me.

Sincerely,

Shannon Valentine

TABLE OF CONTENTS

LIST OF EXHIBITS

REPORT SUMMARY 1

Purpose and Requirements

In 2018, the General Assembly updated reporting requirements of the Office of Intermodal Planning and Investment (OIPI) and the Virginia Department of Transportation (VDOT), establishing a biennial reporting process for each organization. These reports ensure transparency and accountability in the use of transportation funds. The Secretary of Transportation has provided this report in writing to the Governor, General Assembly, and Commonwealth Transportation Board (CTB).

The report fulfills the requirements within the Code of Virginia (Section 33.2-232[1]), including the following information:

Section 2

- The current performance of Virginia's surface transportation system, the targets for future performance (including those established by the CTB), and the progress toward such targets based on measures pursuant to the CTB's goals.

Section 3

- Information on the FY 2022 – 2027 Six-Year Improvement Program (SYIP).
- The results of the most recent project evaluations, pursuant to Section 33.2-214.1[2] (SMART SCALE).
- Status of the Virginia Transportation Infrastructure Bank and Toll Facilities Revolving Account, including balance, funding commitments, repayment schedules, and performance of the current loan portfolio.

Office of INTERMODAL Planning and Investment

Making the best use of Virginia's limited transportation dollars to ensure Virginia's transportation system will be Good for Business, Good for Communities, and Good to Go.

VTRANS | VIRGINIA'S TRANSPORTATION PLAN

Establish a sustainable, long-term vision for a safe and reliable multimodal surface transportation network

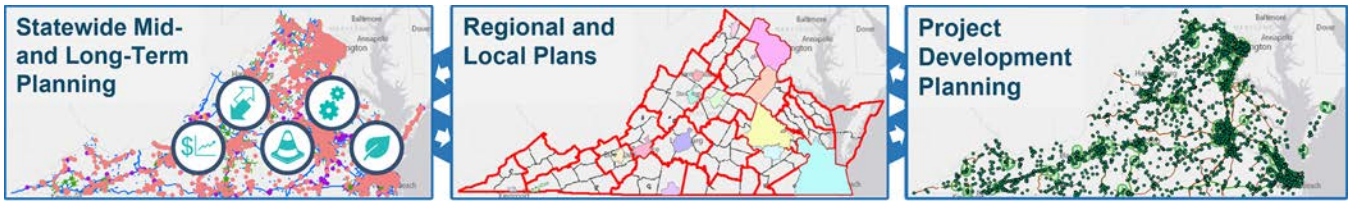
SMART SCALE | *Funding the Right Transportation Projects in Virginia*

Prioritize capacity, operations, and TDM investments to improve and strengthen the network

Monitor and evaluate performance of investments to ensure progress is being made and allow for course-corrections

OIPI Roles and Responsibilities

PLAN **Transportation plans focus on enhancing safety and mobility, increasing accessibility and connectivity, maintaining infrastructure in good condition, providing for economic development opportunities, and supporting healthy and sustainable communities.** They identify transportation needs that agencies work to address through infrastructure projects, operational improvements, and other strategic efforts, including technical assistance and grant programs. These plans help agency leadership and public bodies, such as the CTB, make informed investment decisions to achieve the vision and goals of the Transportation Secretariat. Statewide plans like VTrans; regional and local plans including those led by Virginia's 15 Metropolitan Planning Organizations; and project development planning led by VDOT, DRPT, and local partners collectively help create a pipeline of projects for future investment.



INVEST **VDOT and DRPT work with regional and local agencies to prioritize federal, state, regional, local, and private funds to invest in multimodal transportation improvements across the Commonwealth.** Since 2014, the CTB, through staff leadership at OIPI, has implemented transparent and data-driven project prioritization processes for surface transportation projects with state and/or federal funding. Transportation funding from federal and state sources is applied to surface transportation investments that improve mobility and accessibility through programs such as SMART SCALE, MERIT (DRPTs statewide public transportation grants program), the I-81 Corridor Improvement Program, and the Interstate Operations and Enhancement Program. OIPI works with VDOT and DRPT, MPOs, PDCs, counties, cities, towns, and transit agencies to scope, evaluate, score, and prioritize projects for funding.

MANAGE **It is the responsibility of OIPI in cooperation with VDOT and DRPT to develop measures and targets related to the performance of Virginia's surface transportation network for CTB approval.** To meet this responsibility, OIPI, VDOT, and DRPT have implemented a data-driven approach within transportation planning and investment, answering four fundamental questions: Where do we want to go? How are we going to get there? What will it take? How did we do? These four questions are connected. OIPI and its partners use the performance information presented in this report, among other reports developed by VDOT and DRPT, as well as existing performance dashboards and tools, to inform investment decisions. This report focuses on the "How Did We Do?" question, by presenting performance trends, interpretation of the reasons why performance has changed, and information on proactive strategies and solutions deployed by Virginia's transportation agencies and their partners to help push towards performance goals.

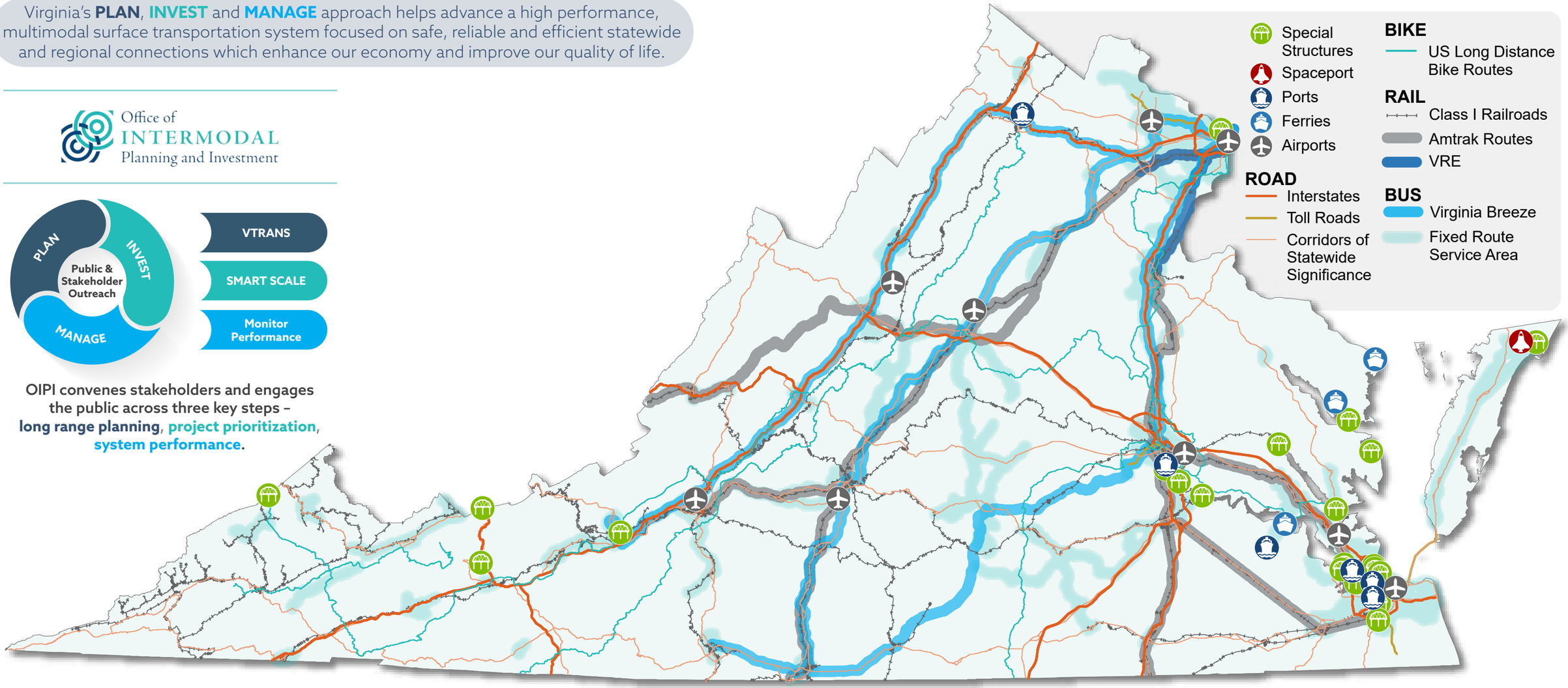
As highlighted through the next four pages, the **PLAN – INVEST – MANAGE** approach is applied to Virginia's robust multimodal transportation system through a diversity of planning and investment programs. These planning and investment programs ultimately help agencies manage a multimodal system that meets the mobility needs of all Virginians.

STATEWIDE | Plan, Invest, Manage

Virginia's **PLAN**, **INVEST** and **MANAGE** approach helps advance a high performance, multimodal surface transportation system focused on safe, reliable and efficient statewide and regional connections which enhance our economy and improve our quality of life.

Office of INTERMODAL Planning and Investment

OIPI convenes stakeholders and engages the public across three key steps – long range planning, project prioritization, system performance.



OWNERSHIP

VDOT operates the 3rd largest state-maintained highway system in the country behind Texas and North Carolina. The Agency must strategically utilize its limited resources to oversee an annual $7 billion budget.

LEADERSHIP

The Virginia Secretary of Transportation chairs the CTB to fund cost effective and beneficial multimodal projects that are assessed using quantitative tools through programs like SMART SCALE, DRPT's MERIT, Virginia's Highway Safety Improvement Program, the Interstate Operations and Enhancement Program, State of Good Repair, and Revenue Sharing, among others. These projects are funded in the six-year improvement program (SYIP).

RESPONSIVENESS

VDOT repurposed rest areas and welcome centers to distribute essential supplies during the 2020 COVID-19 pandemic. Additionally DRPT created a comprehensive COVID relief toolkit and handbook offering tailored strategies to limit vehicle capacity, heighten sanitation efforts and communicate why public transportation remains a safe and viable option.

INNOVATION

Virginia Space and the Mid-Atlantic Regional Spaceport place Virginia as one of only four states with a space port licensed to launch to orbit by the FAA and **one of only two that supports cargo delivery to the International Space Station (ISS).**

IMPACT

The Virginia Port Authority oversees inland and seaport container traffic which helps facilitate over $90 billion in annual spending in Virginia representing nearly 11 percent of Virginia's estimated output purchases.

Note: Values expressed are based on latest available data as of September 1, 2021.

PLAN | How Our Multimodal Transportation System Supports Our Vision

VISION: Virginia's transportation system will be Good for Business, Good for Communities, and Good to Go. Virginians will benefit from a transportation system that advances Virginia businesses, attracts a 21st century workforce, and promotes healthy communities where Virginians of all ages and abilities can thrive.

HIGHWAYS / TOLLS / EXPRESS LANES

VDOT maintains and operates a diverse network of highway infrastructure, roadside assets and traffic management systems, including approximately:

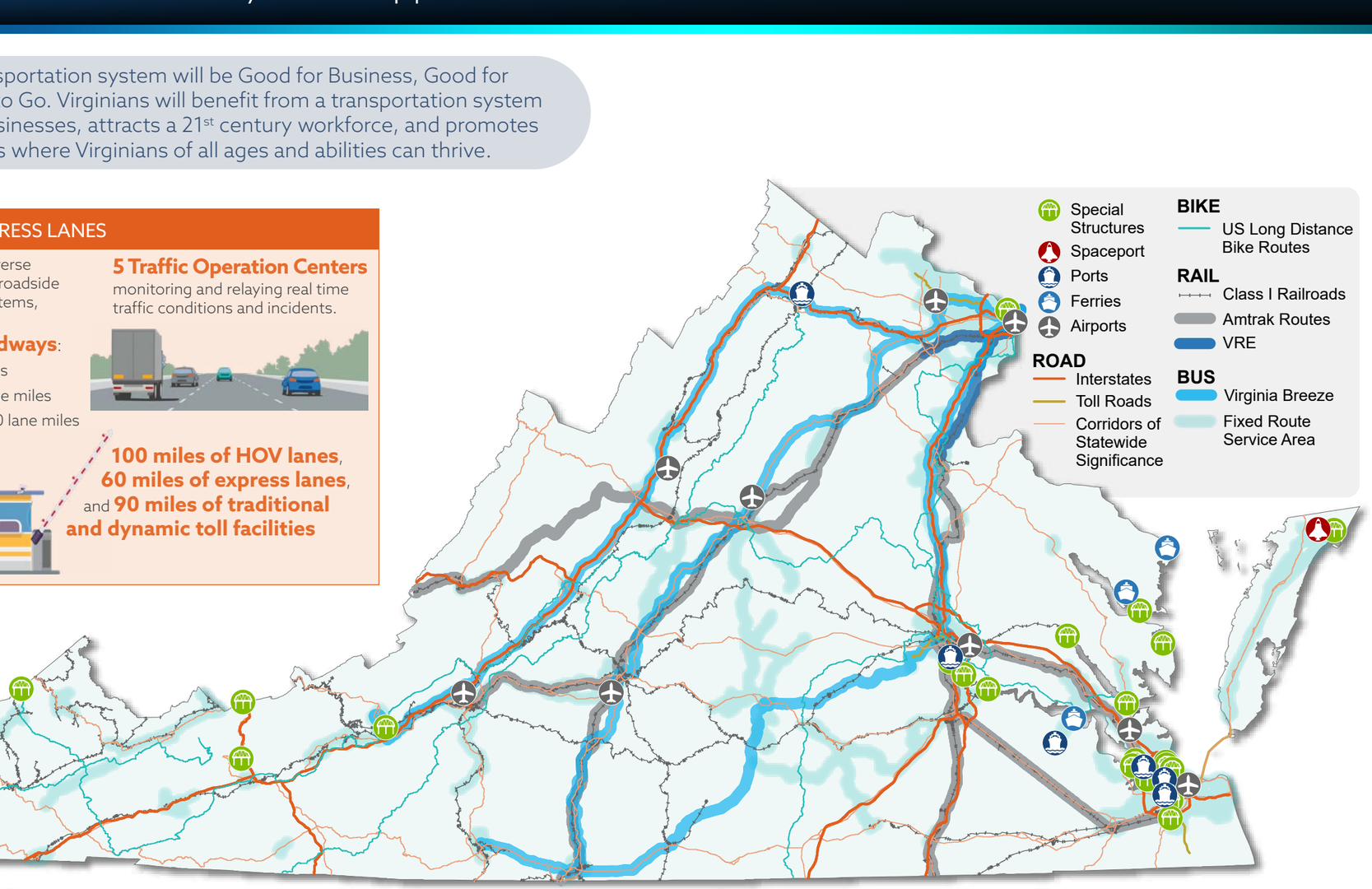
129,000 lane-miles of roadways:

- Interstates – over 5,000 lane miles
- Primary roads – nearly 23,000 lane miles
- Secondary roads – nearly 101,000 lane miles

5 Traffic Operation Centers monitoring and relaying real time traffic conditions and incidents.

41 rest areas, **12 welcome centers** and **over 100 commuter parking lots**.

100 miles of HOV lanes, **60 miles of express lanes**, and **90 miles of traditional and dynamic toll facilities**



BRIDGES & SPECIAL STRUCTURES

VDOT maintains safe passage over, under and through bodies of water, railroads and other transportation consisting of nearly **20,000 bridges** and **25 special structures**, including tunnels, movable bridges, and other complex structures.

SPACEPORT

Virginia Space owns and operates the Mid-Atlantic Regional Spaceport (MARS) located at Wallops Island

launching over 20 successful missions since 1995.

FERRY

VDOT operates **three of seven ferry systems**

including the Jamestown-Scotland Ferry and ferries in Lancaster and Northumberland Counties on the Northern Neck.

FREIGHT RAIL

Virginia's **3,400 mile rail freight system** is owned and operated by **Norfolk Southern**, **CSX** (Class 1 railroads) and **11 shortline railroads**.

PASSENGER RAIL / TRANSIT

DRPT works closely with public and private operators to facilitate rail, commuter service, and public transportation through:

25 daily Amtrak intercity passenger trains over 9 routes through

the Northeast Regional, Cardinal, and Silver/Palmetto services.

Over **40 transit systems**, including fixed route bus, rail and bus transit, demand response, human services and demand management.

These systems serviced nearly **130 million transit trips (FY 2020)** down from 200 million in FY 2019 due to the COVID-19 pandemic.

ACTIVE TRANSPORTATION

Virginia is home to over **2,000 bicycle lane miles** (on and off-road) supporting both commuting and outdoor recreation through nearly **900 miles** of dedicated bicycle facilities.

PORTS (AIR, SEA, INLAND)

Virginia's air transportation system provides a gateway to the nation and world through **66 public use airports** – 9 commercial service and 57 general aviation facilities.

Four cargo airports operate at Washington Dulles, Richmond, Norfolk, Roanoke.

Virginia's **six** port terminals

include four terminals in Hampton Roads, the Richmond Marine Terminal, and the Virginia Inland Port in Front Royal.

Note: Values expressed are based on latest available data as of September 1, 2021.

INVEST | How We Improve Performance and Prepare for the Future

Virginia's investment in transformative projects and the implementation of future plans will continue to strategically enhance systemwide multimodal and intermodal connectivity resulting in more travel options for residents, commuters and visitors and more efficient goods movement to global markets across and through air, sea, and inland freight transportation systems.

ACTIVE TRANSPORTATION

Signature Project:
Fall Line Trail

Ongoing project to connect seven localities in central Virginia to promote active transportation, recreation, and economic development in a 43 mile north-south spine.

Plan Studies:
Multi-Use Trails

General Assembly requirement to develop new Multi-Use Trail opportunities through development of a prioritization, master planning and funding needs assessment process.

Plan Studies:
Shenandoah Valley Rail Trail

DCR is working with VDOT and DRPT to evaluate the conversion of an inactive Norfolk-Southern railroad segment into a 48.5-mile multiuse recreational trail.

HIGHWAYS / BRIDGES / SPECIAL STRUCTURES

Signature Project:
I-64 Capacity, Safety Improvements – Segment 3

$244 million, 8.36 mile reconstruction project in York County to enhance mobility and safety on the Peninsula to/from Hampton Roads.

Signature Project:
Gwynn's Island Bridge

The bridge (one of Virginia's 25 special structures) opens to marine traffic more than any other state-maintained movable bridge. In 2021 and 2022 VDOT will improve the condition of the bridge's mechanical elements, improving traffic operation reliability.

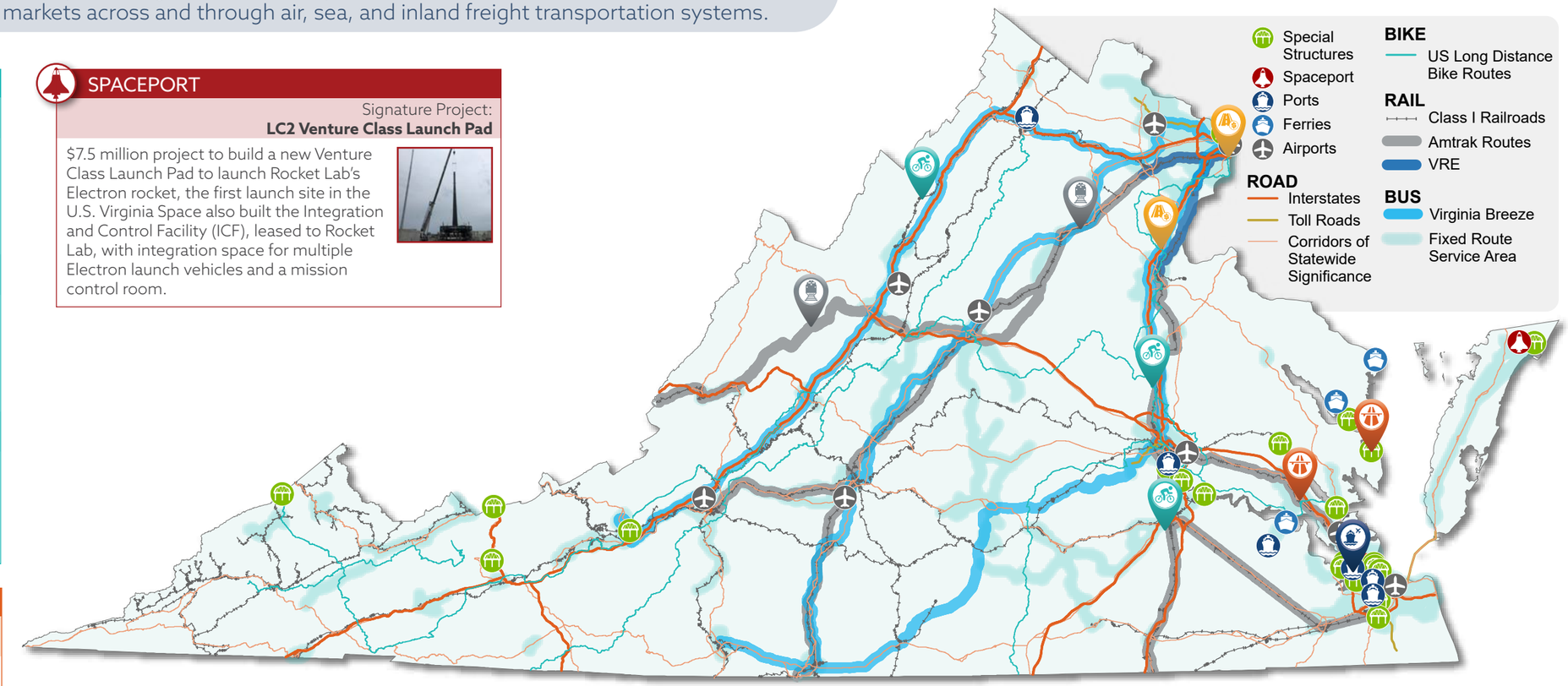
Plan Studies:
Systemic Safety Implementation Plan

Implements Strategic Highway Safety Plan (SHSP) infrastructure focus areas installing eight proven safety countermeasures across Virginia on road locations that meet the defined criteria.

SPACEPORT

Signature Project:
LC2 Venture Class Launch Pad

$7.5 million project to build a new Venture Class Launch Pad to launch Rocket Lab's Electron rocket, the first launch site in the U.S. Virginia Space also built the Integration and Control Facility (ICF), leased to Rocket Lab, with integration space for multiple Electron launch vehicles and a mission control room.



PASSENGER RAIL / FREIGHT RAIL / TRANSIT

Signature Project:
Transforming Rail in Virginia

Financed through a $3.7 billion agreement in 2021 with Amtrak, VRE, and CSX partnerships to double passenger rail service in the state and create a path to separate freight and passenger traffic service.

Plan Studies:
Transit Equity and Modernization Study

DRPT is working with various partners and the public to evaluate opportunities to expand and deliver equitable, accessible and modern transit services to more Virginians, especially those in underserved communities.

TOLLS / EXPRESS LANES

Signature Project:
Fredericksburg Express Lanes (Fred Ex)

As part of the Improve 95 initiative, a $527 million, 10 mile extension of the I-95 express lanes south to Route 17 (I-95 Exit 133) providing an uninterrupted 50-mile Express Lanes corridor from Fredericksburg to Washington D.C.

Plan Studies:
I-495 Express Lanes Northern Extension (495 NEXT)

Analysis and designs for a 3 mile extension from Dulles Toll Road and I-495 interchange to the George Washington Memorial Parkway includes a parallel shared use path and improvements expected to reduce congestion and improve safety through the corridor.

PORTS (AIR, SEA, INLAND)

Signature Project:
Norfolk Harbor Channel

$350 million project to deepen channel depth to 55 feet by 2024 giving Virginia the deepest port on the East Coast. The project will also allow safe, efficient two-way vessel movement for ultra-large container ships and their corresponding cargo loads.

Plan Studies:
South Norfolk Intermodal Terminal (NIT) Expansion

$400 million expansion to terminal's south-side container stack yard. Added two ship-to-shore cranes to handle Super Post Panamax ships and expedite container to truck moves.

Note: Values expressed are based on latest available data as of September 1, 2021.

MANAGE | How We Monitor Performance and Inform Decisions to Achieve Future Transportation Goals

Virginia uses a data-driven process supported by indicators, measures and trends to communicate progress towards established performance targets across its multimodal surface transportation system. This page interprets performance trends for a select set of measures across five goals areas to communicate performance change, resulting outcomes, current progress and changes on the horizon which will influence and alter future transportation performance. The Biennial Report presents Virginia's statewide performance measures, including performance through 2020 and fiscal year 2021.

Economic Competitiveness and Prosperity

Page: **5**

Performance Measures:
Presents highway congestion and reliability and passenger rail and transit on-time performance and reliability.

Pre-Pandemic Direction (2019):
Stable performance

Pandemic Direction (2020-2021):
Improving performance (less travel, especially commuting)

Specific Trend:
The amount and severity of congested and unreliable travel during peak periods on Virginia highways remained stable from 2016 through 2019. In 2020, congested and unreliable travel during peak periods declined by around 75 percent.

Accessible and Connected Places

Page: **14**

Performance Measures:
Presents accessibility to jobs, transit ridership and level of service, and passenger rail ridership.

Pre-Pandemic Direction (2019):
Improving performance

Pandemic Direction (2020-2021):
Declining performance (less travel demand and service)

Specific Trend:
Transit level of service and ridership steadily increased through 2019. Progress in FY 2020 was continuing, until the impact of the pandemic shifted travel patterns leading to ridership decreasing 66 percent and passenger rail ridership decreasing 87 percent in FY 2021.

Safety for All Users

Page: **24**

Performance Measures:
Presents fatalities, serious injuries, and injuries in crashes involving vehicles, bicycles and pedestrians, and transit vehicles.

Pre-Pandemic Direction (2019):
Stable performance

Pandemic Direction (2020-2021):
Mixed performance (depends on the measure)

Specific Trend:
Lower vehicle miles traveled during 2020 did not translate to lower fatal and serious injury vehicle crashes. In fact, there were more fatalities on Virginia roadways in 2020 then there were in 2019, leading to increasing crash rates.

Proactive System Management

Page: **31**

Performance Measures:
Presents condition of highway bridges and pavements, and state of good repair for transit vehicles and assets.

Direction (2019-2021):
Improving performance (no meaningful impact from the pandemic)

Specific Trend:
Bridge condition continues to improve, while pavement condition has remained steady, with some improvement on secondary roads and declines on Interstates. Most of Virginia's transit agencies continue to meet or exceed state of good repair targets.

Healthy Communities and Sustainable Transportation Communities

Page: **39**

Performance Measures:
Presents multiple dimensions of sustainability, including vehicle miles traveled per capita, emissions, mode share, and low-emission and zero emission vehicles.

Pre-Pandemic Direction (2019):
Improving performance

Pandemic Direction (2020-2021):
Improving performance

Specific Trend:
From 2016 through 2019, VMT per capita remained steady in Virginia, before decreasing by 14 percent in 2020. Over the past three years, total registered low-emission vehicles have increased from 1.7 percent in 2018 to 2.4 percent by 2020.

CURRENT PROGRESS

FY 2022 – 2027 SYIP

In June 2021, the CTB adopted the FY 2022-2027 SYIP - the first complete SYIP reflecting the 2020 Omnibus Package and $323 million in one-time funding from the 2021 Transportation Initiative.

The SYIP programs $24 billion for multimodal mobility improvements, system operations, and preservation, including $5.6 billion for rail and public transportation and $17.2 billion for the highway system.

LOOKING FORWARD

Proactive planning activities, partnerships, and pilots are preparing Virginia to understand and manage future performance impacts across its multimodal transportation network.

FUTURE PERFORMANCE

- Virginia DEQ is implementing **Drive Electric Virginia** to ensure 95% of Virginians are within 30 miles of an electric vehicle charger.
- The Port of Virginia has deployed six **all-electric ship-to-shore cranes** at VIG and NIT since 2019, with two more to be delivered in early 2022. These cranes will sustainably service ultra-large container vessels for decades to come.
- DRPT launched a **Statewide Integrated Mobility Initiative** to assess on-demand transportation technology enabled services which will compete with, complement and impact current transit operations.
- VDOT is partnering with DRPT and NVTA to implement one of the nation's first unified, predictive, transportation programs through the **Regional Multimodal Mobility Program (RM3P)**. A data-exchange platform and Artificial Intelligence (AI) will support dynamic responses to traffic events and alert users to on-demand multimodal options by 2023.
- The DOAV launched the **Virginia Flight Information Exchange program** as a platform to share unmanned aerial systems (UAS) information and address key safety and policy concerns across Virginia state and local agencies. The Exchange is the first state-sponsored Supplemental Data Service Provider (SDSP) in the FAA's UAS Traffic Management (UTM) ecosystem enabling low-altitude drone operations.

Note: Values expressed are based on latest available data as of September 1, 2021.

SURFACE TRANSPORTATION SYSTEM PERFORMANCE | 2

Overview

This section provides insight on performance of Virginia's surface transportation system, the targets for future performance, and the progress toward targets based on measures developed by OIPI, VDOT, and DRPT. Some of the measures featured in this section also address Federal performance management requirements. More detail on Federal surface transportation performance measures is available in Appendix A, the Federal System Performance Report.

It is the responsibility of OIPI in cooperation with VDOT and DRPT to develop measures and targets related to the performance of Virginia's surface transportation network for CTB approval. The CTB, OIPI, VDOT, and DRPT adopt additional measures to address the federal requirements as well as other measures consistent with their missions and key policies.

Goals and Objectives

Virginia's multimodal transportation network is the platform upon which the economy functions and our residents capitalize on the unique opportunities in Virginia for employment, education, health care, and recreation. Continued strategic investment in the system helps maintain and grow these opportunities, leverages existing assets, and creates a transportation system that readily adapts to new and emerging trends in how we travel. The VTrans Vision, reaffirmed by the CTB in January 2020, envisions a future in which:

Virginia's transportation system will be Good for Business, Good for Communities, and Good to Go. Virginians will benefit from a transportation system that advances Virginia businesses, attracts a 21st century workforce, and promotes healthy communities where Virginians of all ages and abilities can thrive.

The VTrans Goals support the VTrans Vision. They communicate the key values driving planning, policy, and investment decisions. Objectives help operationalize how transportation agencies will achieve each goal. Together, the goals and objectives form the basis for performance measures, which are numeric descriptions of a transportation system's performance or condition. Performance measures tell a story about whether the Commonwealth is making progress towards the VTrans Vision and Goals.

Performance Measures

For each performance measure, this report answers three fundamental questions:

» **What Are We Measuring?** How do we define the performance measure and where does the data come from?

» **How is Virginia Performing?** What does the performance trend tell us is happening, how is the performance trend moving relative to our target, and what are the internal and external factors impacting the performance trend?

» **How Are We Improving Performance?** What planning studies and investment programs are underway or will soon be implemented to help advance performance toward our goals?

GOALS	PERFORMANCE MEASURES
Economic Competitiveness and Prosperity	
Invest in a transportation system that supports a robust, diverse, and competitive economy	• Highway Congestion and Reliability • Passenger Rail On-Time Performance • Transit Vehicle Operational Reliability
Accessible and Connected Places	
Increase opportunities for people and businesses to efficiently access jobs, services, activity centers, and distribution hubs	• Accessibility to Activity Centers for Workers and Equity Emphasis Area Workers • Transit Ridership and Service • Transit Level of Service • Passenger Rail Ridership
Safety for All Users	
Provide a safe and secure transportation system for passengers and goods on all travel modes	• Roadway Fatalities and Fatality Rate • Roadway Serious Injuries and Serious Injury Rate • Non-Motorized Fatalities and Serious Injuries • Transit Related Fatalities and Injuries
Proactive System Management	
Maintain the transportation system in good condition and leverage technology to optimize performance of existing and new infrastructure	• Percentage of Good and Fair Bridges • Percentage of Sufficient Pavement • Transit Asset Management – Vehicle and Facilities Condition
Healthy Communities and Sustainable Transportation Communities	
Support a variety of community types promoting local economies and healthy lifestyles that provide travel options, while preserving agricultural, natural, historic, and cultural resources	• Vehicle Miles Traveled (VMT) and VMT per Capita • On-Road Criteria Pollutant Emissions • Greenhouse Gas Emissions • Non-Single Occupant Vehicle Commute Share • Low-Emission Passenger Vehicle Fleet Share • Low-Emission Public Transit Vehicle Fleet Share

Performance measures developed by OIPI, VDOT, and DRPT in coordination with the CTB.

Performance measures developed as part of MAP-21 and the FAST Act and implemented by FHWA and FTA.

Economic Competitiveness and Prosperity

Virginia's transportation network of roads, rail, transit, waterways, and airports contributes greatly to the economic vibrancy of the state. From worker mobility to e-commerce delivery, increased productivity translates to a demand for capacity across the entire intermodal system.

Percent Person Miles Traveled in Excessively Congested Conditions (PECC)

Travel Time Index (TTI)

What Are We Measuring?

A heavily used road system is a sign of a productive, booming economy. However, when vehicle travel reaches the point of severe congestion, it increases the cost of mobility for everyone and reduces the effectiveness of the transportation network. This reduces productivity for workers, freight carriers, and retail stores, among others, leading to losses that impact Virginia's residents and businesses.

Based on analysis conducted by VDOT through 2019, 70 percent of congestion on interstate highways in Virginia is considered "recurring congestion." Recurring congestion occurs when total vehicle travel approaching or exceeding the total capacity of the road. This can occur during the morning or late afternoon commutes but can also occur during peak travel times during the weekend.

This report uses two measures to describe the severity of recurring congestion at the statewide and regional scale. For both measures, a lower value is better. Performance results are segmented geographically into Statewide, Northern Virginia, and the Urban Crescent. For the purposes of this measures, the Urban Crescent includes applicable facilities within the Hampton Roads, Richmond, Fredericksburg, and Northern Virginia regions.

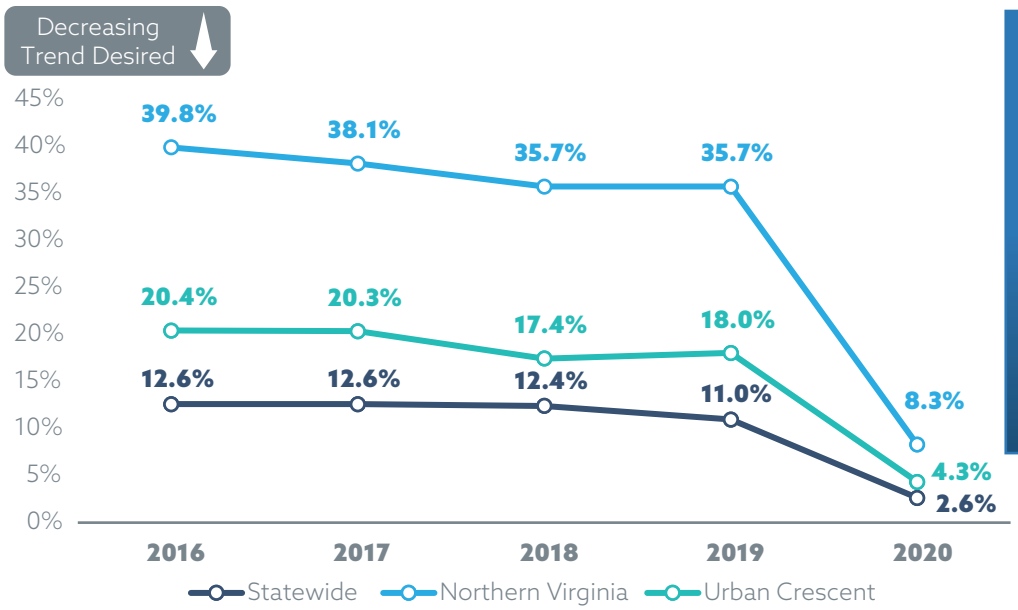
MEASURE	SOURCE
Percent of person miles traveled (PMT) in excessively congested conditions (limited access facilities during the peak hour)	The measure estimates the percent of person miles traveled during the peak hour at travel times that are 75 percent longer than free flow travel time. The measure is estimated based on vehicle speed data available through INRIX and traffic volumes from VDOTs Traffic Monitoring System.
Travel time index (representative set of primary arterial facilities during the peak hour)	The measure reports the ratio of average travel time during the peak hour to free flow travel time. The measure is estimated based on vehicle speed data available through INRIX on a representative set of primary arterial facilities, typically National Highway System and Virginia state routes.

Note: OIPI and VDOT track other recurring congestion measures for the purposes of statewide, regional, and corridor planning and project development activities. Information on FHWA required congestion and reliability measures are available in Appendix A.

How Is Virginia Performing?

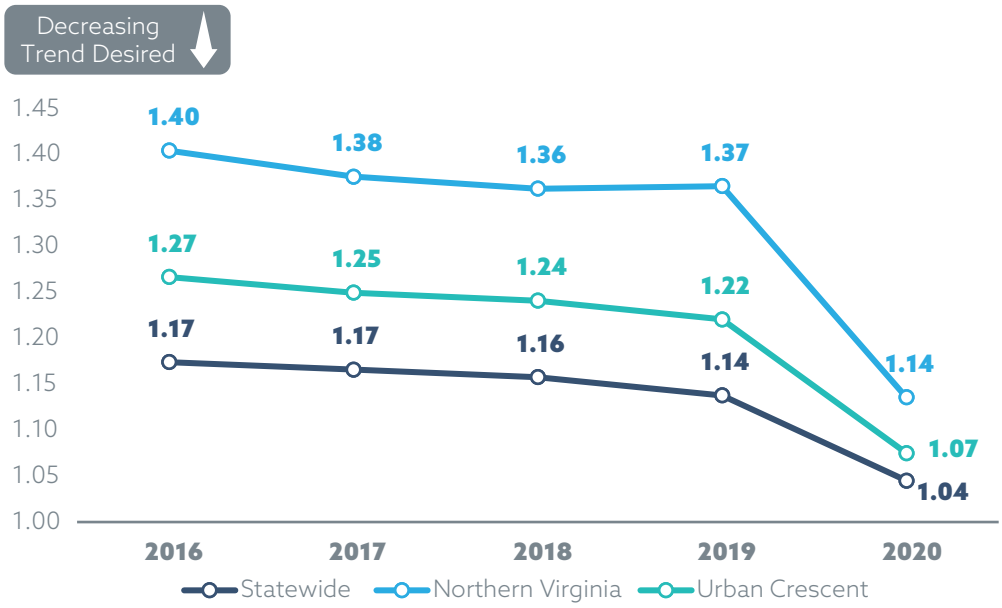
The reduction in commuting starting in March 2020, and lasting through most of 2020, led to decreases in traffic congestion across Virginia. The impact was most dramatic in metropolitan areas during peak travel periods on weekdays, as most businesses and government agencies continued in a work from home environment throughout 2020.

Percent of Person Miles Traveled in Excessively Congested Conditions (Limited Access)



Conditions are considered excessively congested when travel times are 75 percent longer during the peak hour than free flow travel times. For example, if a trip operating at free flow speed (travel at a speed without congestion or other adverse conditions) takes 20 minutes, an excessively congested trip would take 35 minutes.

Peak Hour Average Travel Time Index (Non-Limited Access)



For example, if a trip operating at free flow speed (travel at a speed without congestion or other adverse conditions) takes 20 minutes, and the peak hour average travel time is 30 minutes, the travel time index would be 1.50.

Between 2018 and 2019, peak period travel times stayed relatively consistent with some slight improvement. Due to the impacts of the pandemic on travel demand, peak period travel times decreased across Virginia on both limited access facilities and a representative sample of non-limited access roads in 2020.

- Only 2.6 percent of all person miles during weekday peak hours were traveled in excessively congested conditions statewide in 2020.
- On a representative sample of non-limited access primary arterials across Virginia, the travel time index decreased to 1.04 in 2020, meaning that the average peak hour trip took only four percent longer than a trip with no delay.

» Decreases in Northern Virginia were sharpest relative to the Urban Crescent and statewide averages. COVID-19 brought significant changes to the number of people teleworking, particularly in Northern Virginia, due to the impact on the Federal government workforce. The Metropolitan Washington Council of Governments (MWCOG) Voices of the Region Survey[3] conducted in fall 2020 showed that the percentage of people working from home at least part time went from 16 percent pre-pandemic to 60 percent during the pandemic.

How Are We Improving Performance?

Interstate Improvements. Based on action by the General Assembly and direction provided by the CTB in 2019, VDOT has identified over $2.8 billion over the life of the program (2038) for interstate improvements through the I-81 Corridor Improvement Program and Fund[4] and the Interstate Operations and Enhancement Program. Major corridor improvement programs and public private partnerships are underway in Interstate corridors including I-81, I-95, I-64, and I-66. In 2020, VDOT completed corridor studies for I-77, I-85, and I-295 which identified operational improvements that were funded in the 2022 – 2027 SYIP. From FY 2022 – 2027, total estimated revenue for the I-81 Corridor Improvement Program and Fund is approximately $819 million from the regional fuels tax, the Interstate Operations and Enhancement Program, and interest income. Both roadway improvements and transportation system management and operations (TSMO) strategies have been identified to improve performance on these corridors.

Arterial Management Plans. To help maintain mobility on the Commonwealth's arterial system, VDOT works cooperatively with localities to develop plans and procedures dedicated to preserving the existing transportation investments. Arterial Management Plans[5] use a holistic approach that identifies ways to ensure safety and preserve the capacity of the Commonwealth's arterial highway network without wide-scale roadway widenings. Arterial Management Plans are a key component of the Arterial Preservation Program—providing localities and VDOT a guide to future development and supporting transportation network infrastructure.

VDOT's STARS (Strategically Targeted Affordable Roadway Solutions)[6] Program coordinates with local planners and engineers to identify cost-effective solutions aimed at improving safety and reducing congestion. Projects developed through STARS studies have almost an 80 percent success rate for being funded through SMART SCALE or regional funding programs.

Person Miles Traveled in Reliable vs. Unreliable Conditions

What Are We Measuring?

Virginia tracks travel time reliability in order to understand the variability in travel conditions experienced by passenger and commercial vehicles. Travel time reliability is important to all transportation system users across all modes. Freight carriers require predictable travel times to remain competitive. Reliable travel times are correlated to improved safety and improved quality of life. Reliability can be impacted by incidents, weather, construction, and other events.

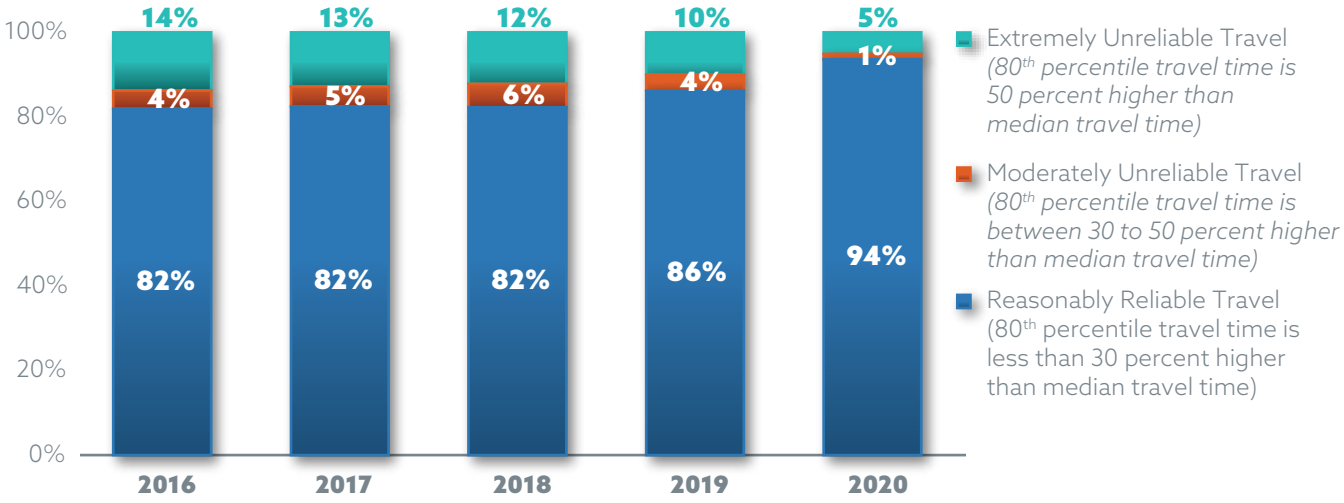
Roadway reliability is calculated using the Level of Travel Time Reliability (LOTTR), defined as the ratio of the 80th percentile travel time compared to the 50th percentile travel time. Conditions are considered unreliable when the LOTTR for an hour is above 1.5 (in other words, 20 percent of the time, the trip takes 50 percent longer than the average trip). For this measure, a greater percentage of PMT on segments with lower LOTTRs is better.

MEASURE	SOURCE
Weekday and Weekend Share of Person Miles Traveled (PMT) in Reliable vs. Unreliable Conditions (limited access roadways)	The measure is estimated based on vehicle speed data available through INRIX and traffic volumes from VDOTs Traffic Monitoring System. It estimates person miles traveled (PMT) at different levels of LOTTR, during the 14-hour period from 6AM to 8PM on both weekdays and weekends.

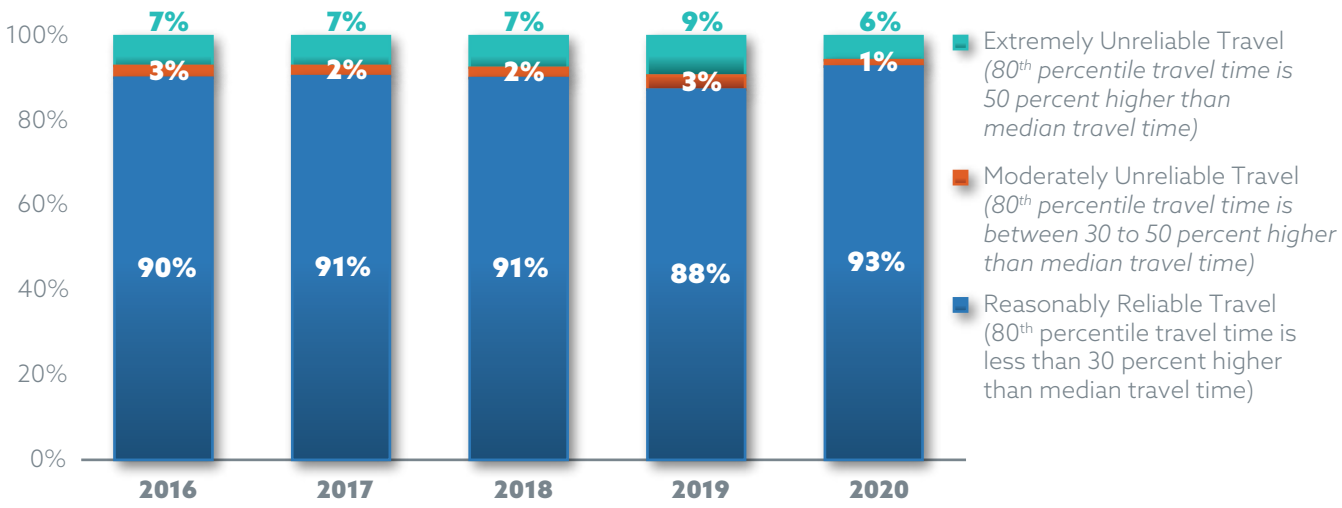
How Is Virginia Performing?

These charts show the share of unreliable PMT, PMT approaching unreliable conditions, and reliable PMT on an average weekday and weekend for limited access roadways at the statewide level.

Weekday Share of Peak Hour Person Miles Traveled (PMT) in Reliable vs. Unreliable Conditions on Limited Access Roadways (Statewide)



Weekend Share of Peak Hour Person Miles Traveled (PMT) in Reliable vs. Unreliable Conditions on Limited-Access Roadways (Statewide)



The share of weekday peak hour PMT experiencing extremely or moderately unreliable travel decreased from 18 percent in 2018 to 14 percent in 2019. Due to reduced travel during the pandemic, weekday travel reliability improved dramatically, with 94 percent of peak hour PMT experiencing reasonably reliable travel. The share of weekend peak hour PMT experiencing extremely or moderately unreliable travel increased from 9 percent in 2018 to 12 percent in 2019. This decreased to seven percent in 2020.

How Are We Improving Performance?

Regional Multimodal Mobility Program (RM3P). The RM3P incorporates Integrated Corridor Management (ICM), which focuses on using or integrating the capacity of all parallel arterial and interstate highways and modes of travel to manage congestion events. In 2020, VDOT was awarded a $4.3 million Federal Highway Administration (FHWA) grant to expand the program in the Fredericksburg District. More information on the RM3P initiative is available here.[7]

Incident Management. Core to VDOT's transportation system management and operations (TSMO) program is the everyday work of Traffic Operations Centers (TOCs) and the many operational strategies they deploy to minimize the impacts of non-recurring congestion. Safety Service Patrol Programs continue to expand across Virginia to help manage efficient incident management. The Interstate Operations and Enhancement Program funds many of these programs, including cameras, towing programs, and safety service patrols. VDOT's Operations Dashboard[8] tracks statewide and by Construction District the percentage of lane-impacting events cleared under 30 minutes and under 90 minutes. As of October 1, 2020, 46 percent of lane-impacting events were cleared in under 30 minutes, and 89 percent were cleared in under 90 minutes.

Rail On-Time Performance

On-time performance (OTP) is a measure of the percentage of time a passenger rail service arrives and departs within a designated window of time. The exact time frame for what is considered "on-time" varies depending on the service provider and the length of the trip. OTP can directly reflect system efficiency and reliability and can be an indicator of underlying issues such as congestion.

What Are We Measuring?

OTP is measured for two rail systems in Virginia: Amtrak and Virginia Railway Express (VRE).

Amtrak

Virginia financially supports six daily roundtrips on four Amtrak routes listed below (state-sponsored Amtrak Routes) connecting the Commonwealth to destinations along Amtrak's Northeast Corridor. Amtrak uses a mile-age-based tolerance to develop on-time percentages. In other words, a train must arrive at the station within the allowed number of minutes of its scheduled arrival time, which varies based on the number of total miles traveled.

- Route 46: Washington – Lynchburg – Roanoke
  1 daily roundtrip
- Route 47: Washington – Newport News
  2 daily roundtrips
- Route 50: Washington – Norfolk
  2 daily roundtrips
- Route 51: Washington – Richmond
  1 daily roundtrip

Virginia Railway Express

Virginia also provides financial support to VRE, which provides Monday-Friday commuter rail service from Northern Virginia suburbs to Alexandria, Crystal City, and downtown Washington, DC, along the I-66 and I-95 corridors. VRE's OTP standard is that trains arrive at their destination within five minutes of scheduled arrival, and no revenue train departs an intermediate station before scheduled departure.

- Manassas Line (Broad Run to Union Station)
- Fredericksburg Line (Spotsylvania to Union Station)

Passenger Rail on-Time Performance is measured from the following sources:

MEASURE	SOURCE
1. Amtrak On-Time Performance: 15-minute tolerance	State-sponsored routes are allowed a 15 minute tolerance and the OTP target for those routes is 82 percent as established by Amtrak as part of Service Line Plans (FY20-24). Virginia endpoint performance measures are provided by Amtrak.
2. VRE On-Time Performance: 5-minute tolerance	VRE sets an annual OTP target as part of its budget process. The current (FY22) OTP target is 90 percent. VRE routes are allowed a 5 minute tolerance and the OTP target for these routes is 90 percent.

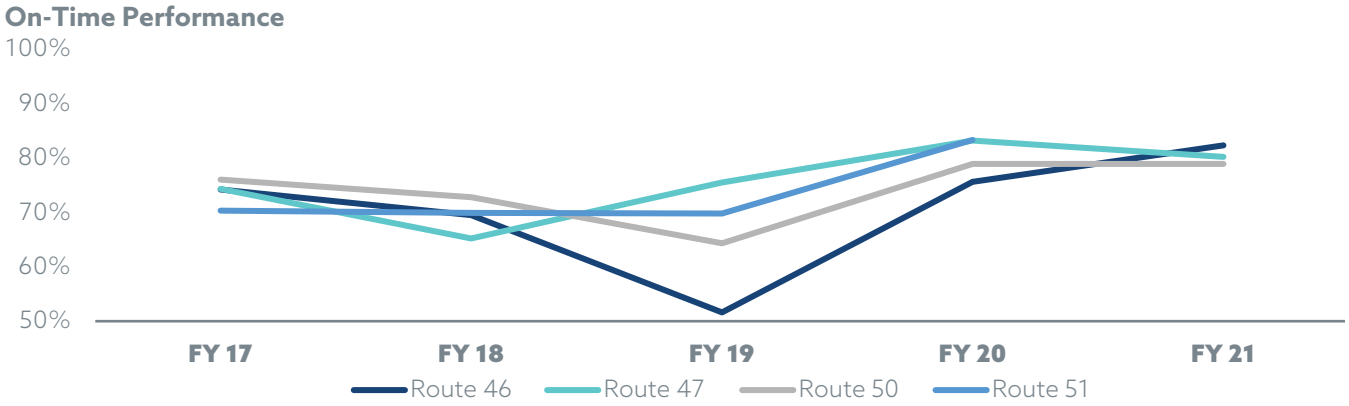
How Is Virginia Performing?

OTP for Amtrak and VRE trains changed significantly during the COVID-19 pandemic spanning the end of FY20 to FY21. In April 2020, Amtrak Virginia service was cut back from six to three daily roundtrips due to the decline in ridership and restrictions on travel. Newport News and Norfolk service was restored to two daily roundtrips respectively in September 2020 and Richmond route's one daily roundtrip was reinstated in September 2021. Similarly, VRE service was running on a reduced schedule between April 2020 to June 2021. As service was incrementally added back in FY21, OTP started to decline due to increased traffic on the rail network.

During normal operating conditions, small variations in OTP may be ascribed to singular events, or occasional, but ongoing, issues. Extreme heat, power outages, and severe weather often cause VRE's summer OTP declines. Summer is also when most track work is performed, which increases OTP issues on all rail services. Where capacity is an issue in Northern Virginia, Amtrak and VRE trains can interfere with one another's OTP if one train delay causes a cascade of events in the network.

Amtrak

Amtrak OTP, All Directions; FY17 – FY21

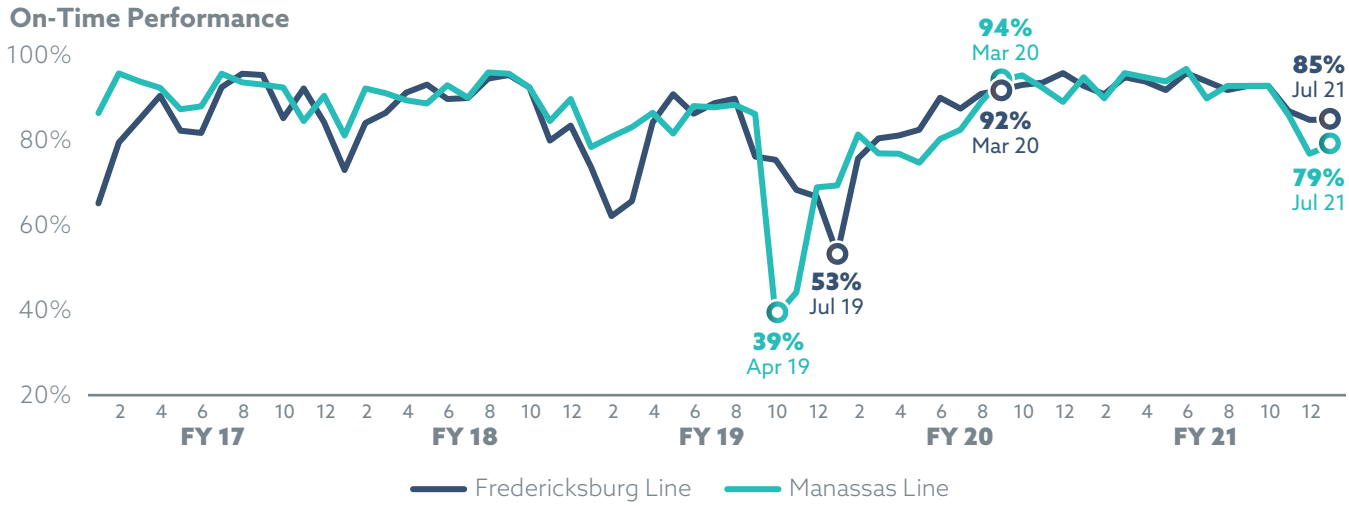


Note: Route 51 operation was suspended in response to the decline in ridership during the COVID-19 pandemic. Route 51 service was restored on September 27, 2021.

The Federal Rail Administration issued a final rule on OTP in November 2020, setting customer OTP as a primary measurement for intercity passenger rail. Customer OTP is defined as the percentage of all customers on an intercity passenger rail train who arrive at their detraining point no later than 15 minutes after their published scheduled arrival time, reported by train and by route. Amtrak will begin reporting on this customer OTP measure in November 2021. More information on FRA's final rule can be found here.[9]

Virginia Railway Express

Virginia Railway Express OTP; FY 2017 – FY 2021



From 2014 to 2020, OTP was typically between 80 to 90 percent on the Fredericksburg Line and typically between 85 to 95 percent on the Manassas Line. On-time performance sometimes drops lower than these ranges for multiple months due to maintenance activities. For example, the Manassas line dropped to 39 percent OTP in April 2019, while the Fredericksburg line dropped to 53 percent OTP in July 2019. Since the beginning of the COVID-19 pandemic in March 2020, OTP has been above 90 percent on both lines due to VRE running limited-service schedules.

How Are We Improving Performance?

The Commonwealth continues investing in rail network capacity and improvements in the following ways:

Transforming Rail in Virginia. Through agreements with CSX Transportation (CSXT), the Transforming Rail in Virginia[10] program allows Virginia to expand reliability and double service frequencies for Amtrak state-sponsored service and VRE service during the next decade. Virginia is acquiring 386 miles of CSXT right-of-way and 223 miles of track in rail corridors paralleling I-95, I-64, and I-85. Over the next 10 years, Virginia is building 36 miles of track and implementing a series of infrastructure improvements in the Richmond to Washington, DC, corridor, including a new, two-track Long Bridge for passenger trains. In addition to doubling Amtrak state-sponsored service and VRE Fredericksburg Line service, expansion of the VRE Manassas Line is under consideration; such expansion will be subject to an agreement with Norfolk Southern due to its ownership of a portion of the line's tracks. Eventual separation of freight and passenger rail will eliminate freight and passenger rail conflicts that can cause many of today's bottlenecks and delays.

Virginia Passenger Rail Authority (VPRA). VPRA[11] is a new, independent authority established by Chapter 1230 of the 2020 General Assembly that is dedicated to managing, funding, and growing statewide rail services. VPRA will partner with Amtrak to fund intercity passenger rail operations. With the authority to own and acquire rail infrastructure, VPRA is expected to be the entity that takes ownership of railroad infrastructure and manages improvement projects as defined in the Transforming Rail in Virginia program. While VPRA is being mobilized, DRPT is providing services to VPRA.

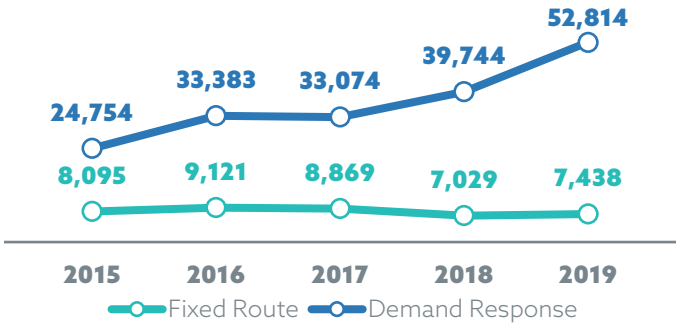
Mean Distance Between Major Mechanical Failures by Transit Mode

What Are We Measuring?

MEASURE (APPLIES TO FIXED-ROUTE AND DEMAND-RESPONSIVE MODES)	SOURCE
Mean distance between major failures for both fixed-route and demand-responsive modes	Data on major transit failures is maintained as part of the National Transit Database and updated annually. The Mean Distance Between Failure metric corresponds to the required targets in the Public Transportation Agency Safety Plan.

How Is Virginia Performing?

The mean distance between failure (MDBF) measure illustrates the reliability of transit fleets. Achieving a high MDBF is a positive sign, as a high MDBF indicates less service disruptions. MDBF has improved dramatically for the state's demand-response transit operators, more than doubling between 2015 and 2019. MDBF for Virginia's fixed-route fleet has remained relatively steady, with a slight decrease in performance between 2015 and 2019. It is common for MDBF to be higher for demand response fleets as their smaller vehicles require less maintenance than larger, more complicated fixed-route vehicles.



How Are We Improving Performance?

The Public Transportation Agency Safety Plan (PTASP)[12] requires that each agency set a "System Reliability" target using Mean Distance Between Failure for each mode in operation for each year, which will then be reviewed and updated on an annual basis along with other transit safety targets required by the PTASP. Consistent tracking and review of the transit reliability metric will allow Virginia's transit agencies to closely monitor fleet performance and plan long-term changes to improve reliability.

In addition, the MERIT – Capital Assistance program, introduced in FY 2020, prioritizes the allocation of state capital funding to State of Good Repair needs before system enhancements or expansions. In doing so, transit agencies throughout the state have been replacing their aging fleet vehicles, infrastructure, and facility amenities to further improve system safety and performance.

Accessible and Connected Places

Virginia is committed to increasing the opportunities for people to access jobs and businesses to access workers and for everyone to access services, activity centers, and distribution hubs. Accessibility considers a person's travel experience at both the home end and the destination end of every trip for all available travel modes.

Equitable access to destinations is a primary consideration within this goal. Transportation can provide access to new opportunities for disadvantaged populations; accordingly, a primary goal of Commonwealth transportation agencies is ensuring that transportation decisions account for the needs of all transportation system users, especially those facing other economic and social challenges.

Accessibility to Activity Centers for Workers

What Are We Measuring?

The commitment to increasing access to jobs across Virginia requires an understanding of where people live and the opportunities for commuting to available jobs. The location of workers and jobs is important to this understanding, as are the available travel modes and the travel time between where workers live and where they work. This information allows transportation agencies to assess how well Virginians can access jobs and inform how agencies tailor investment strategies to eliminate barriers and create new access to opportunities.

The number of workers who can access jobs in VTrans Activity Centers within a 45-minute drive or within a 45-minute transit trip are measured from a tool developed by VDOT and DRPT. This same tool is utilized to measure the accessibility impacts of proposed projects within SMART SCALE, Virginia's project prioritization process. OIPI and VDOT are working on compiling and reviewing statewide accessibility information into a meaningful measure that can show change resulting from transportation investments. This report provides accessibility information consistent with pre-pandemic accessibility during 2019.

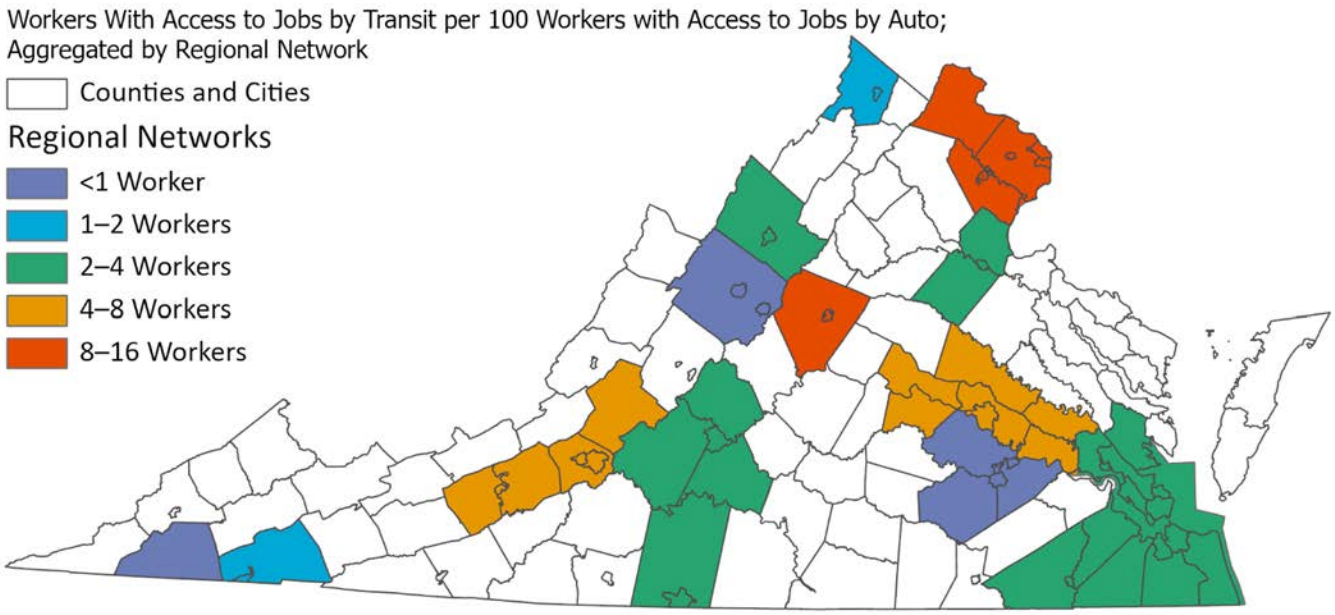
How Is Virginia Performing?

For auto access – Activity Centers where the highest number of workers can access jobs within a 45-minute auto trip are located in areas of the Commonwealth with high numbers of adjacent jobs and households, like the Northern Virginia, Hampton Roads, and Richmond regions. For example, over 200,000 workers in Northern Virginia can typically access activity centers like Tysons, Rosslyn, and Crystal City within a 45 minute drive.

For transit access – Activity Centers where the highest number of workers can access jobs within a 45-minute transit trip are concentrated in Northern Virginia (primarily around Metrorail stations – some of which also have VRE or Amtrak access), Hampton Roads, and Richmond. This is partly due to the fact that transit access to jobs is highly dependent on first and last-mile connections. In these areas, transit stops and stations are adjacent to job centers and networks for last mile connections, including sidewalks, bicycle accommodations, and convenient microtransit (like bike share) options. For example, over 40,000 workers in Northern Virginia can typically access activity centers like Tysons, Rosslyn, and Crystal City within a 45 minute transit trip.

Comparing transit to auto access across Regional Networks – This measure compares the prior two measures to view the ratio of workers able to access jobs by transit compared to by driving within 45 minutes. A high ratio under this measure would be an activity center that can be accessed within 45 minutes by 10 workers via transit for every 100 workers via auto. Scores for each Activity Center are subsequently aggregated across Regional Networks. The Regional Networks doing best on this measure include Charlottesville, where a robust bus network provides access to downtown jobs, and Northern Virginia, where Activity Centers are close to WMATA Metrorail stations (e.g., Rosslyn, Tysons, and Crystal City).

VTrans Activity Center Access to Auto Access Ratio; 2019



Comparing transit to auto access for Activity Centers in Equity Emphasis Areas – Also based on the measure of workers who can access jobs in VTrans Activity Centers within a 45-minute drive or within a 45-minute transit trip, the ratio of transit access to auto access for Activity Center jobs in Equity Emphasis Areas measures opportunity for workers in and around these areas.

Equity emphasis areas represent areas within each regional network that have significantly higher-than-average concentrations of people who are low-income, people with disabilities, minority populations, populations with Limited English Proficiency (LEP), or populations age 75 or higher. There are 103 Activity Centers within Census block groups designated as Equity Emphasis Areas; of these, 12 meet a threshold of high transit access (activity centers that can be accessed by at least 10 workers via transit for every 100 workers via auto).

How Are We Improving Performance?

Virginia's statewide transportation plan, VTrans, has compiled a diversity of transit accessibility and safety needs which are eligible for state funding programs. Additionally, VTrans is developing strategic actions to improve accessibility for all Virginians and, more specifically, for those that may need it the most.

Multimodal projects incrementally have received more funding through SMART SCALE through each round – increasing from two percent in Round 1 to 28 percent of total funding in Round 4; additionally, 39 percent of highway projects submitted for consideration included at least one multimodal element.

Annual Transit Ridership and Service Characteristics

Promoting opportunities for Virginians requires analyzing and working to improve access to transit throughout the Commonwealth, not just in and around Activity Centers. Understanding when transit operates, who has access to service, and what jobs lie within reach of that service are all critical to ensuring equity of opportunity throughout Virginia.

What Are We Measuring?

All public transit agencies in the Commonwealth are required to report monthly ridership, hours, and miles to DRPT, which is then aggregated on an annual basis. DRPT calculates passenger miles based on transit ridership information.

Those grouped measures provide insights into how many Virginians are utilizing transit service, how far they're traveling, and the efficiency of transit service. Presenting these measures together facilitates understanding of transit travel patterns and DRPT and transit operator decisions to optimize existing service and plan new service to meet travel needs.

- Ridership, in the form of unlinked passenger trips (UPT) or total transit boardings, offers a snapshot of accessibility outcomes, especially the usefulness of transit services to Virginia residents.
- Vehicle revenue miles (VRM) measure the mileage of transit vehicles while in passenger service and can indicate the amount of transit service provided.
- Vehicle revenue hours (VRH) measure how much time transit vehicles spend in passenger service, serving as an alternate indicator of transit service provided.
- Transit level of service measures are based on an analysis using general transit feed specification (GTFS) data from each transit agency operating fixed-route service in Virginia. This enables measurement of how many hours transit operates as well as how well it connects residents to critical goods and services and jobs to workers.

How Is Virginia Performing?

Virginia's transit agencies reported 60,390,357 transit boardings (UPT) in FY 2019. This represents a 0.6 percent increase relative to FY 2018. In FY 2020, as a result of the COVID-19 pandemic, which began affecting transit ridership in March 2020, total ridership decreased 19.1 percent to 48,838,450 boardings. In FY 2021, boardings remained 39 percent below FY 2019 boardings, totaling 36,838,118 boardings. While total annual ridership is still well below pre-pandemic levels, from February through June 2021, ridership has increased 35 percent.

Ridership by Mode; 2017-2020

	FY 17	FY 18	FY 19	FY 20	FY 21
Virginia Transit Agency Ridership					
Light Rail	1,319,791	1,417,350	1,416,912	1,044,002	545,259
Bus	60,616,801	57,065,639	57,485,493	46,564,511	35,227,693
Paratransit	1,224,696	1,212,456	1,186,631	1,021,599	913,348
Ferry	295,983	327,661	301,321	208,338	151,818
SUBTOTAL	**63,457,271**	**60,023,106**	**60,390,357**	**48,838,450**	**36,838,118**
WMATA Ridership in Virginia					
Heavy Rail	89,497,280	91,116,098	90,305,329	66,347,907	13,677,941
Bus	19,154,426	17,293,559	16,474,263	12,588,125	6,920,441
Paratransit	333,226	339,196	349,066	257,294	132,102
SUBTOTAL	**108,984,932**	**108,748,853**	**107,128,658**	**79,193,326**	**20,730,484**
TOTAL	**172,442,203**	**168,771,959**	**167,519,015**	**128,031,776**	**57,568,602**

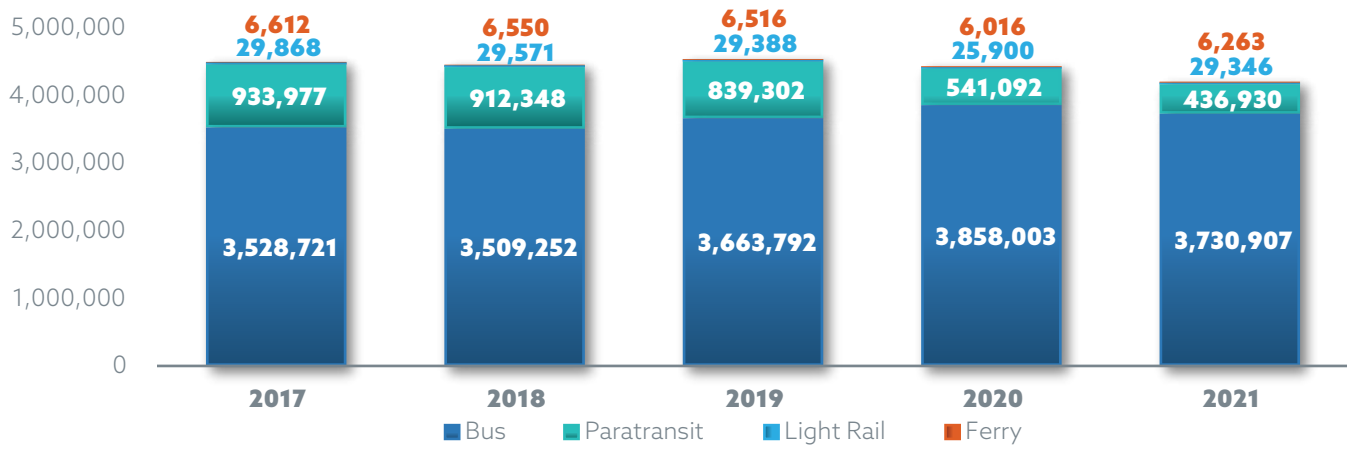
In addition to the ridership reported by Virginia transit agencies, WMATA served over 107 million boardings in FY 2019. In FY 2020, this decreased to just under 80 million boardings as a result of COVID-19 impacts in March through June 2020. In FY 2021, total WMATA ridership in Virginia was just over 20 million, 81 percent below FY 2019 total boardings.

Coupling ridership with vehicle revenue miles and vehicle revenue hours explores the efficiency of each transit mode (how many passengers are carried per revenue mile and vehicle revenue hour). The table below compares the results by transit mode for FY 2021; the figures that follow depict historical performance for vehicle revenue hours and riders per vehicle revenue hour.

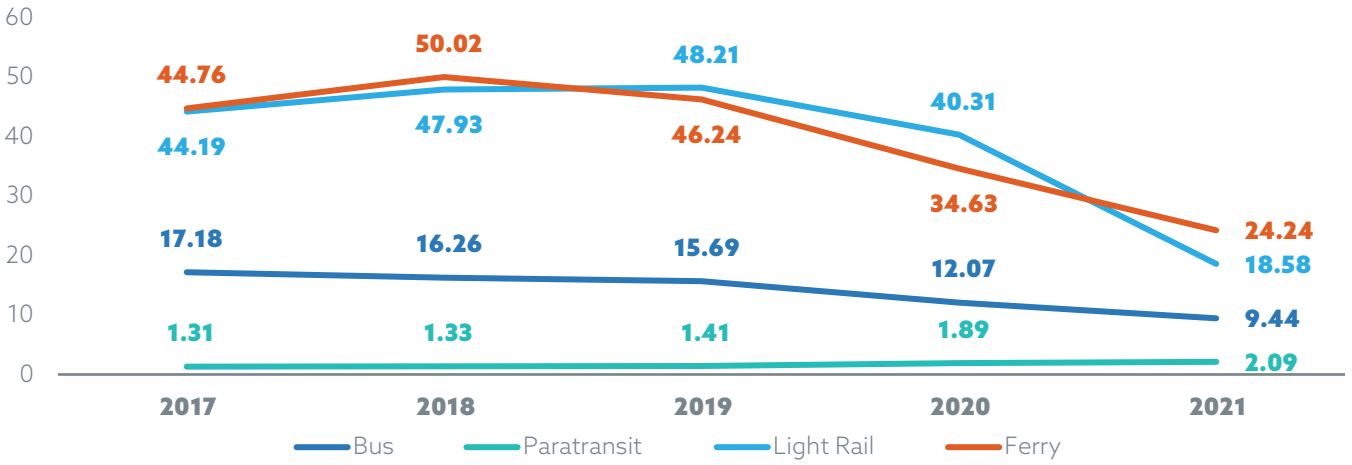
Ridership, Vehicle Revenue Miles, and Vehicle Revenue Hours (excl. WMATA)

FY2021	RIDERSHIP	VEHICLE REVENUE MILES	VEHICLE REVENUE HOURS	RIDERS PER VEHICLE REVENUE MILE	RIDERS PER VEHICLE REVENUE HOUR
Light Rail	545,259	381,494	29,346	1.4	18.6
Bus	35,227,693	49,778,974	3,730,907	0.7	9.4
Paratransit	913,348	7,190,036	436,930	0.1	2.1
Ferry	151,818	17,827	6,263	8.5	24.2
TOTAL	**36,838,118**	**57,368,331**	**4,203,446**	**0.6**	**8.8**

Vehicle Revenue Hours by Mode (excl. WMATA)



Riders per Vehicle Revenue Hour by Mode (excl. WMATA)



Virginia's robust transit networks ensure residents of the Commonwealth have access to jobs, schools, and the goods and services they need. Transit level-of service analysis considers the number of residents, workers, and jobs within a half-mile of transit and the actual transit service they experience. Across the Commonwealth, it is estimated that slightly less than half of all residents have access to transit, half of all workers have access to transit, and over 70 percent of all jobs are accessible by transit.

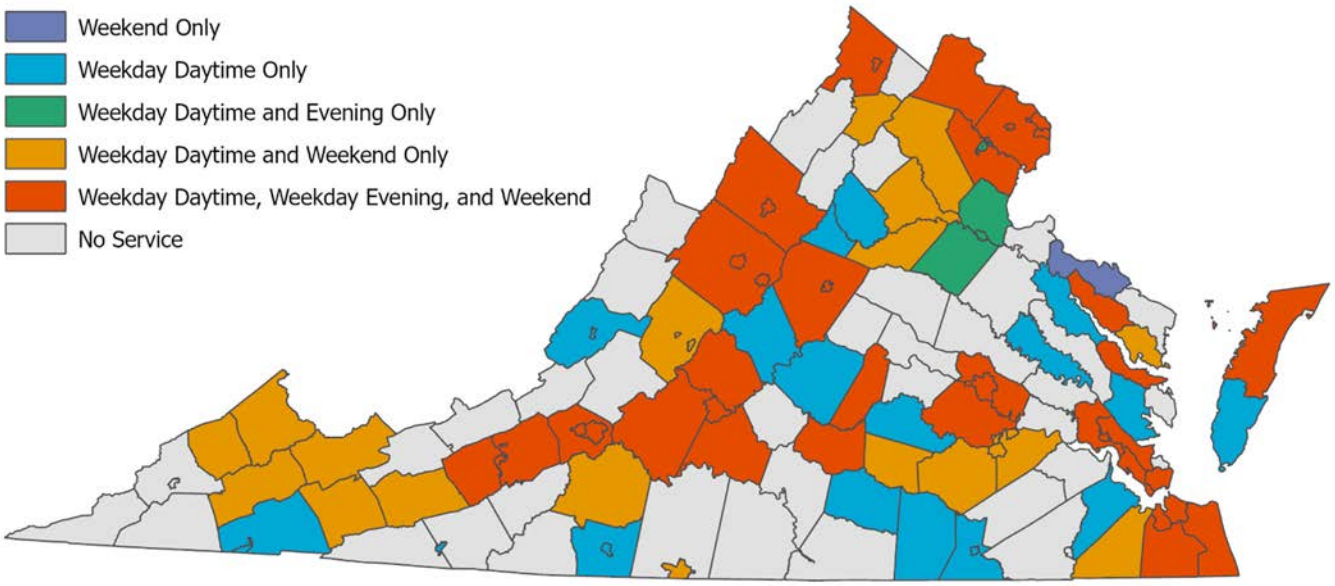
NO ACCESS **52%** ACCESS **48%**

NO ACCESS **50%** ACCESS **50%**

NO ACCESS **29%** ACCESS **71%**

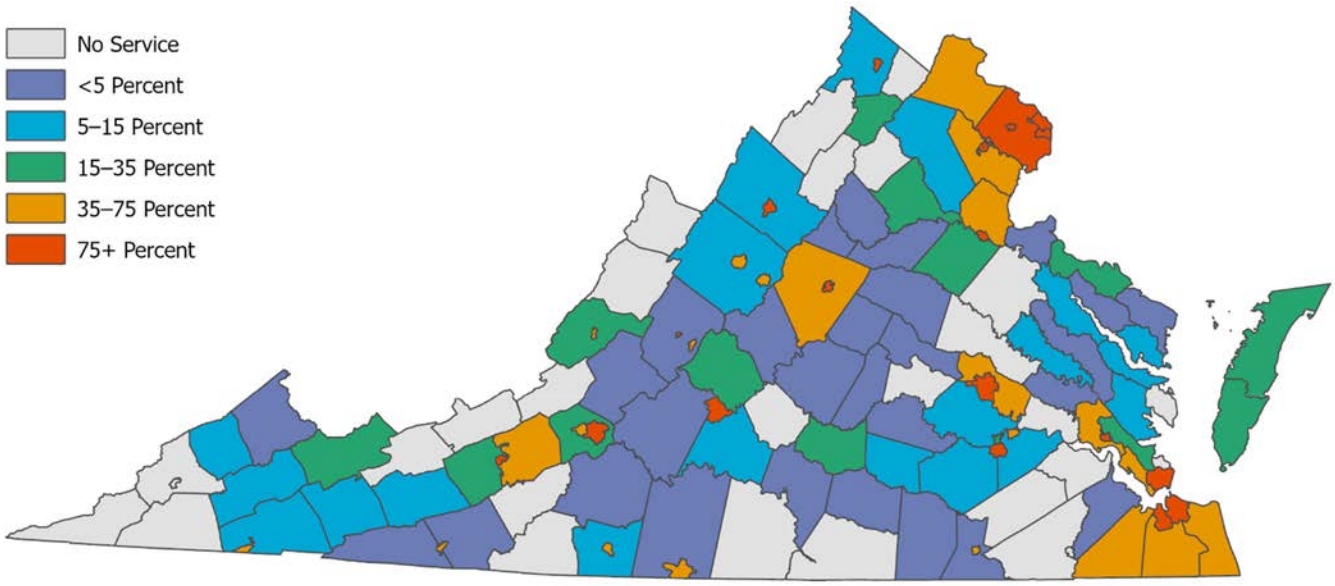
Transit service availability by jurisdiction – Approximately 70 percent of the 133 cities and counties in Virginia feature fixed-route transit service. Within 43 of these geographies, which account for roughly 32 percent of cities and counties in Virginia, transit service operates all week (i.e., service is offered during daytimes and evenings during the week, as well as over weekends). All week service is primarily found in the Northern Virginia, Harrisonburg/Charlottesville, and Hampton Roads regions, as well as the areas in and around the cities of Richmond, Blacksburg, Roanoke, and Lynchburg.

Fixed-Route Transit Service Hours by Jurisdiction



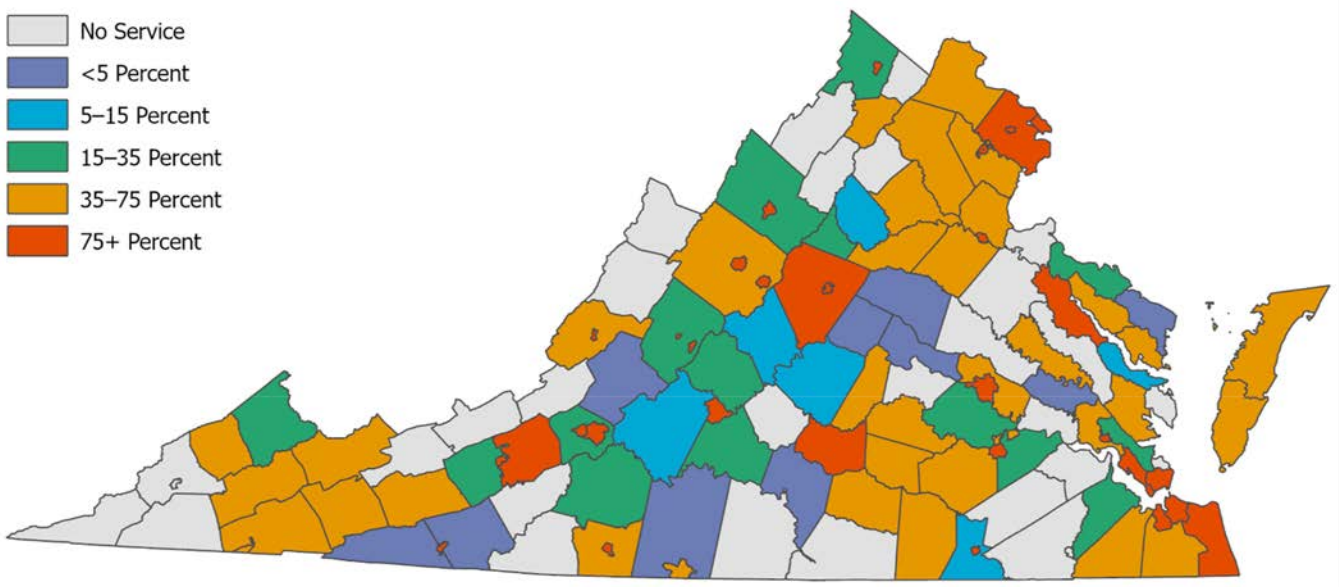
Residents with access to transit service by jurisdiction – Where transit exists, urbanized areas feature the most robust access to transit; these localities, where upwards of 75 percent of residents live within a half mile of a fixed-route service, include, Charlottesville, Fredericksburg, Harrisonburg, Lexington, Lynchburg, Petersburg, Radford, Richmond, Roanoke, Williamsburg, and Winchester. Additionally, the Hampton Roads and Northern Virginia regions both feature relatively large areas where over 75 percent of the population is served by fixed-route transit. Collectively, these cities and counties are home to more than 60 percent of the Commonwealth's residents with access to transit.

Percent of Residents with Access to Fixed-Route Transit by Jurisdiction



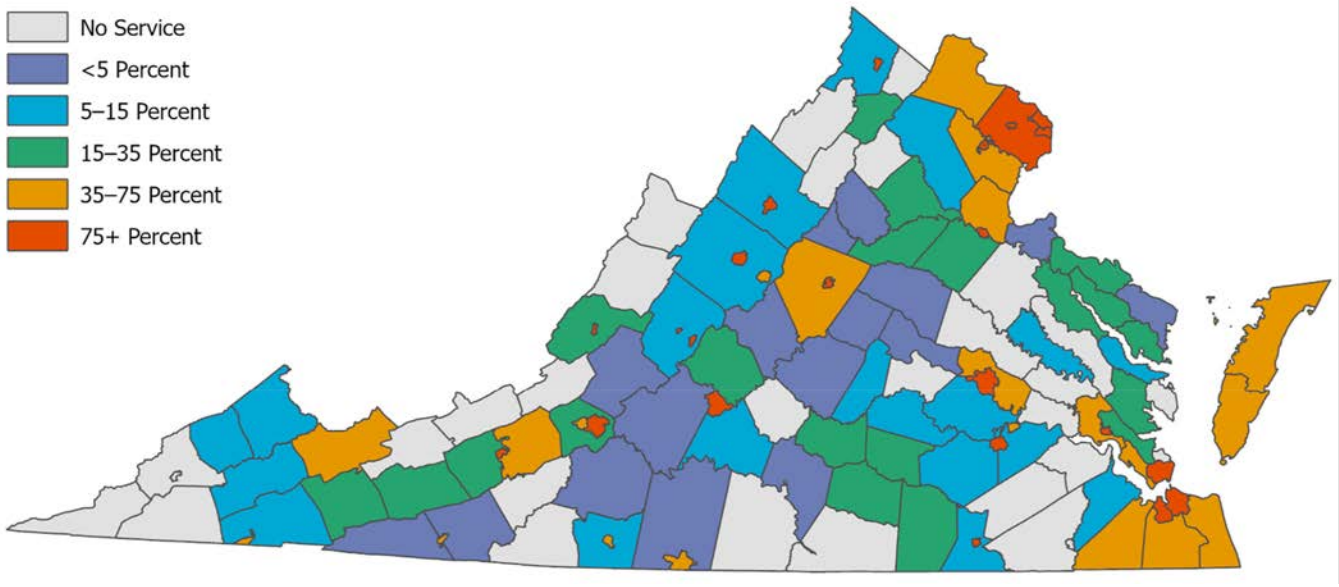
Workers with access to transit service by jurisdiction – Based on this analysis, it is estimated that throughout Virginia, more workers live within a half mile of fixed route transit than do not. Though the percentage of workers with access to transit by county closely resembles the percentage of residents overall with access to transit by county, several smaller places, including Buena Vista, Covington, Emporia, and Lexington also exceed the 75 percent threshold for transit access.

Percent of Workers with Access to Fixed-Route Transit by Jurisdiction



Jobs accessibility by transit by jurisdiction – A substantial percentage of jobs within Virginia are served by fixed-route transit; across the Commonwealth, the number of jobs served by transit is nearly 250 percent the number of jobs that are not. This is driven in large part by densely populated areas with an exceptionally high percentage of jobs with access to transit. In 18 of the 20 most densely populated cities and counties, more than half of all jobs are accessible by transit; within 12 of these localities, more than 75 percent of jobs are accessible by transit and within six of these localities more than 95 percent of jobs are accessible by transit.

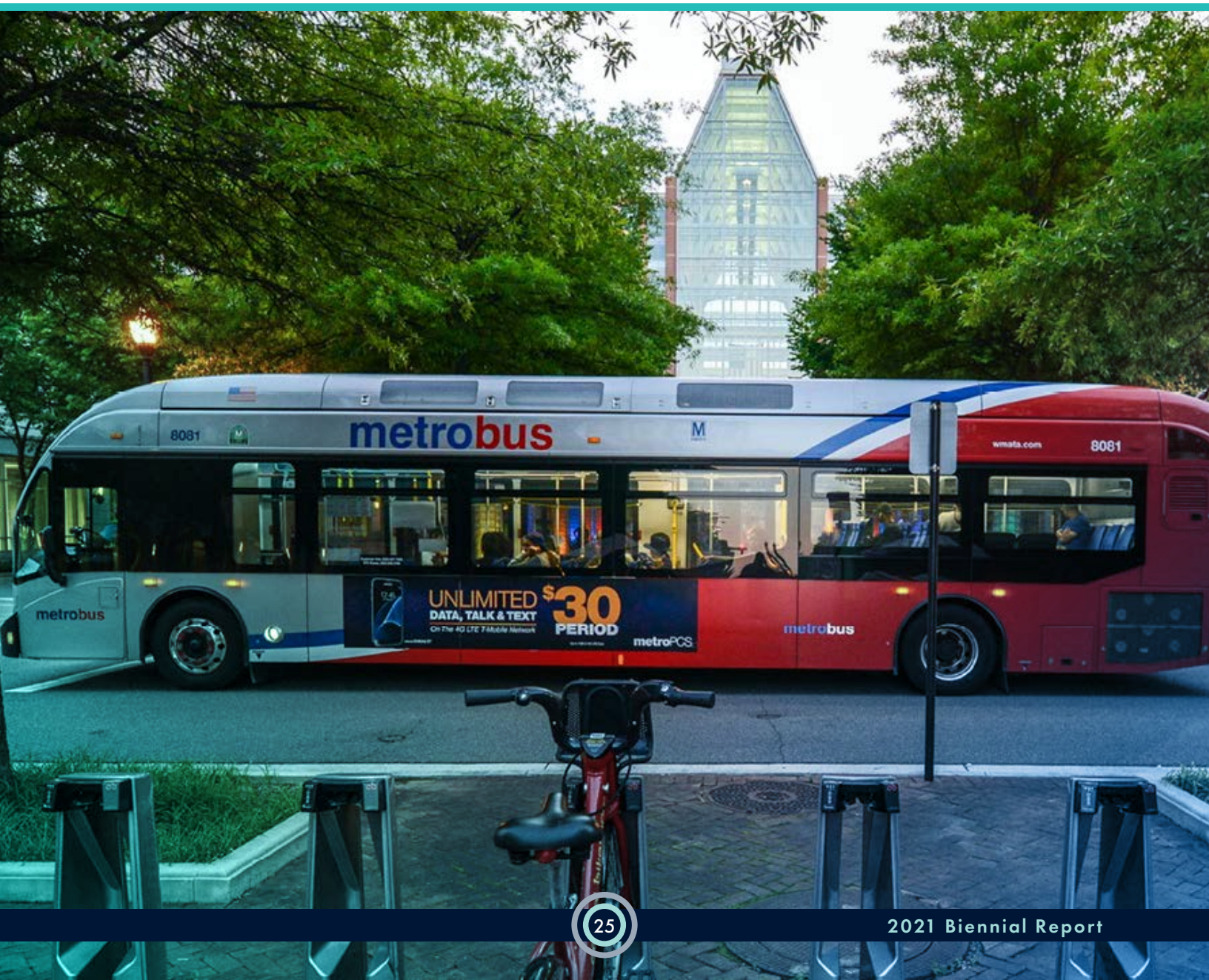
Percent of Jobs Accessible by Fixed-Route Transit by Jurisdiction



How Are We Improving Performance?

DRPT Transit Strategic Planning[13] requirements are intended to ensure that the largest urban transit agencies are proactively managing their systems through effective system planning and design. WMATA has completed a Bus Transformation Study that is a regionally developed mobility strategy that defines the roles of buses and their operators, advances innovations, and creates a plan to advance improved regional connectivity and equitable access. The Greater Richmond Transit Company and Blacksburg Transit have both completed system overhaul efforts, leading to significant increases in ridership prior to COVID-19. Transit Strategic Plans (TSPs) were also developed by Hampton Roads Transit and Greater Lynchburg Transit Company in the calendar year 2019, and the Potomac and Rappahannock Transportation Commission (Omni Ride) in the calendar year 2020. TSP requirements have been temporarily suspended due to the impacts of COVID-19 but DRPT intends on restoring those requirements as agencies return to pre-pandemic service levels.

FY 2020 also marked the transition of Commonwealth's transit operating assistance to performance-based allocation formula. More accountability and transparency in the statewide operating program rewards lower operating costs and higher ridership, promoting more efficient system operations and enhancing ridership.



Annual Intercity Passenger Rail Ridership

What Are We Measuring?

DRPT aggregates intercity rail ridership on an annual basis. For Amtrak, this measure only accounts for ridership of state-sponsored intercity routes, not long-distance routes, which also serve many of Virginia's stations.

This measure provides insight into the performance of Virginia's passenger rail system. Ridership presents an outcome of accessibility and shows how many Virginia residents rely on multimodal transportation options where passenger rail service exists.

How Is Virginia Performing?

In FY 2020 (July 1, 2019, to June 30, 2020), VRE and Amtrak's state-sponsored routes reported ridership of 2,645,503, a significant decline from FY 2019, primarily attributed to the COVID-19 pandemic. Ridership remained low throughout most of FY 2021, at 87 percent below FY 2019 levels, although there are signs of a recovery in spring 2021 with consistent monthly ridership increases.

FY 2019 was the highest reported year of ridership for Amtrak's state-sponsored routes to date, with over 900,000 passengers boarding in Virginia. Before the pandemic, VRE ridership decreased slightly in FY 2018 and FY 2019 after a peak of nearly 4.7 million annual riders in FY 2017. VRE returned to a full schedule in June 2021 (32 trains daily) after six consecutive months of ridership increases.

Ridership and Ridership Change by Service Type; 2016-2019

	FY 16	FY 17	FY 18	FY 19	FY 20	FY 21
VRE	4,352,814	4,676,123	4,631,909	4,408,114	2,135,503	341,627
Amtrak	838,329	851,443	839,446	924,636	510,000	333,684
TOTAL	**5,191,143**	**5,527,566**	**5,471,355**	**5,332,750**	**2,645,503**	**675,311**

How Are We Improving Performance?

In May 2021, the Commonwealth reached an agreement with Norfolk Southern to extend passenger rail service to the New River Valley for the first time since 1979. Known as the Western Rail Initiative, this agreement will increase intercity passenger rail service from Roanoke to the Northeast Corridor and is an expansion of the Transforming Rail in Virginia program to build a 21st-century rail network. The initiative includes $257.2 million in funding to acquire 28.5 miles of right-of-way and track between Salem and Christiansburg, implement rail infrastructure improvements throughout the corridor, and increase daily service between Roanoke and Washington D.C. in 2022.

Safety For All Users

In meeting Virginia's VTrans Vision of a transportation system that is Good for Business, Good for Communities, and Good to Go, the Commonwealth is committed to providing a safe and secure transportation system for all travelers. This includes our bus drivers, highway maintenance and construction personnel, port and airport workers, and anyone who helps keep our transportation system operating safely and efficiently.

Roadway Fatalities/Fatality Rate and Serious Injuries/Serious Injury Rate

2022 Targets[14]

Fatalities: 861 | **Fatality Rate:** 0.995 | **Serious Injuries:** 6,901 | **Serious Injury Rate:** 7.971

2021 Targets

Fatalities: 898 | **Fatality Rate:** 1.012 | **Serious Injuries:** 7,385 | **Serious Injury Rate:** 8.352

2020 Target Achievement:

Fatalities: 950 (made) | **Fatality Rate:** 1.08 (missed) | **Serious Injuries:** 7,473 (made) | **Serious Injury Rate:** 8.52 (missed)

Note: VDOT and OIPI collaborate with FHWA to set targets for these four measures based on five-year average trends, rather than annual performance. More information on Federal targets and performance is provided in Appendix A.

What Are We Measuring?

Highway safety measures address both the number of people killed and the number of people experiencing serious injuries during a motor vehicle crash on any public road in Virginia. For both of these measures, total fatalities and total serious injuries are also normalized through a rate that presents the number of people killed or the number of serious injuries per 100 million vehicle miles traveled (VMT) based on annually published VDOT data. According to NHTSA, serious injuries "include... internal injuries...unconsciousness, severe lacerations, severe burns, and [being] unable to leave the scene without assistance."

MEASURE	SOURCE
Fatalities and fatality rates for motorized vehicle crashes (passenger vehicles, including motorcycles and buses, and commercial trucks on all public roads in Virginia)	The data is reported by state and local police and maintained by the Department of Motor Vehicles (DMV) and provided to the Virginia Department of Transportation. The data tracks the number of persons killed as a result of a motor vehicle crash, and the rate of fatalities per 100 million vehicle miles traveled (VMT).
Serious injuries and serious injury rate for motorized vehicle crashes (passenger vehicles, including motorcycles and buses, and commercial trucks on all public roads in Virginia)	The data is reported by state and local police and maintained by the Department of Motor Vehicles (DMV) and provided to the Virginia Department of Transportation. The data tracks the number of persons seriously injured as a result of a motor vehicle crash, and the rate of serious injuries per 100 million vehicle miles traveled (VMT).

How Is Virginia Performing?

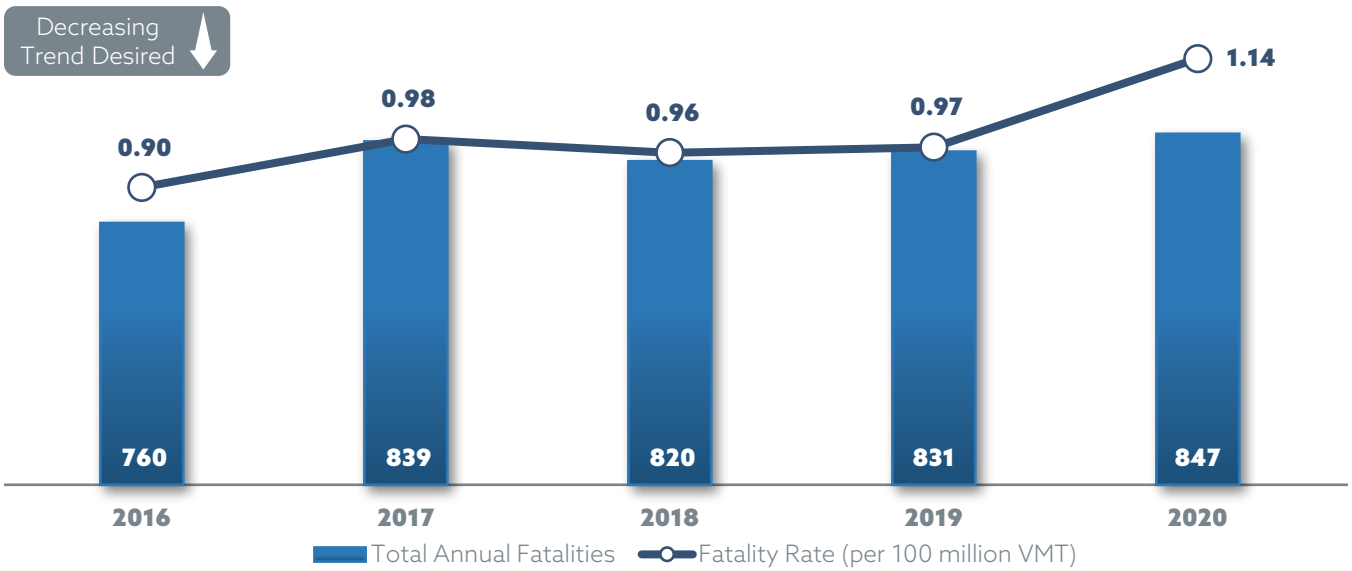
The number of fatalities increased 2.4 percent from 2019 to 2020, while annual VMT decreased by 16 percent. The result is a higher fatality rate (increase from 0.97 fatalities per 100 million VMT to 1.14 fatalities per 100 million VMT). These safety outcomes in 2020 are consistent with national trends. While Americans drove less in 2020 due to the pandemic, early estimates show that an estimated 38,680 people died in motor vehicle traffic crashes—the largest projected number of fatalities since 2007.[15] This represents an increase of about 7.2 percent compared to 2019. Nationwide, the fatality rate for 2020 was 1.37 fatalities per 100 million VMT, up from 1.11 fatalities per 100 million VMT in 2019. National Highway Traffic Safety Administration (NHTSA) and Virginia analysis shows that the main behaviors that drove this increase include impaired driving, speeding and failure to wear a seat belt.[16]

According to the Virginia Department of Motor Vehicles, preliminary numbers indicate speed-related crashes have already claimed 199 lives on Virginia's roadways and injured another 6,090 people within the first six months of 2021. In 2020, 22,479 speed-related crashes on Virginia roadways resulted in 406 fatalities, the highest number in at least 10 years, and an increase of 16.3 percent from 2019.

While statistics show the lifesaving value of seat belts, approximately 15 percent of Virginians still do not buckle up. Despite fewer cars on the road, Virginia continues to see an increase in unbelted fatalities on the Commonwealth's roadways. Approximately 13 percent more people who were not wearing their seat belts have been killed in crashes in 2020, compared to 2019 (343 compared to 304).[17]

Virginia is committed to tracking progress. For more information, view safety performance trends, conduct data analysis, and review the status of implementation activities on VDOT's Highway Safety Improvement Program[18] website.

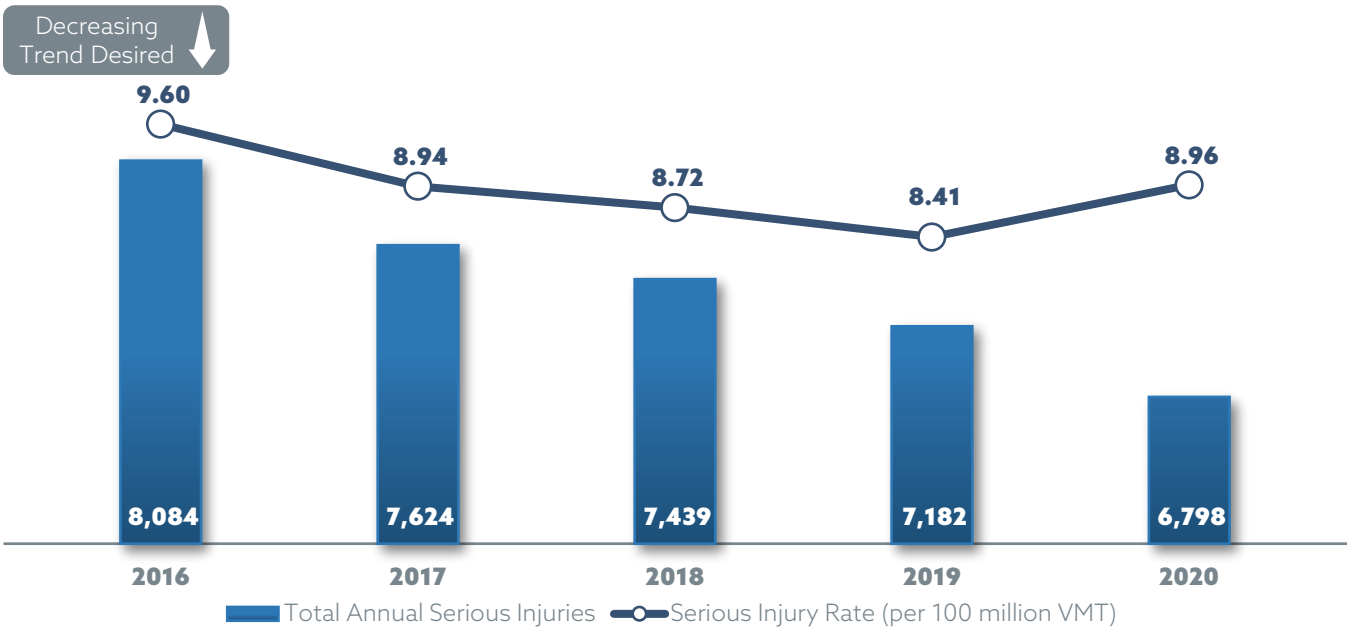
Total Fatalities and Fatality Rate



Source: NHTSA Fatality Analysis Reporting System (FARS) (2016-2019) and VDOT Traffic Safety Data (2020).

The number of serious injuries is trending down (a 16 percent decrease from 2016 to 2020), but the 2020 rate increased slightly 6.1 percent from 2019. VMT was down everywhere as the COVID-19 pandemic shelter-in-place guidelines took effect in March 2020. Despite fewer road users, there was an increase in riskier driving behaviors, including impaired driving, speeding and unbelted occupants in 2020. The serious injury rate increase in 2020 is not as sharp as fatalities, and the raw count falls below the 2020 target of 7,473. The count and rate still show an overall downward trend from 2016.

Total Serious Injuries and Serious Injury Rate



Source: VDOT Traffic Safety Data

How Are We Improving Performance?

Virginia is currently updating the Strategic Highway Safety Plan (SHSP) for the 2022-2026 period, and is evolving its approach to include "Safe Systems," a philosophy premised on the concept that humans make mistakes and are vulnerable. This approach seeks to reduce kinetic energy (speeds) of collisions through a combination of infrastructure design and operation with promotion of safe behavior by all road users. The current plan runs through 2021 with the safety theme "Arrive Alive" with a commitment to highway safety illustrated by Toward Zero Deaths vision for Virginia. Toward Zero Deaths (TZD) is a national strategy on highway safety that uses a multi-sectoral, unified approach to improve safety with a goal of ultimately reducing the number of traffic-related serious injuries or deaths to zero. Virginia's TZDVA.org website, maintained by DMV, includes statewide resources and events to engage Virginians in the effort. While the TZD effort is focused on the highway system – it is representative of the Commonwealth's goal for all transportation.

VDOT, DMV, Virginia State Police, and other state agency partners will finalize the next five year SHSP in 2022. The SHSP will include a focus on emphasis area actions that will reduce severe crash outcomes. This update includes outreach to state, regional and locality stakeholders. The SHSP will be approved by the partner state agency executives.

The Virginia Highway Safety Improvement Program (VHSIP) has been enhanced by adding state funding to FHWA funding resulting in $459.9 million in federal and state funding sources within the FY 2022-2027 SYIP. The breakdown of costs (after administrative costs) starting in 2024 is 54 percent for infrastructure projects (including systemic improvements like guardrails and rumble strips); 29 percent for behavioral strategies; and 17 percent for other strategies in the CTB's investment strategy.

Total Non-Motorized Fatalities and Serious Injuries

2022 Target[19]	*2021 Target*	*2020 Target Achievement*
646	751	711 (made)

What Are We Measuring?

Virginia safety measures consider the number of non-motorized fatalities and serious injuries, those involving pedestrians and bicyclists. These road users are more vulnerable to fatal and serious injuries.

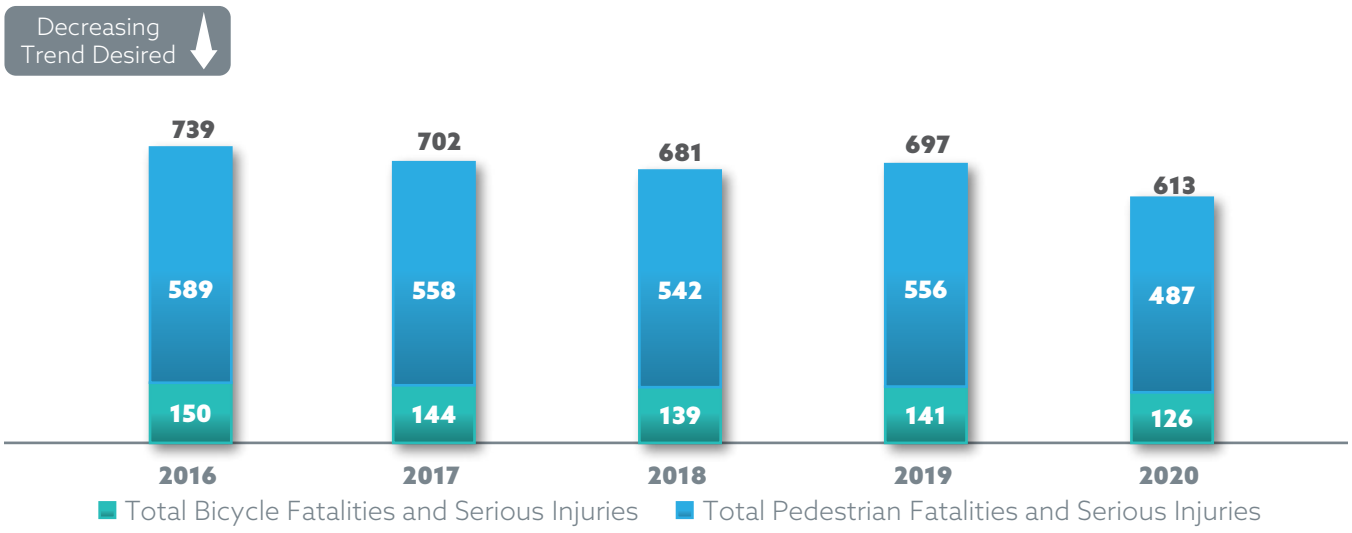
MEASURE	SOURCE
Non-motorized fatalities and serious injuries (bicyclists and pedestrians)	The data is reported by state and local police and maintained by DMV and VDOT. The data tracks pedestrians and cyclists involved in fatal or serious injury outcomes from crashes (the crash involves a motorized vehicle).

How Is Virginia Performing?

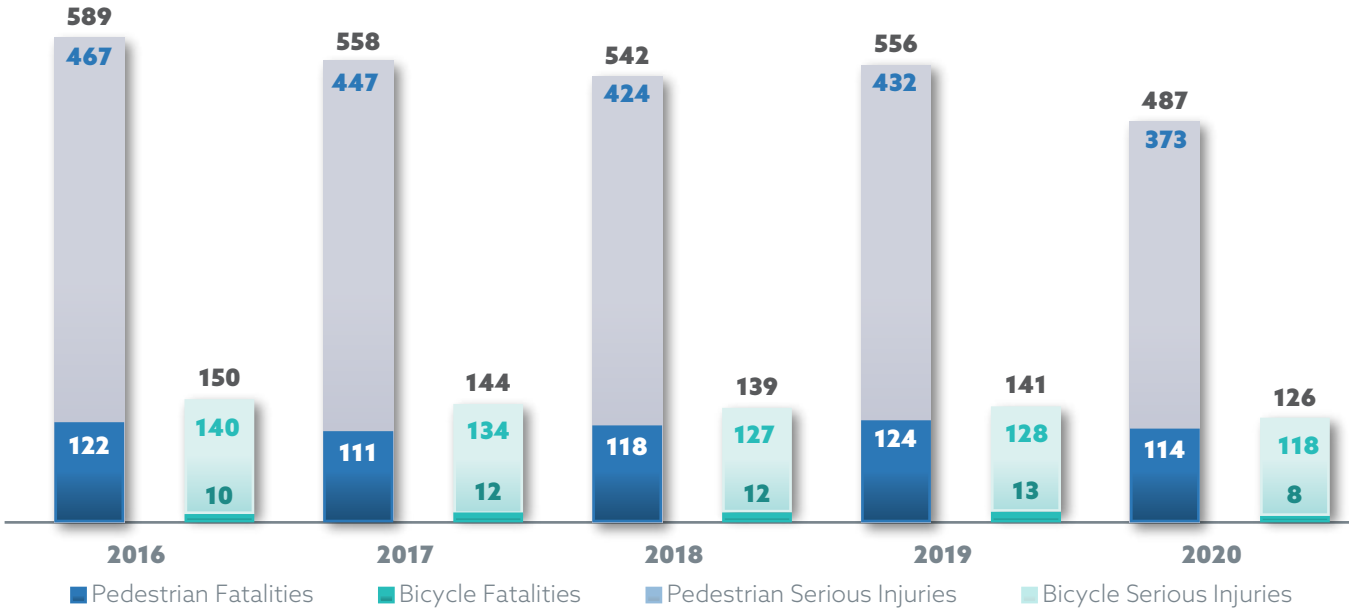
The number of non-motorized fatalities and serious injuries in 2020 was lower than the 2020 target. However, this could be partly due to decreased VMT on roadways resulting from COVID-19. Pedestrian fatalities and serious injuries decreased over 12 percent from 2019, while bicycle fatalities and serious injuries decreased over 10 percent.

As shown in the chart on the following page, the majority of the non-motorized fatalities (122) were 114 pedestrians killed on Virginia roads in 2020, which is overall consistent with pedestrian fatalities from 2016 through 2019. Because of this challenging trend, among other factors, the 2021 target for non-motorized fatalities and serious injuries is higher than the 2020 target. While there is evidence that outdoor recreation increased in popularity during 2020, it appears that an increase in bicycle trips and recreation did not lead to an increase in fatal and serious injury crashes involving cyclists.

Total Non-Motorized Fatalities and Serious Injuries



Detailed Chart of Non-Motorized Fatalities and Serious Injuries



Source: NHTSA Fatality Analysis Reporting System (FARS) (2016-2019) and VDOT Traffic Safety Data (2020).

How Are We Improving Performance?

Within the update to the 2022-2026 Virginia SHSP, there is a new emphasis area of vulnerable road users. This includes bicyclists and pedestrians.

VDOT commits significant resources from the Virginia Highway Safety Improvement Program on improving pedestrian crossings at signalized intersections. Further, many projects approved for funding through other programs such as SMART SCALE, Revenue Sharing, and Transportation Alternatives include non-motorized accommodations to improve safety. VDOTs Pedestrian Safety Action Plan (PSAP) map viewer shares data on the top 5 percent of pedestrian crash clusters by construction district. VDOT uses this data in coordination with the PSAP to identify and deploy investments to address safety issues.

To help spread a message of safety, DMV launched a summer 2021 campaign urging pedestrians to thoroughly check that the way is clear before crossing the street. The campaign also reminds motorists of their duty to be aware of pedestrians and make sure pedestrians have crossed safely before proceeding. The motto of the campaign is "If you don't know, don't go." Also, beginning July 1, 2021, a new law requires motorists to change lanes when passing a bicyclist if the lane of travel is not wide enough to accommodate three feet in distance between the motor vehicle and the bicycle.[20]

Transit Injuries: Rate per Total Vehicle Revenue Miles (VRM) by Mode

Transit Fatalities: Rate per Total Vehicle Revenue Miles (VRM) by Mode

Virginia is committed to providing a safe public transit system for all transit users and system employees. Beginning in 2020, all transit agencies receiving funding under the Federal Transit Administration's (FTA) Urbanized Area Formula Funding program (49 U.S.C. 5307) were required to develop a Public Transportation Agency Safety Plan (PTASP). The development of these plans created a unified national standard for measuring transit safety performance.

What Are We Measuring?

Safety outcomes on Virginia's transit systems are communicated through the following:

MEASURE (APPLIES TO FIXED-ROUTE AND DEMAND-RESPONSIVE MODES)	SOURCE
Fatalities and fatality rates per 100,000 vehicle revenue miles for all Virginia public transit agencies	Safety event, fatality, and injury data is reported by each public transit agency to the FTA on an annual basis. The datasets are uploaded to the National Transit Database (NTD) at the end of each fiscal year. These datasets are used to calculate each of the metrics listed here, which align with the PTASP. Safety data for commuter rail is reported separately to the Federal Railroad Administration (FRA).

By tracking these measures, Virginia can evaluate how transit systems across the state are performing in keeping their riders and employees safe and secure.

How Is Virginia Performing?

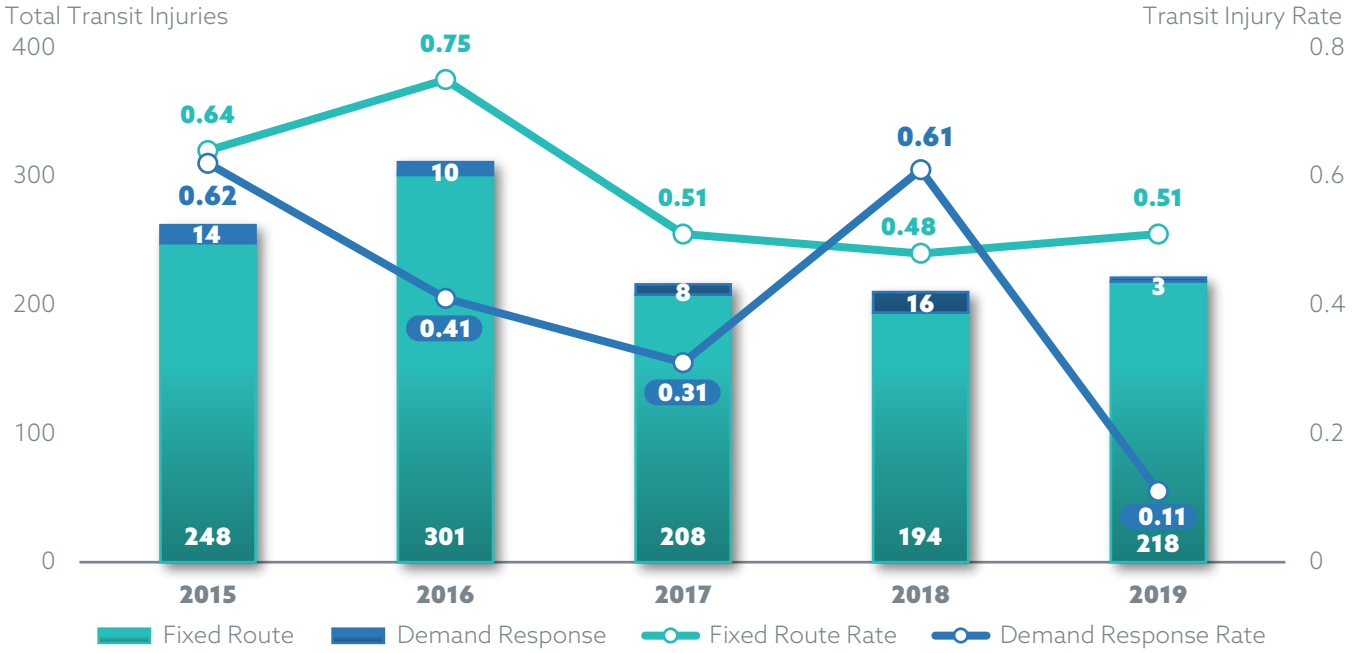
Seven fatalities have occurred on fixed-route transit modes in Virginia between 2015 and 2019. Four of these fatalities occurred in 2018 and 2019. No fatalities have occurred on Virginia's demand-responsive systems within the past six years. In 2020 there was one recorded fatality on fixed-route transit modes in Virginia.

For fatality rate, this report only includes analysis of FY 2015 through FY 2019. During this period, transit fatalities in Virginia occurred at a rate of 2.15 deaths per 100 million vehicle revenue miles, a rate lower than the majority of states (Virginia ranked 19th out of 50 states and Washington D.C.).

The chart on the next page shows the total number of injuries and the rate of injuries over the past five years, for both fixed-route and demand-response modes for agencies reporting to the National Transit Database. Fixed-route injuries decreased by almost 100 injuries in 2017 and have since remained relatively steady. 2015 and 2018 were both relatively high years for injuries on demand response modes, but 2019 saw a dramatic decrease in both total injuries and injury rate. Between 2015 and 2019, Virginia's injury rate of 3.74 injuries per million VRM ranked 21st best out of 51 qualifying states and territories.

While not included in the chart (either as a total or a rate), as final revenue mile information is not available, there were 139 injuries for fixed-route modes and 4 injuries for demand response in 2020.

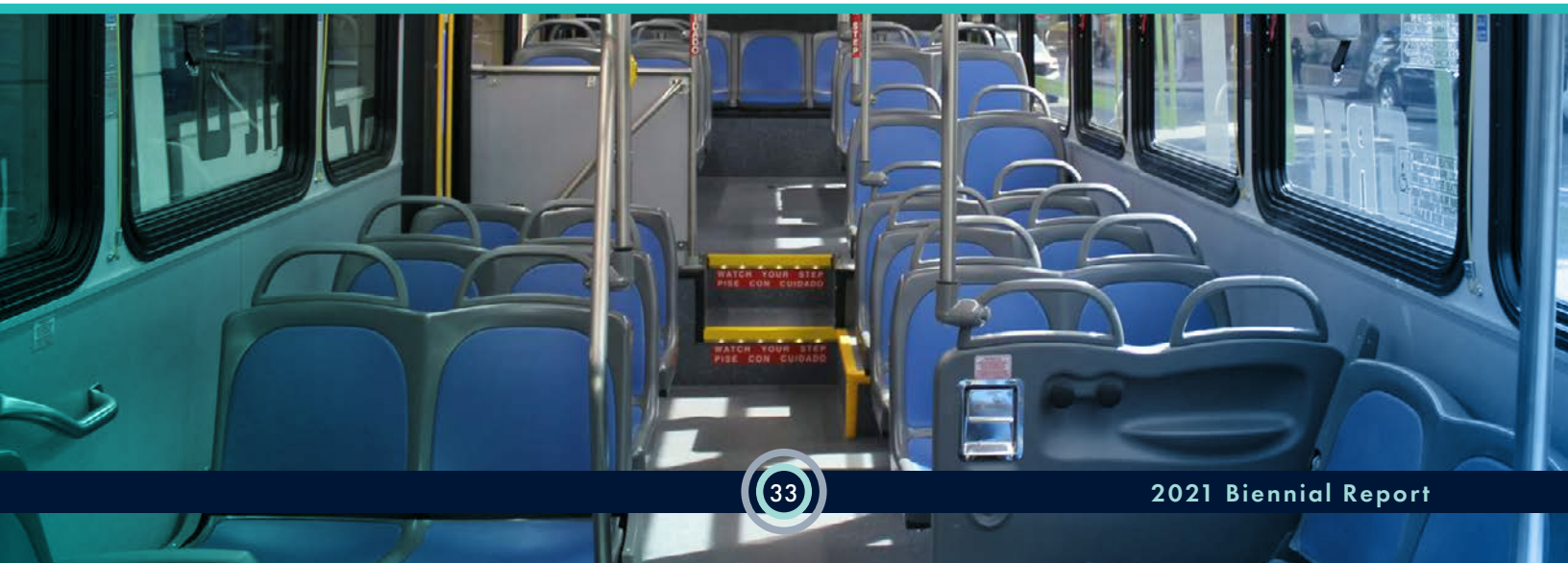
Transit Injuries and Injury Rate per 100,000 Revenue Miles by Mode Type



How Are We Improving Performance?

In July 2020, DRPT completed a PTASP[21] for 15 participating agencies across Virginia. The development of comprehensive PTASPs for each of the state's transit operators marks a major step forward in the monitoring of safety performance and the development of policies and procedures needed to maintain a robust safety culture. Each Tier I transit agency (operators with 101 or more vehicles or operate rail) is responsible for the development of its own agency safety plan, while DRPT aided in plan development for all of the state's Tier II agencies (Tier II providers operate 100 or fewer vehicles, or are a subrecipient under the 5311 Rural Area Formula Program). **Each participating Tier II agency is ultimately responsible for PTASP plan implementation and annual review.**

The PTASP requires that each agency review annual targets for each of the transit safety metrics outlined above. Additionally, each PTASP contains a detailed program for developing both formal and informal processes to monitor and measure safety on an ongoing basis. Other elements of PTASPs that have a direct impact on transit safety performance include detailed procedures for safety risk management and resolution that are meant to help transit agencies identify and assess systemic issues and develop mitigation strategies to prevent reoccurrence of safety events.



Proactive System Management

Continued strategic investment in preserving the condition of our transportation system helps maintain and grow opportunities for employment, education, health care, and recreation for Virginians. It leverages the assets we own and creates a transportation system capable of meeting the needs of new and emerging trends in how we travel.

Percentage of Good and Fair Bridges – Interstate, Primary, Secondary

Targets:

Interstate: ≥ 97% | **Primary:** ≥ 93% | **Secondary:** ≥ 90% | **Average General Condition Rating (GCR):** ≥ 5.6

What Are We Measuring?

Virginia's bridge measures track the overall health of bridges and culverts (also known as structures but referred to collectively as bridges in this Report) maintained by VDOT on all public roads, segmented by the Interstate, Primary, and Secondary roadway systems.

MEASURE	SOURCE
Percentage of Interstate, Primary, and Secondary system bridges in good or fair condition	Bridges are periodically inspected to determine the condition of bridge components, which are rated on a scale of 0 (failed) to 9 (excellent). Bridges are considered in poor condition if the culvert, deck, the superstructure, or the substructure receive a condition rating of 4 or below. Each measure is expressed as a percentage, representing the number of bridges that are rated in good or fair condition divided by the total number of bridges on the highway system being evaluated. For each measure, a higher value is better.
Average weighted General Condition Rating (GCR)	The GCR represents the average condition rating of all bridges (on the scale of 0 to 9) weighted by an importance factor. The importance factor is a unitless measurement of the relative importance of each structure to the overall highway network. It uses objectively-measured data such as traffic volume and detour length to calculate an importance value for each structure

Maintaining Virginia's bridges is important to ensure a safe and well-functioning roadway network for passenger and freight movement. By tracking these measures, Virginia is able to proactively identify and prioritize bridge maintenance needs and manage overall maintenance costs.

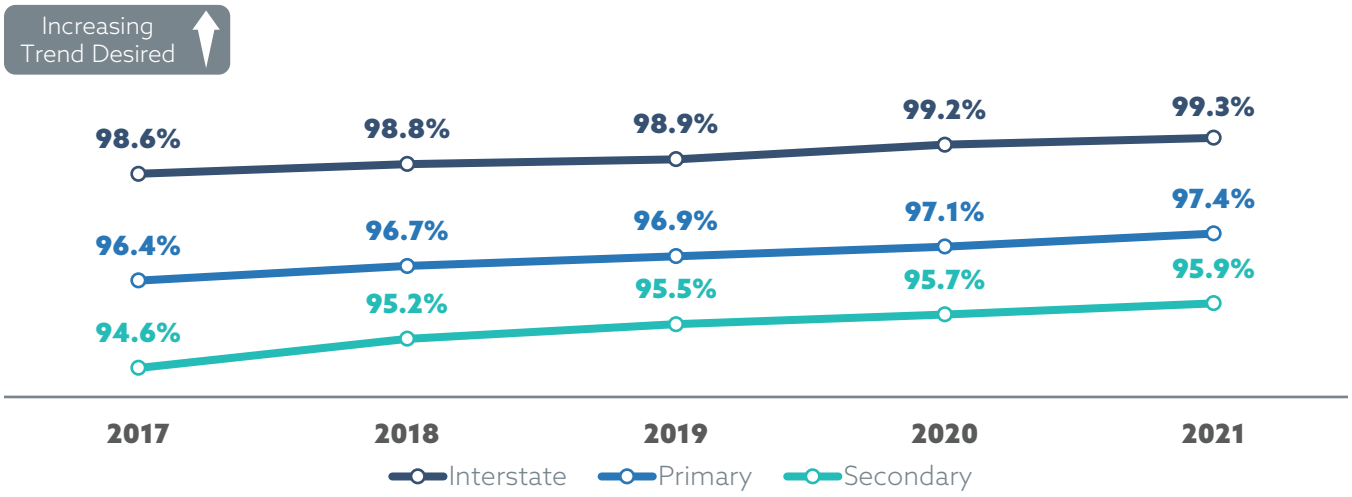
How Is Virginia Performing?

Since 2017, bridge condition has trended upwards across the three systems, and each measure has exceeded its target. The Interstate system has the highest percentage of bridges in good or fair condition, while the secondary system has the lowest percentage. Since 2017, the percentage of Interstate bridges that are in good or fair condition has increased by 0.7 percentage point, and the percentage of bridges on primary roads in good or fair condition has increased by one percentage point. Bridges on secondary roads showed the greatest improvement in conditions in the last five years with a 1.3 percentage point increase.

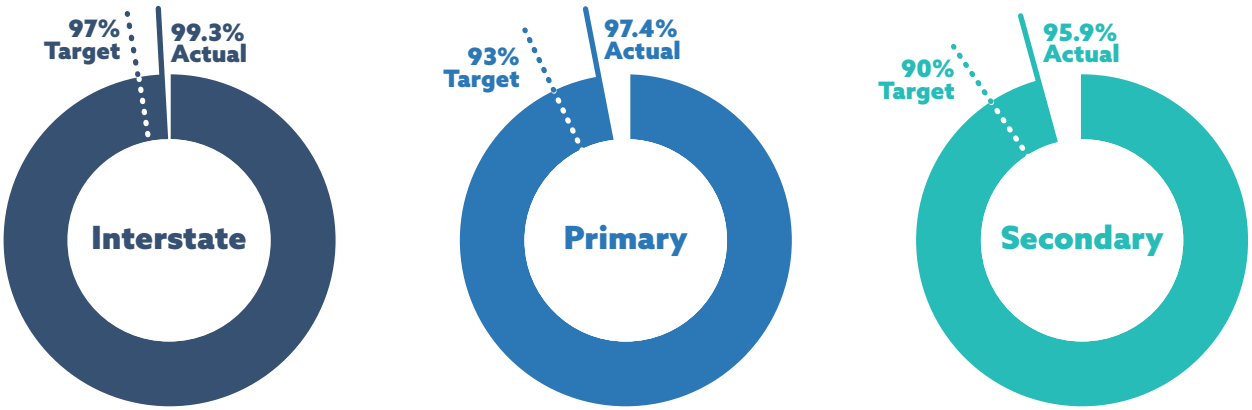
The targets for percentage of bridges in good or fair condition are different for each system, with a 97 percent target for Interstates, 93 percent target for Primary facilities, and a 90 percent target for Secondary facilities. Performance against these targets is consistent with the CTB policy and targets adopted in December 2019 to create a long-term sustainable program.

VDOT has achieved the targets for each roadway system in recent years by focusing on proactive rehabilitation with an emphasis on preservation, timely intervention, and efficiency through high return new materials, techniques, and treatments. This is a new strategy, which utilizes bridge maintenance funding to focus on overall inventory condition rather than a "worst-first" approach. VDOT's strategy focuses on maintaining the roadway system over a decades-long life cycle approach in the most cost-effective manner. The Commissioner of Highways provides an annual Maintenance and Operations Comprehensive Review[22] report to the CTB on the projected and actual performance, most recently in September 2021.

Percent Good or Fair Condition Bridges

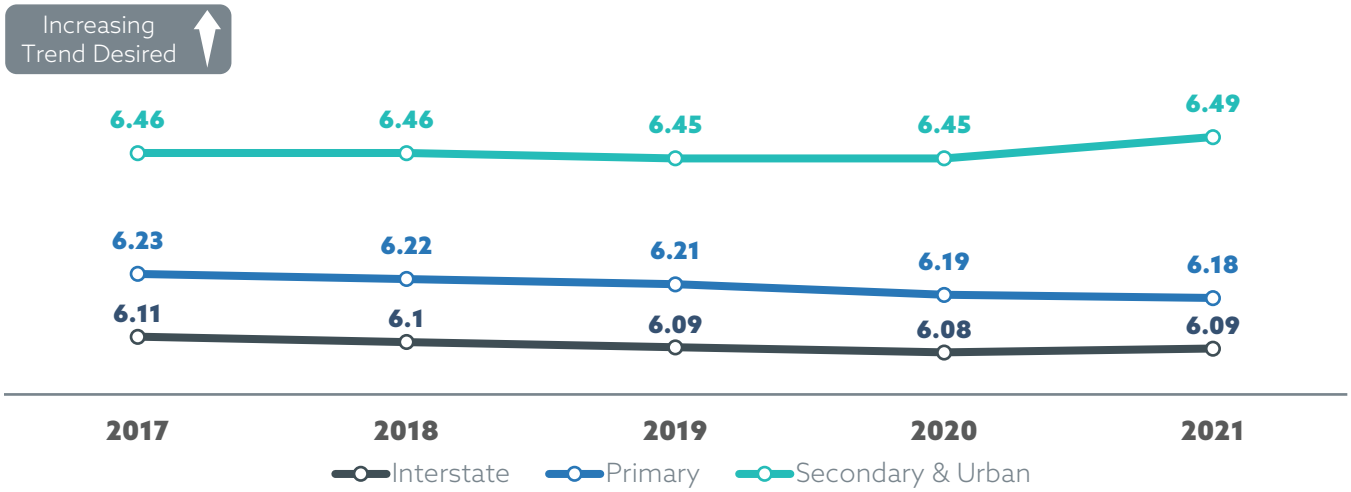


2021 Targets and Percentage of Good or Fair Condition Bridges:



The CTB, in consultation with VDOT, has also set an average weighted GCR target of greater than or equal to 5.6 across all VDOT owned and maintained bridges. The average weighted GCR has exhibited a gradual but steady decline in recent years, but Interstate and Secondary systems have increased between 2020 and 2021. Performance remains well above the target for all three systems. VDOT has achieved more across the entire system in recent years by focusing on proactive rehabilitation with an emphasis on preservation and efficiency through new materials, techniques, and treatments.

Average Weighted General Condition Rating (GCR)



How Are We Improving Performance?

In the FY 2022-2027 SYIP, $1.2 billion in funding is allocated to the state of good repair bridge program, supporting improvements to both VDOT and locally maintained bridges. Projections of available funding for bridge preservation and replacement relative to goals and forecasted needs show an increasing funding gap. The gap can be mitigated, but not eliminated, through following the overall inventory approach, rather than the worst-first strategy approach.

There are 21,259 bridges and structures in Virginia, including 19,598 owned by VDOT. While the share of poor bridges is decreasing, 2021 inspection data shows approximately 5,115 that are likely one inspection away from having one or more components evaluated as poor. These bridges represent almost 24 percent of the statewide inventory maintained by VDOT. Most can be rehabilitated and preserved at 20 percent or less of the replacement cost, providing decades of additional service life.

For Virginia's 25 special structures, the FY 2022-2027 SYIP includes $480 million in allocated funding. Special structures include unique assets, such as Virginia's nine movable bridges and six tunnels. For these assets, VDOT has developed a health index that looks at both the individual structure (i.e., the bridge itself) and the systems within the structure (i.e., electrical and mechanical subsystems). Based on this approach, 34 percent of movable bridge systems and 13 percent of tunnel systems were assessed as being in poor or severe condition. VDOT developed a ten-year plan to address the poor systems and will continue to use the health index to monitor, optimize, and adjust the special structures program on an annual basis. For example, the Gwynn's Island Bridge, opens to marine traffic more than any other state-maintained movable bridge. In 2021 and 2022 VDOT will improve the condition of the bridge's mechanical elements, improving traffic operation reliability.

Percentage of Sufficient Lane Miles – Interstate, Primary, Secondary

Targets:

Interstate: ≥ 82 percent
Primary with AADT Greater than or Equal to 3,500: ≥ 82 percent
Primary with AADT Less Than 3,500: ≥ 75 percent
Secondary with AADT Greater than or Equal to 3500: ≥ 82 percent
Secondary with AADT Less Than 3,500: ≥ 60 percent

What Are We Measuring?

The VDOT-maintained highway network comprises over 129,300 lane-miles of roadway, including over 5,600 lane miles of Interstates, over 22,600 lane miles of primary roads, and nearly 101,100 lane-miles of secondary roads including county and local routes. Preserving this infrastructure provides safe and reliable movement of people and goods within the Commonwealth.

MEASURE	SOURCE
Percentage of sufficient lane miles on the Interstate, Primary, and Secondary system	VDOT uses a numeric scale, the Critical Condition Index (CCI), to explain and categorize pavement sufficiency. CCI is calculated on a scale of 0 to 100, with a value of 100 representing pavement with no visible distress, while a value of 0 indicating a pavement in heavily distressed condition. Pavements with CCI values 60 or above are considered sufficient. The pavement measure is expressed as a percentage, representing the number of lane miles rated sufficient divided by the total number of lane miles. Primary and secondary facility condition measures are segmented into condition on facilities with greater than or equal to 3,500 average annual daily traffic (AADT) and on facilities with less than 3,500 AADT.

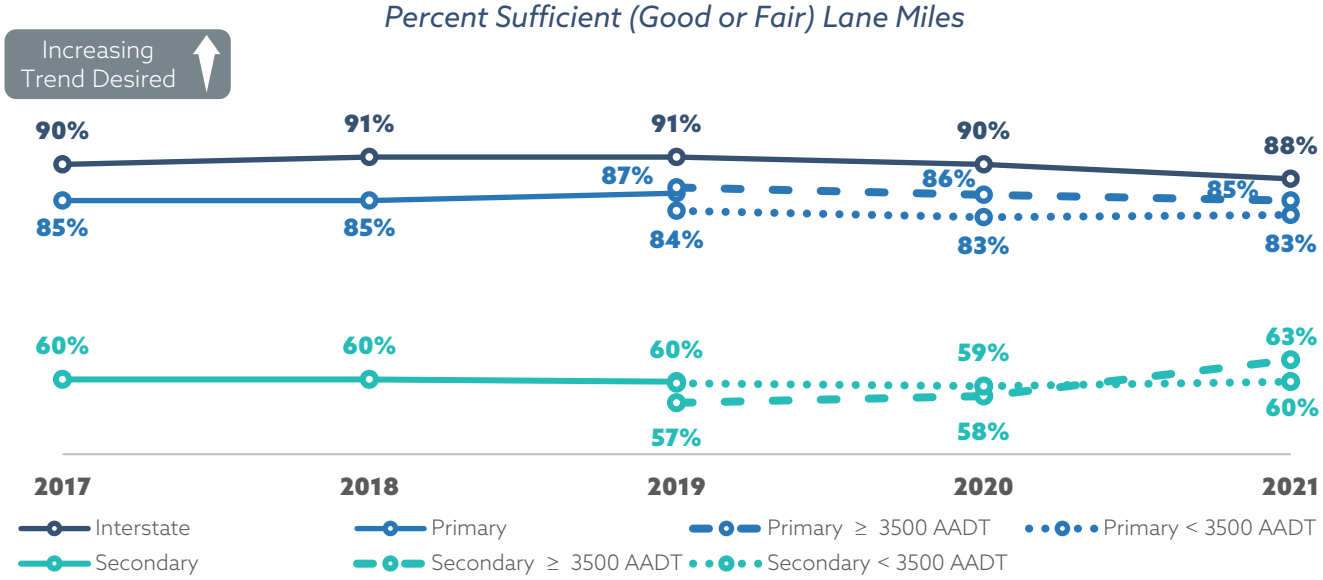
How Is Virginia Performing?

Between 2020 and 2021, the percentage of sufficient lane miles has declined slightly for the Interstates and high volume primary system, stayed steady for low volume primary system, and has improved for both categories of the secondary system. These changes are consistent with the targets and the policy set by the CTB in December 2019 to create a long-term sustainable program. VDOT will continue to monitor pavement condition annually to ensure that the actual performance is consistent with the projected conditions.

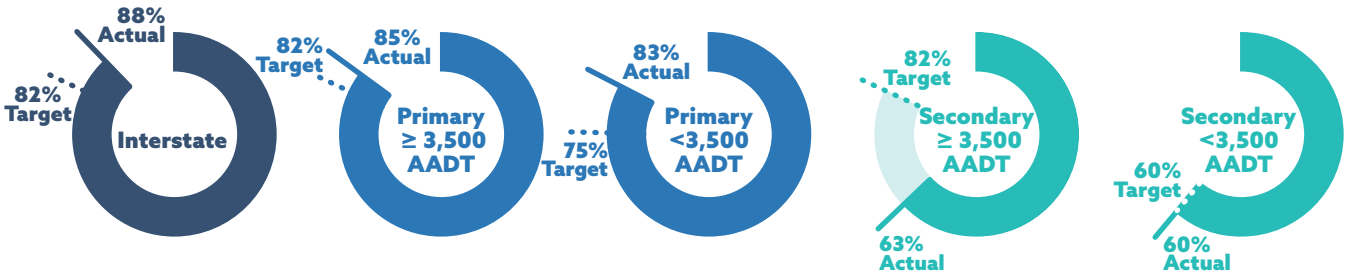
Interstate pavement conditions remain well above the 82 percent target, while primary system pavement performance is still above target for both high- and low-volume roads. However, secondary system performance is below target for high-volume and at target for low-volume roads, at 63 percent and 60 percent (exactly 59.6 percent), respectively, in 2021.

Annual condition assessments of Virginia's pavement network are essential to maintaining a sustainable pavement maintenance program and meeting performance targets. VDOT's approach focuses on maintaining pavement assets over decades-long asset lifecycles in a cost-effective manner. This strategy has helped prioritize proactive maintenance to the Interstate and Primary system to support continually improving performance while simultaneously extending the pavement life. The Commissioner of Highways provides an annual report to the CTB on the projected and actual performance, most recently in September 2021.

Percent Sufficient (Good or Fair) Lane Miles



2021 Targets and Percentage of Sufficient Lane Miles:



How Are We Improving Performance?

VDOT's investment strategy includes a strategic and optimal balance of preventive, corrective, restorative, and reconstruction activities within its paving program. VDOT's approach focuses on maintaining highway assets over decades-long asset lifecycles in a cost-effective manner. This strategy has helped prioritize proactive maintenance to the Interstate and Primary system to support continually improving performance while simultaneously extending the pavement life and keeping bridges safe.

In the FY2022-2027 SYIP, the State of Good Repair Program provides $293.5 million funding for the reconstruction and rehabilitation of deteriorated pavements on the Interstate and primary systems and locality maintained primary extensions. The Highway Maintenance and Operating Fund (HMOF) provides additional funding for maintaining the roadway network.

Highway maintenance spending represents 35 percent of VDOT's annual budget, totaling over $1.7 billion in FY 2022. Some example projects include:

- I-64 Capacity, Safety Improvements – Segment 3. $244M, 8.36-mile pavement reconstruction project in York County that will also enhance mobility and safety by adding lanes and a 12-foot wide shoulder in each direction.
- VDOT provides public access through the Virginia Roads open data portal to a statewide paving status map[23] that identifies segments recently completed, in progress, or scheduled for paving. As of October 1, 2021, 2,475 roadway segments totaling 4,817 lane miles of roadways have been paved. Routine paving helps extend the life of existing pavements by protecting from the effects of aging, stress, and water damage.

Transit Rolling Stock, Equipment, Facilities, and Track Segment Condition

What Are We Measuring?

The State of Good Repair for four categories of transit and passenger rail capital assets:

- **Rolling Stock –** Percent of revenue vehicles exceeding useful life baseline (ULB)
- **Equipment –** Percent of non-revenue service vehicles exceeding ULB
- **Facilities –** Percent of facilities rated under 3.0 on the Transit Economic Requirements Model (TERM) scale
- **Infrastructure –** Percent of track segments underperformance restriction

For the purpose of transit asset management, the Federal Transit Administration (FTA) separates transit providers into two groups, Tier I and Tier II. Tier I providers operate 101 or more vehicles across all fixed route modes during peak regular service or operate rail; Tier II providers operate 100 or fewer vehicles, or are a subrecipient under the 5311 Rural Area Formula Program. There are six Tier I providers and 34 Tier II providers in Virginia.

How Is Virginia Performing?

Tier I Providers

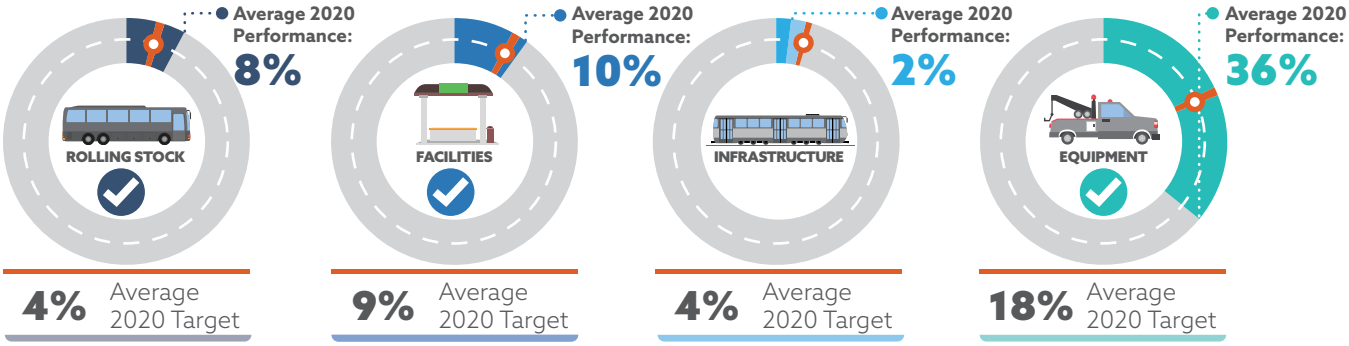
Data compiled from FTA's National Transit Database (NTD) was used to compare current asset inventory conditions against performance targets set by each transit operator.

Virginia Railway Express (VRE)

VRE has met their ambitious performance targets for exceeding useful life or minimum asset condition. Based on the latest published asset performance data (2019), zero percent of VRE vehicles and equipment exceed their useful life, and zero percent of infrastructure and facilities are rated below minimum condition standards.

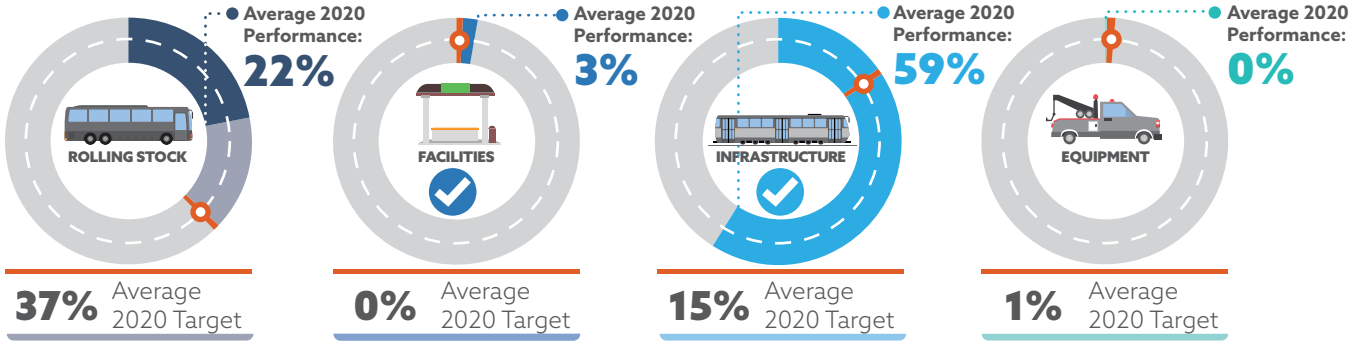
Washington Metropolitan Area Transit Authority (WMATA)

WMATA met their infrastructure (heavy rail) targets but have not met their other targets. Eight percent of their vehicles, 10 percent of their facilities, and 36 percent of their equipment have met or exceed their useful life.



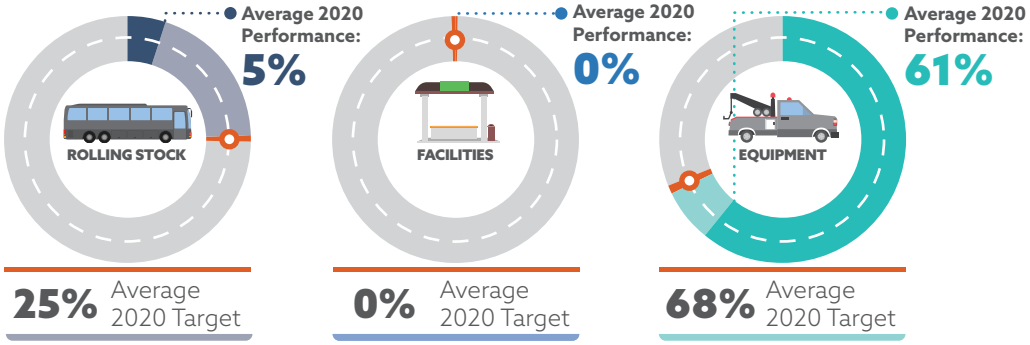
Hampton Roads Transit (HRT)

HRT has not met all of their performance targets. Their vehicles and infrastructure (light rail) met their targets, but three percent of their facilities and 59 percent of their equipment have met or exceeded their useful life benchmark.



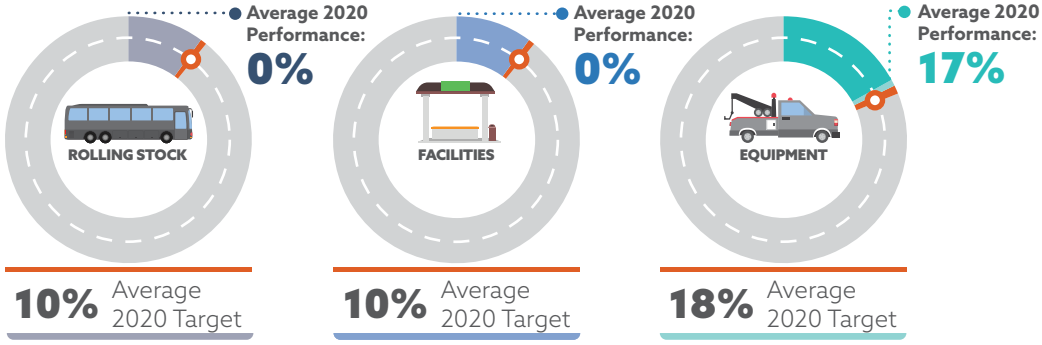
Greater Richmond Transit Company (GRTC)

GRTC has met all of their performance targets.



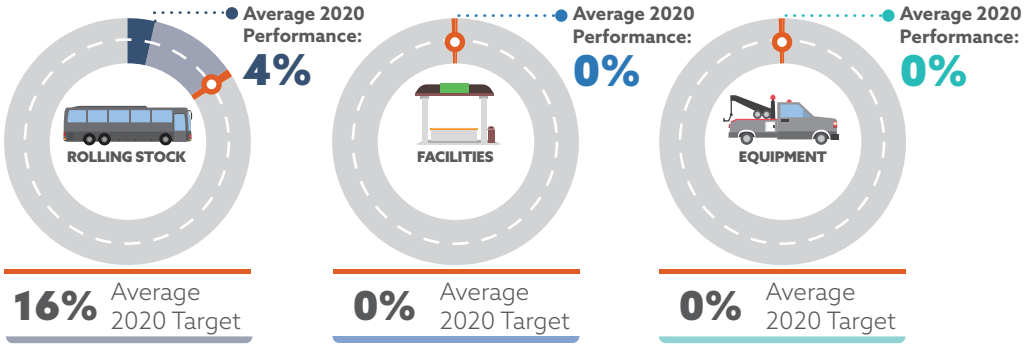
Fairfax County

Fairfax County has met all of their performance targets. Zero percent of their vehicles or facilities have met or exceeded their useful life benchmark.



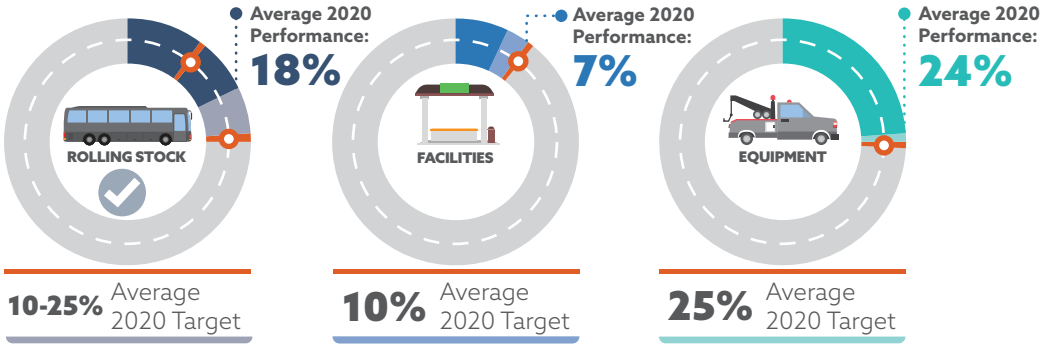
Potomac and Rappahannock Transportation Commission (PRTC)

PRTC has met all of their performance targets. Zero percent of their facilities and equipment have exceeded their useful life benchmark.



Tier II Providers

Aggregated asset inventory condition assessments for Tier II providers are published in the NTD consistent with the group Transit Asset Management (TAM) Plan[24] developed by DRPT for these 34 providers in October 2019.



How Are We Improving Performance?

Aging infrastructure creates maintenance challenges. Integrating asset management principles into the everyday business of transit providers creates accountability and transparency for the condition of revenue vehicles, equipment, and facilities. Transit asset management practices allow for advanced planning to manage aging infrastructure by balancing preventive maintenance with asset replacement.

DRPT's Transit Grant Program, MERIT, and Commuter Assistance Program, CAP, provide financial assistance to support public transportation and TDM services throughout the state and are designed to support DRPT's core mission: "To facilitate and improve the mobility of the inhabitants of Virginia, and to promote the efficient transport of goods and people in a safe, reliable, and cost-effective manner."

MERIT places the highest priority on maintaining the state's transit assets in a state of good repair. This approach codifies priorities to prevent the capital program from being diverted to fund expansion projects at the expense of maintaining system assets, as was possible previously.

Healthy and Sustainable Transportation Communities

Virginia provides a safe and efficient transportation system that supports economically prosperous and livable communities. A sustainable transportation future for Virginia can be characterized by a system that operates efficiently with minimal environmental impacts while fostering opportunities for Virginia residents to experience a high quality of life.

Vehicle Miles Traveled per Capita

What Are We Measuring?

MEASURE	SOURCE
Annual vehicle miles traveled (VMT) and VMT per capita	Total annual miles of vehicle travel in Virginia on all public roads as reported annually by VDOT[25] divided by the total Virginia population as estimated annually by the Weldon Cooper Center[26].

Prior to 2020, VMT in Virginia steadily increased as a result of continued population and economic growth. VMT per capita gives a different picture of travel demand by looking at average miles traveled per person. Increases in VMT per capita can negatively impact traffic congestion, air pollution, and public health. Decreases in VMT per capita, even as total VMT increases, is often associated with more travel on alternative modes.

Decreases in VMT per capita result from a variety of factors, including: newly implemented land use policies that better link households to destinations; connected transit, bicycle, and pedestrian infrastructure; economic and social factors; and other strategies to reduce auto use.

How Is Virginia Performing?

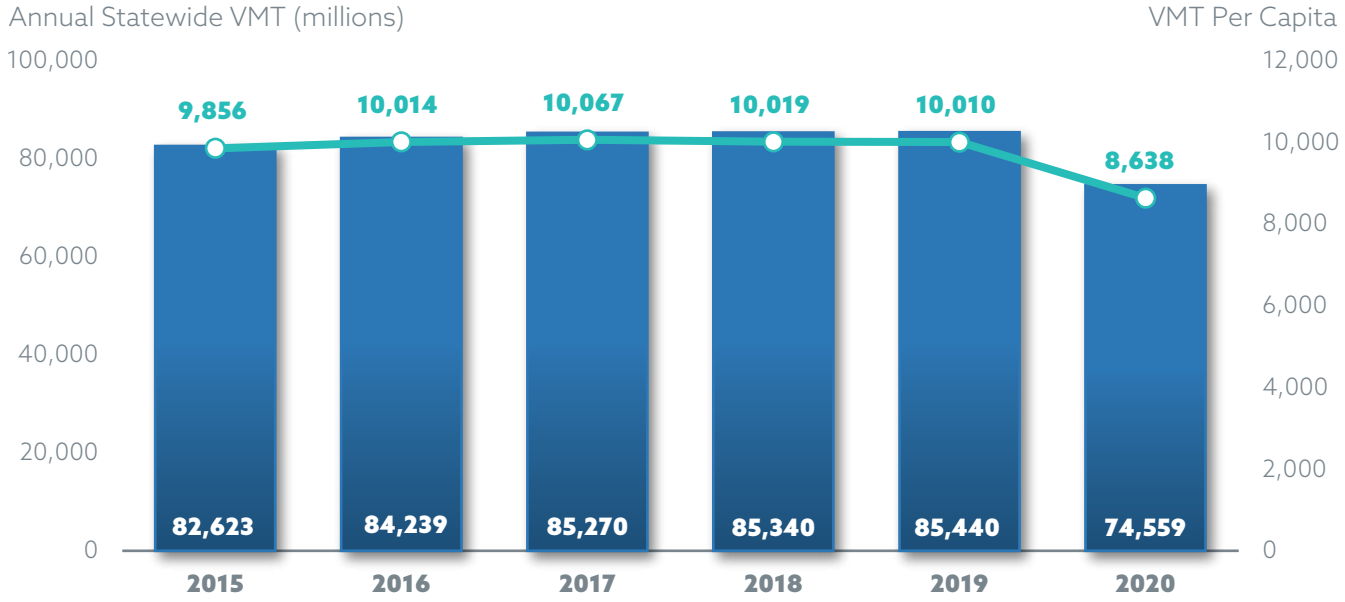
Statewide total VMT increased each year from 2015 to 2017 and then remained stable through 2019. 2020 annual VMT declined 11 percent from 2019 annual VMT as a result of the COVID-19 pandemic impacts to personal and commercial vehicle travel starting in March 2020. Prior to 2020, VMT per capita generally remained steady since 2016, even as VMT gradually increased. In 2020, VMT per capita dropped by nearly 14 percent compared to 2019.

Daily traffic volume, based on information from 512 continuous count stations on roadways across the Commonwealth, dropped to as low as 62 percent below 2019 volumes by the middle of April 2020. Traffic volumes stayed at least 20 percent below 2019 levels through early June. From June through December of 2020, traffic volumes slowly recovered, averaging around 10 percent below 2019 levels.

From January through May 2021, truck volumes have averaged 5 to 10 percent above 2019 levels, while total traffic volume, has steadily increased since March 2021, approaching 2019 volume levels in mid-May.

Annual Statewide Vehicle Miles Traveled (VMT) and VMT per Capita

Decreasing Trend Desired



How Are We Improving Performance?

The Commonwealth's commitment to urban development areas and other communities through grant programs and prioritized investments are encouraging compact and mixed-use development in town centers matched with a safe, multimodal transportation system. This includes the OIPI's new Growth and Accessibility Planning (GAP) Technical Assistance Program[27] and DRPT's newly updated Multimodal System Design Guidelines[28], which provide a set of tools for multi-modal planning and design for the full diversity of jurisdictions throughout the Commonwealth. Also, as part of the DRPT Annual Report, the annual VMT reduction from DRPT's Commuter Assistance Programs are reported.

Investments that expand service and increase the reliability of transit, support micro-mobility options in urban centers (scooters, shared bikes), and improved bicycle and pedestrian networks provide options to reduce vehicle travel. Examples include the Transit Ridership Incentive Program (TRIP), a new statewide grant program created in 2020, dedicated to improving transit's regional connectivity in urban areas with a population in excess of 100,000 and reducing barriers to transit use by supporting low income and zero fare programming. Innovation is a key focus of the Virginia Secretary of Transportation and the CTB has a subcommittee dedicated to the promotion of innovation through emerging transportation technologies and mobility choices.

In July 2020, VDOT was awarded two federal grants totaling more than $4.5 million[29] to support projects that will enhance safety, improve congestion and incident management, and predict parking availability. These tools will provide transportation system managers and travelers more real-time information to improve travel decisions.

On-Road Criteria Pollutant Emissions

What Are We Measuring?

The On-Road Mobile Source Emissions measure tracks the statewide emissions of criteria pollutants and their precursors from on-road vehicles. Criteria pollutants are identified by the Clean Air Act, and it is critical to meet all national ambient air quality standards to protect the public's health. In Virginia, the transportation-related criteria pollutants of most concern are fine particulate matter (PM 2.5) and ozone precursors – nitrogen oxides (NOx) and volatile organic compounds (VOCs).

Emission data is obtained from the U.S. Environmental Protection Agency (EPA) National Emissions Inventory (NEI).

MEASURE	SOURCE
Fine particulate matter (PM 2.5) **Ozone precursors: nitrogen oxides (NOx) and volatile organic compounds (VOCs)**	EPA publishes Air Pollution Emissions Trends Data[1] at the national and state levels for criteria pollutants.

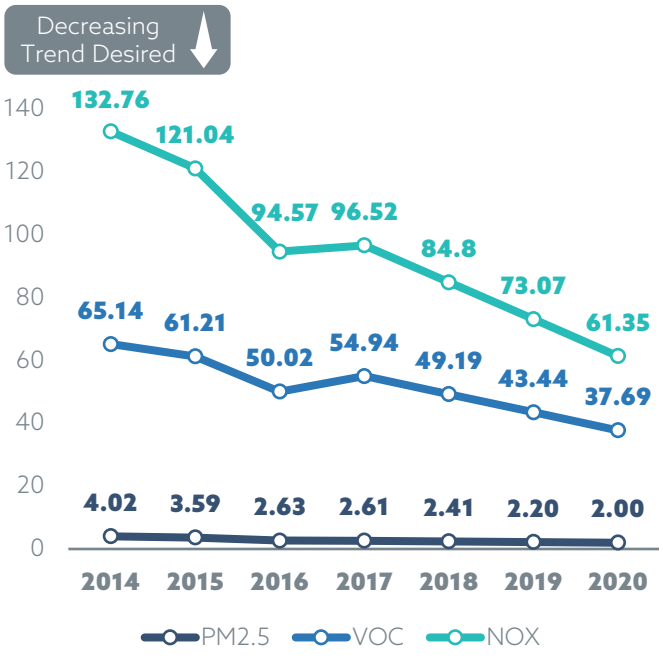
[1] *https://www.epa.gov/air-emissions-inventories/air-pollutant-emissions-trends-data.*

How Is Virginia Performing?

Emissions have declined considerably in the last seven years, especially NOx (49 percent) and VOCs (41 percent). PM2.5 is down 39 percent from 2014. During this same period, statewide VMT increased more than 5 percent. Much of the decline in emissions is attributed to Federal vehicle emission and fuels standards, as new, lower emitting cars and trucks are put into use and older, higher-emitting vehicles are retired.

State and local efforts have also contributed to the significant criteria pollutant declines through delivery of CMAQ-funded projects (Congestion Mitigation and Air Quality Improvement Program), which are designed to relieve congestion or provide alternatives to single-occupancy vehicle travel, thereby improving air quality. Examples of CMAQ programs include the Vehicle Fuel Conversion Incentive Program, which allows state agencies and local governments to be reimbursed for incremental costs to transition to alternative fuels.

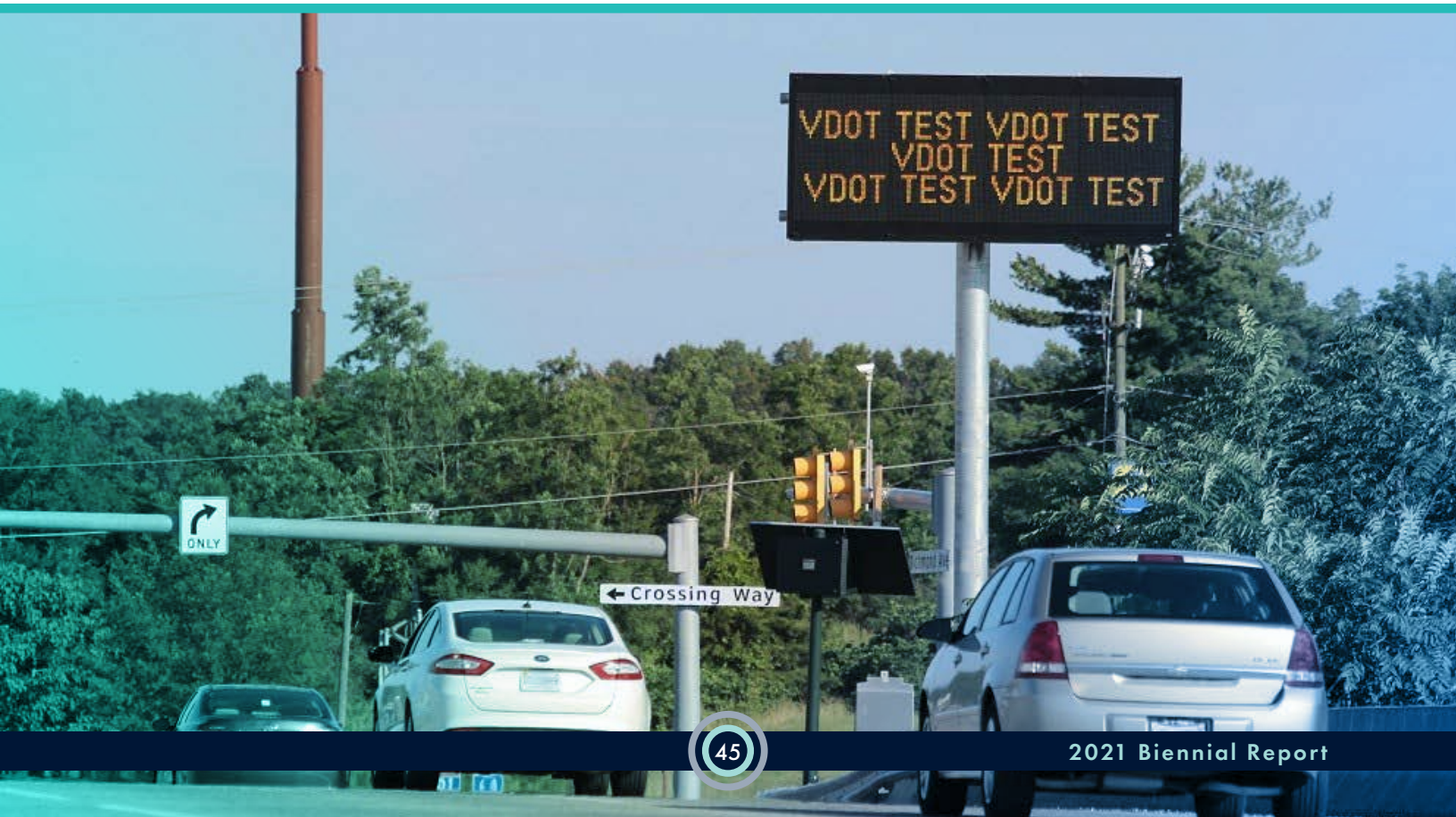
Virginia on Road Mobile Source Emissions (1000 Annual Tons)



How Are We Improving Performance?

Emissions reductions within the transportation sector primarily come from four groups of strategies.

- **Vehicle and fuel technologies –** Federal standards and state incentives to support hybrid, electric, and alternative fuel vehicles will reduce emissions. Legislation was enacted in the 2021 Special Session (Chapter 263[30]) that requires car manufacturers to sell a certain percentage of electric or hybrid electric passenger cars in Virginia, beginning in 2025.
- **Congestion mitigation –** Reducing inefficient travel patterns can help reduce wasteful fuel emissions. For example, a vehicle operating in congested conditions at 25 mph emits 25 percent more greenhouse gases than a vehicle operating at 50 mph. Innovative intersections and interchanges are being designed and constructed throughout Virginia, which eliminate left-turn movements and allow fewer traffic signal phases, reducing delay and increasing capacity. Statewide signal systems and automated traffic signal performance measures will allow for optimum distribution of green time and less delay. Starting in fall 2021, VDOT is implementing a variable speed limit pilot on I-95 northbound in the Fredericksburg region to help manage congestion and improve safety.
- **Reducing vehicle miles traveled per person –** Alternatives to driving alone, such as working from home, transit, shared rides, biking, and walking, help reduce emissions. For example, DRPT operates a number of Transportation Demand Management (TDM) incentive programs, including Vanpool!VA, which provides financial incentives to operate vanpools throughout Virginia, and Telework!VA, which provides resources for business to start or expand formal telework programs.
- **Infrastructure design and fleet management –** Through operation and maintenance activities, VDOT is exploring various innovative concepts, such as broadband installation within transportation right-of-way and other communication technology along priority corridors to prepare for safer and more efficient autonomous and connected vehicles, and a solar power assessment for VDOT facilities.



Greenhouse Gas Emissions

Due to concern over the potential effects of climate change, greenhouse gas (GHG) emissions are receiving increasing attention at many levels of government. This measure tracks the statewide emissions of greenhouse gases from cars, trucks, buses, and motorcycles. **Nationwide, greenhouse gas (GHG) emissions from transportation account for 29 percent of emissions from all economic sectors.** Federal GHG emission standards for cars and trucks and a growing marketplace in Virginia for electric vehicles are helping to reduce GHGs even as VMT increases.

What Are We Measuring?

Legislation was enacted in the 2021 Special Session (Chapter 13[31]) that directs the Department of Environmental Quality (DEQ) to conduct a statewide baseline and projection inventory of all greenhouse gas emissions and to update such inventory every four years. Once DEQ issues their inventory for the transportation sector (anticipated in late 2021), this Virginia specific data will be used as it will represent how we track our progress towards net zero emissions in 2045.

For this report, GHG emissions from transportation are measured by the Environmental Protection Agency (EPA) through the National Emissions Inventory (NEI) and the Inventory of U.S. Greenhouse Gas Emissions and Sinks.

MEASURE	SOURCE
Total on-road mobile source greenhouse gas emissions (mmt CO2e = million metric tons of CO2 equivalents, which includes CO2, methane, and nitrous oxide)	The EPA NEI is developed every three years in coordination with DEQ. The last NEI was developed for 2017, and 2020 is currently under development. EPA also estimates annual GHG emissions trends through publication of the Inventory of U.S. Greenhouse Gas Emissions and Sinks (last published in 2020, including data through 2018).

How Is Virginia Performing?

National fuel economy standards are anticipated to have a great impact on helping to decrease GHG emissions from transportation in Virginia, even as vehicle miles traveled are projected to increase. From 2014 through 2018 (the most recent year with a statewide transportation sector inventory through the EPA NEI), total emissions from on-road transportation sources decreased by 0.6 percent. This is compared to a five percent increase in VMT within Virginia and an over two percent increase in the state's population during the same period.

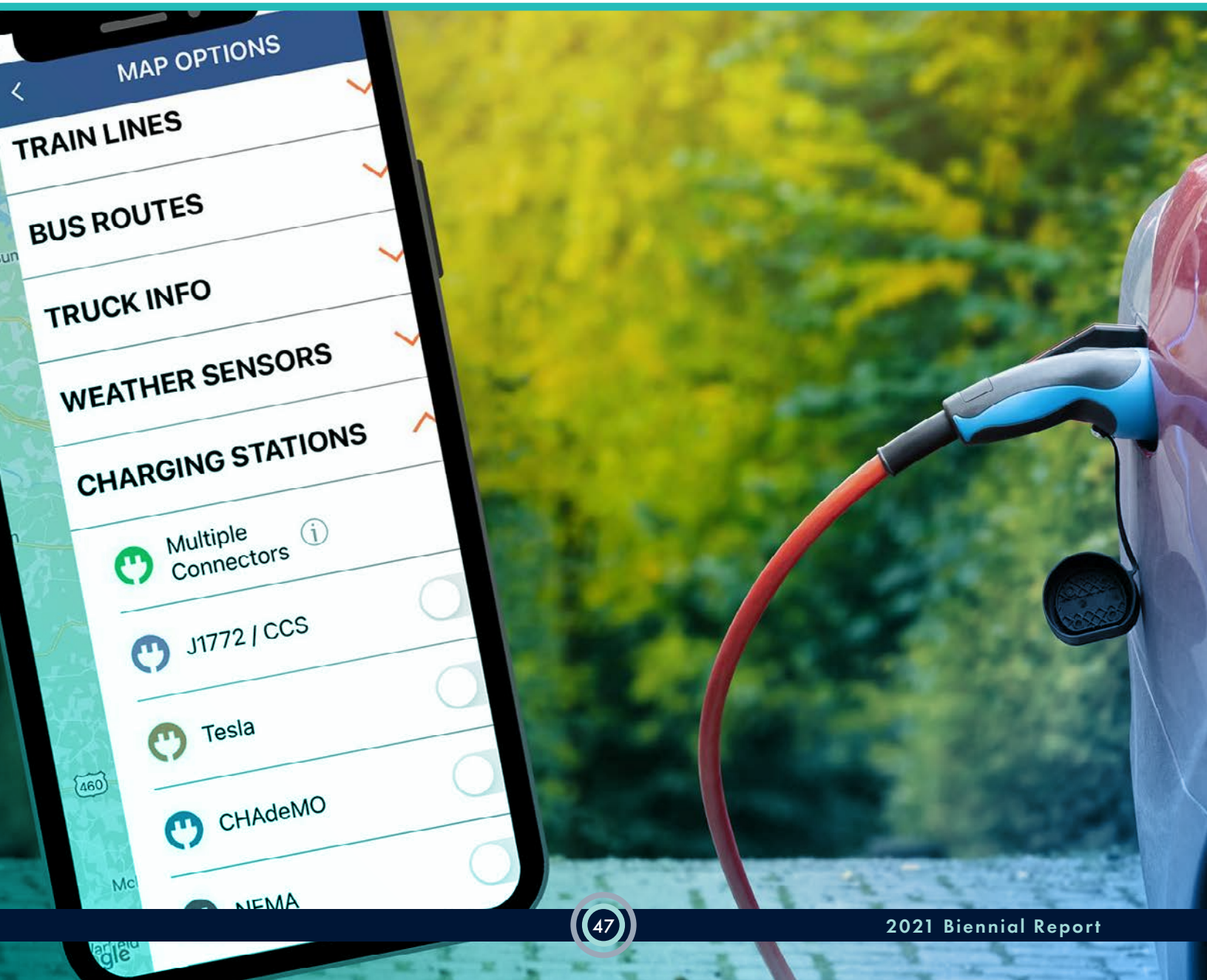
How Are We Improving Performance?

In 2020, VDOT initiated a Statewide Greenhouse Gas Planning Level Analysis to develop resources for addressing GHGs and climate change in National Environmental Policy Act (NEPA) documents. The VDOT study assesses GHG emissions from all surface transportation sources including on-road vehicles, buses, heavy and light rail, commuter and intercity passenger rail, freight rail, and construction and maintenance activities, including the impact of planned transportation investments. The results of the Statewide Greenhouse Gas Planning Level Analysis will provide VDOT and DRPT information to address GHG emissions during the planning and NEPA process.

VDOT, DRPT, and DEQ are investing in new technologies to mitigate criteria pollutant emissions (which have decreased over 30 percent since 2014) and GHGs, including electric vehicle (EV) charging stations and alternative fuel transit and school buses while expanding travel demand management programs and incentives.

VDOT is implementing an Energy Performance Contract to replace over 9,600 existing roadway lights with new, energy efficient light-emitting diode (LED) lights throughout VDOT's Northern Virginia, Fredericksburg, Richmond and Hampton Roads districts. The installation phase started in August 2020 and has continued into 2021. LED lighting is more energy efficient and cost-effective than traditional high-pressure sodium (HPS) roadway lighting while minimizing environmental impacts. The upgrades will enable improved safety for drivers and crews due to enhanced visibility and fewer maintenance activities.

The Transportation Secretariat is developing the framework for an Office of Transportation Sustainability that would lead the transportation sector's response to clean energy policy created by the Virginia Clean Economy Act.[32] The Office is anticipated to focus on four scope areas, including: sustainable investments and initiatives, GHG emissions mitigation and decarbonization, resiliency to climate impacts, and stewardship and land management.



Non-Single Occupancy Vehicle (SOV) Commute Share

Mode share measures the proportion of trips taken by various transportation options, for example driving alone, sharing a ride (carpooling), using public transportation, and walking and biking. Commute mode share reflects how community design and access to different modal options support choices for travel to work and is an indicator of environmental conditions and contributing factors that may affect public health. This measure specifically tracks the percentage of work trips that use options besides driving alone.

What Are We Measuring?

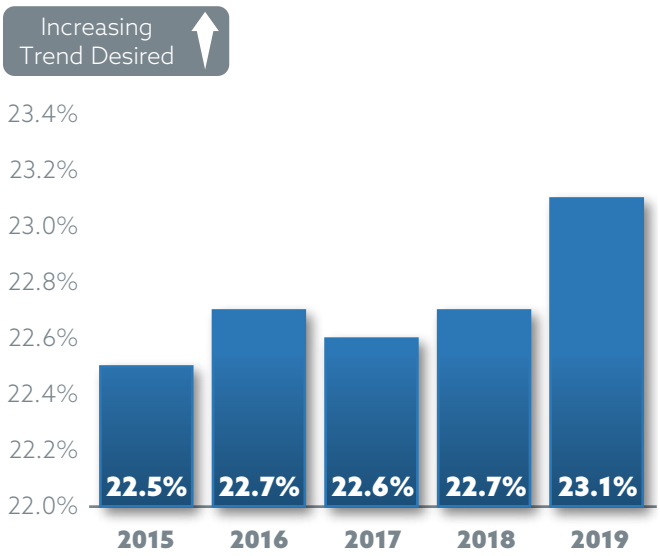
Mode share is based on the American Community Survey (ACS) commuting data from the U.S. Census Bureau, which is updated annually, and typically available by October of the following year. Due to the COVID-19 pandemic and 2020 Census effort, 2020 commuting data is not available for this report.

How Is Virginia Performing?

Driving alone is the dominant commute mode in Virginia and has remained fairly steady in recent years. Non-drive alone commute to work mode share has steadily increased from 22.5 percent in 2015 to 23.1 percent in 2019. This change is attributed to the share of those commuting by carpool and public transit decreasing slightly, while work from home has increased.

Transportation agencies in Virginia conducted surveys throughout 2020 to better understand and plan for changes in commuting behavior due to the COVID-19 pandemic. Important findings from these surveys are called out below, and generally indicate an increased preference for working from home along with a reduced preference for driving.

Non-SOV Commute to Work Mode Share



Based on the "Voices of the Region" survey conducted in Fall 2020 by MWCOG, many Washington D.C. region residents want to drive less for general travel. 47 percent of respondents noted they expected to drive or ride in cars less than before the pandemic.

VDOT and DRPT surveyed the public in fall 2020 to understand how commutes are changing and identify new opportunities to improve commuting. 81% of respondents hope to continue to work from home at least part time.

How Are We Improving Performance?

Building and widening roads is not enough to meet Virginia's transportation needs of today and the future. Investments in public transportation, walking and biking facilities, express lanes, bus rapid transit, and transportation demand management programs that improve mobility are part of the solution. The Commonwealth invests in Commuter Assistance Programs that promote transit, vanpools, carpools, telework, and biking. Examples include Telework!VA, Vanpool!VA, and Bike to Work!VA. The $8 million Parking Demand Management System funded through the Innovation and Technology Transportation Fund (ITTF) will provide real-time parking information for eight park and ride lots on the I-95 corridor that support VRE, vanpooling, and carpooling – enabling better information for commuters.

VDOT and Transurban have entered into a public-private partnerships to build Express Lane and High-Occupancy Toll (HOT) Lane projects in Northern Virginia that have resulted in major improvements to moving more people efficiently in these corridors. By offering time and cost competitive options to driving alone, more commuters are choosing to rideshare, vanpool, or take transit. Toll revenues are used for multimodal projects that will provide more low-cost and reliable travel options to commuters. This includes, for example, the use of the Express Lanes by commuter buses and vanpools on the I-95 corridor.

Percentage of Passenger Fleet Composed of Low-Emission Vehicles

Low emission vehicles include Hybrid Electric Vehicles (HEVs), Plug-in Hybrid Electric Vehicles (PHEV), and Battery Electric Vehicles (BEV) which emit fewer or no emissions compared to conventional, gasoline and diesel powered vehicles. **These vehicle types have a positive impact on air quality, even when factoring in the emissions associated with electricity generation.** This measure tracks the annual registration by the Department of Motor Vehicles (DMV) of HEVs, PHEVs, and BEVs in Virginia as an indicator for reducing on-road vehicle emissions.

What Are We Measuring?

Percentage of passenger low-emission vehicles (LEV) on Virginia's roadway systems are communicated through the following measure:

MEASURE	SOURCE
1. **Number of registered low-emission vehicles in the Commonwealth**	Virginia DMV registration data for vehicles registered and titled each year.

How Is Virginia Performing?

YEAR	REGISTERED HEVS, PHEVS, EVS	SHARE OF VIRGINIA REGISTRATIONS
2014	13,759	1.9%
2015	16,396	1.5%
2016	21,679	1.4%
2017	24,825	1.4%
2018	28,858	1.7%
2019	34,157	1.9%
2020	35,322	2.4%

As Virginia's economy has grown over the prior decade, vehicle ownership has continued to grow, both for all vehicles and for low-emission vehicles. Between 2014 and 2020, the number of registered low-emission vehicles has grown by 157 percent, resulting in an increase in the share of statewide registrations by over 25 percent. A greater selection, more competitive pricing, and improved reliability of HEVs, PHEVs, and BEVs has supported the increase in registrations over time.

How Are We Improving Performance?

A variety of incentive programs, laws, and regulations help to expand opportunity and decrease costs of electric vehicle ownership for private and public fleets. Virginia Energy, previously known as the Virginia Department of Mines, Minerals and Energy (DMME), in cooperation with the Departments of Environmental Quality, Motor Vehicles, and Taxation launched an Electric Vehicle Incentive Working Group[33], which released a report[34] with recommendations on implementing a rebate program to encourage the adoption of electric vehicles in the Commonwealth. The General Assembly passed legislation to create a rebate program for the purchase or lease of new and used electric vehicles, but the rebate program went unfunded in the budget adopted in April 2021. OIPI also recently completed an Electric Vehicle Readiness Study[35] that helps to understand the current level of EV readiness and identifies several ways Virginia can become more prepared for a growing number of EVs.

Legislation was enacted in the 2021 Special Session (Chapter 263) that directs the State Air Pollution Control Board to adopt a low-emissions and zero-emissions vehicle program for motor vehicles beginning with a model year of 2025 and later. After Governor Northam signed the program into law, Virginia became the 15th state – and first in the south – to adopt ambitious low-emission vehicle and zero-emission vehicle standards that are more stringent than federal standards.

Virginia Volkswagen (VW) Settlement Beneficiary Mitigation Plan – The Virginia Department of Environmental Quality (DEQ) administers an environmental mitigation trust that has been established as part of the VW settlement. **$93.6 million is allocated from the trust through Virginia's mitigation plan, and the funding is spread through a suite of programs and projects for surface transportation, including:**

- $14 million committed to expanding EV charging station locations across Virginia.
- $20 million aimed at accelerating the deployment of electric school buses.
- $17 million toward the deployment of all-electric transit buses.

Remaining trust funding will be allocated to the implementation of eligible mitigation actions informed by the public process undertaken during the development of Virginia's mitigation plan

Through the VW settlement funds, DEQ entered into a $14 million contract with EVGo in August 2018 to develop the network over the subsequent three years. As of summer 2020, EVGo has setup 24 fast charging site locations and 76 chargers across the state. Additionally, in July 2021, VDOT announced the availability of a new feature on the 511 Virginia website and mobile app that helps drivers locate electric vehicle (EV) charging stations.

Through the Federal Highway Administration's (FHWA's) Alternative Fuel Corridor designation, Virginia has identified I-64, I-66, I-81, I-85, and I-95 as part of a national network of alternative fueling and charging. **According to the Environmental Protection Agency's (EPA's) Alternative Fuel Center data[36], as of July 2021, there are 898 public electric charging stations with a combined 2,470 charging outlets in Virginia. VDOTs 511 traffic information application now includes charging station locations, number of outlets, and access information.**

Public Transit Fleet Zero Emission Buses

Transit vehicle manufacturers are continuing to improve electric bus technology to increase reliability, extend range, and decrease costs. Increasingly, transit agencies are beginning to replace older diesel buses with buses powered by electricity and other renewable sources to save on fuel and maintenance costs and meet emission reduction goals.

What Are We Measuring?

Virginia's 40 transit agencies operate a diverse fleet of buses. Transit buses are replaced on a regular cycle as they age, while fleets are expanding to support growth in service. This measure tracks the share of new buses entering transit agency fleets each year that are fully electric, Zero Emission Buses (ZEBs).

How Is Virginia Performing?

Virginia's transit agencies began operating the first ZEBs in the Commonwealth in 2020. As of September 2021, there are 18 ZEBs in service in Virginia transit fleets and a total of 22 additional vehicles approved for purchase with transit capital and/or DEQ funds. In total, the in-service and approved for purchase fleet will total 1.46 percent of Virginia's transit fleet.

The majority of the vehicles referenced above were funded during the FY 2020 and FY 2022 grant cycles, where DRPT awarded $17 million available from the Volkswagen Environmental Mitigation Trust to purchase 36 ZEBs and fast charging infrastructure. These funds were leveraged with $12 million from Virginia's state-wide transit capital program. Highlights include the following:

- Hampton Roads Transit (HRT) launched Virginia's first all-electric zero emissions public transit buses in 2020. In doing so, HRT has removed the same number of diesel buses from its fleet.
- In late 2020 and early 2021, Alexandria's public transit company, Driving Alexandria Safely Home (DASH), put six ZEBs into service. The 40-foot battery buses have a 175-mile estimated range between charges.
- In April 2021, Blacksburg Transit (BT) launched five ZEBs into service, supported by $6.9 million in DRPT and DEQ funds that enabled the purchase of five battery-electric transit buses and fast chargers. BT was awarded funding to support the purchase of an additional 12 ZEBs in the FY 2022 grant cycle.
- In the FY 2022 grant cycle, DRPT approved funding to support the first purchases of all-electric ZEBs for three additional transit agencies: four for Fairfax County's Fairfax Connector, three for Roanoke's Valley Metro, and three for Loudoun County Transit.

Additionally, in May 2021, Fairfax County announced the purchase of four electric solid waste trucks and one electric medium-duty truck using $4.4 million in grant funds from the DEQ's Clean Air Communities Program, along with the four new all-electric Fairfax Connector buses.

How Are We Improving Performance?

Funds for transit technologies come from a variety of sources, including DEQ administration[37] of over $93 million in the Volkswagen Environmental Mitigation Trust (Trust) to reduce air pollution in Virginia. The overall goal of the Trust is to fund projects that protect human health and the environment by mitigating emissions from higher intensity sources, like heavier trucks, buses, and maintenance vehicles. Most of the projects funded by the Trust repower or replace diesel vehicles and engines with all-electric ones.

Additionally, during the 2021 General Assembly Special Session HJ 542 was adopted, requiring DRPT to conduct a study of transit equity and modernization in the Commonwealth, with an emphasis on transit services and engagement opportunities for underserved and underrepresented communities. Specific topic areas that will be explored in this study include transit electrification and implementation of emerging technology, with a specific focus on the interrelationship with providing equitable transit service.

INVESTING IN SURFACE TRANSPORTATION | 3

There are four fundamental questions to cover when telling the story of how the Commonwealth takes in revenue for transportation, distributes it to funding programs, prioritizes investment decisions, and then delivers those investments. These questions include:

What are the sources of transportation funding?	Where and how is transportation funding distributed?	How do we make investment decisions?	What transportation programs do we deliver?
Where do revenues for maintaining, operating, and expanding our multimodal transportation system come from?	How are transportation revenues organized and distributed into different funding programs?	What processes do we follow to ensure a transparent and accountable approach to decision making and how are these decisions packaged into investment programs?	How do the implementing agencies deliver the program and track implementation outcomes, and connect these outcomes to performance?

Commonwealth Transportation Fund

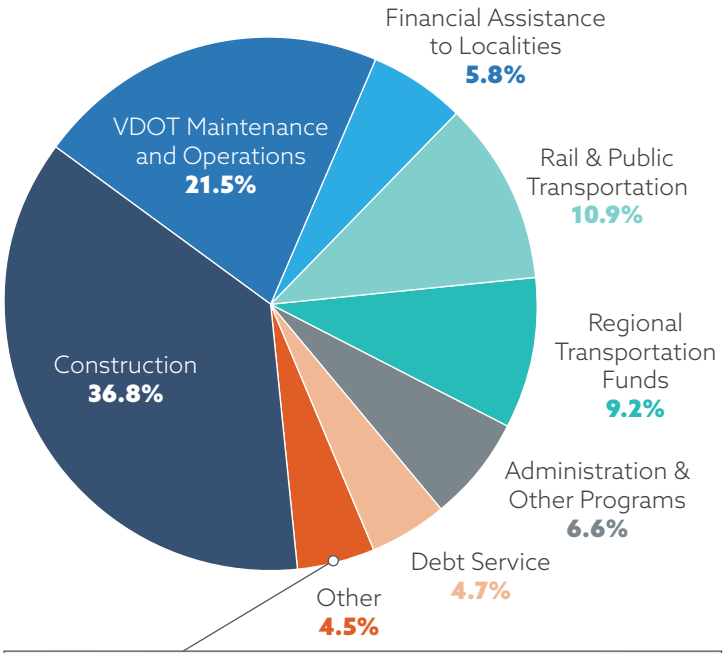
Dedicated state and federal revenues for transportation are deposited into the Commonwealth Transportation Fund (CTF).

Transportation revenues from federal, state, regional, and local sources are deposited into the CTF and then distributed to different sub-funds based on direction established in the Code of Virginia. Each agency and its Board then decides how to develop an optimal package of investments to meet Commonwealth needs. The graphic shows the recommended distribution of the CTF to different agencies and programs for FY 2022.

36.8% to highway construction projects, including contributions from regional and local funding.

27.3% to highway maintenance and operations, including financial assistance to localities.

10.9% to rail and public transportation capital and operating expenses, plus an additional 1.6 percent to the WMATA Capital Fund.



Other includes funds to Department of Motor Vehicles, Port of Virginia, Department of Aviation, Virginia Space Flight Authority, and Washington Metropolitan Area Transit Authority (WMATA).

The **Commonwealth Transportation Board (CTB)** adopted a new CTF six-year financial plan and the 2022-2027 Six-Year Improvement Program (SYIP) in June 2021.

The CTF identifies **$47 billion** for transportation over the next six years including revenue from bond proceeds and a positive revenue impact from the 2020 Omnibus Transportation Package.

The SYIP programs **$24 billion** from the CTF, among other sources, for surface transportation over the next six years, and incorporates the results of SMART SCALE Round 4, other VDOT and DRPT programs like state of good repair, the Omnibus Transportation Package, and COVID-19 impacts on revenues (including federal grants).

2020 Omnibus Transportation Package and 2021 Transportation Initiative

In the 2020 General Assembly, HB 1414, the Governor's Omnibus Transportation Package, adopted changes to transportation funding in Virginia. The legislation helps address declines in state revenues collected from the existing gas tax even as the overall vehicle miles traveled (VMT) on Virginia roadways increases. This occurs by converting the current state motor fuels sales taxes to a fixed excise tax (approx. 16.2 cents per gallon), increasing the tax by five cents in 2021 and 2022, increasing the tax in 2023 and beyond consistent with the consumer price index (reflecting the change in cost of goods and services, reducing base vehicle registration fees by $10, and establishing a new road use charge based on vehicle fuel economy.

Beyond creating new revenue for transportation, the Omnibus Package establishes direction for funding important transportation priorities. For surface transportation, this includes addressing Virginia's 25 special structures, substantially increasing safety funding within a Virginia Highway Safety Improvement Program (VHSIP), creating the Transit Ridership Incentive Program (TRIP), and creating the Virginia Passenger Rail Authority.

In the 2021 General Assembly, as part of the FY 2022 budget, the 2021 Transportation Initiative set aside $323 million for FY 2022 spending drawn from general fund transfers, uncommitted funding from 2020 and 2021, and additional revenue from COVID-19 recovery grants from the federal government. The Transportation Initiative commits over $160 million to intercity passenger rail and VRE service improvements, funding for WMATA, transit fare-free pilot programs, improvements to the I-64 corridor, and development of a regional trails program.

COVID-19 Impacts

The timing of the 2020 Omnibus Transportation Package was fortuitous for Virginia, as changes to the majority of state transportation revenue generated through Virginia's motor vehicle fuels tax (including annual increases in 2020 and 2021, and increases consistent with inflation on an annual basis in 2022 and beyond) is helping offset substantial declines resulting from decreases in vehicle miles traveled (and therefore total fuel purchases) and transit ridership (and therefore total farebox revenue). In addition, one time federal grants associated with the COVID-19 pandemic have helped offset revenue losses, particularly for transit systems, through over $51 million in Section 5311 funds for operating assistance.

In total, FY 2022 total operating revenues of $7.3 billion are 4.6 percent greater than the FY 2021 budget, thanks to the combination of the Omnibus Package, Transportation Initiative, and federal COVID-19 recovery related grants. These revenues are leveraged through the strength of regional funding programs in Northern Virginia, Richmond, Hampton Roads, and the I-81 Corridor, as well as Virginia's bonding capacity and continued commitment to public-private partnerships.

Six-Year Improvement Program

Each year the CTB must approve a Six-Year Improvement Program (SYIP) showing all funded transportation projects proposed for development or study for the next six years.

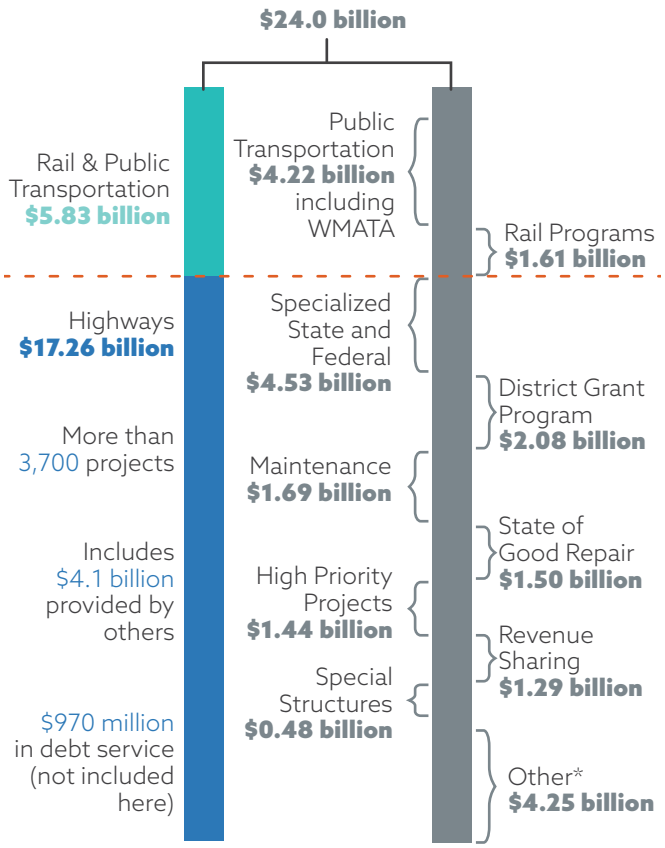
In June 2021, the CTB adopted the FY 2022-2027 SYIP. This is the first complete SYIP update reflecting the impacts of the 2020 Omnibus Package, given guidance in place in 2020 due to the COVID-19 pandemic. This SYIP includes planned Omnibus investments, fuel tax revenue for the I-81 Corridor, new funding programs like the Interstate Operations and Enhancement Program, and $323 million in one-time funding as part of the 2021 Transportation Initiative.

The following link accesses the SYIP database, which contains the approved projects.

http://syip.virginiadot.org/Pages/allProjects.aspx

The database is menu-driven, user-friendly, and provides easy access to details for each project, such as a brief description, the VDOT Construction District in which the project is located, the locality in which the project is located, estimated cost of the project, and the road system on which the project is located. There is also a data field that flags whether a project was selected for funding through the prioritization process of § 33.2-214.1 (SMART SCALE), so the project list can be filtered to show, by District, or SMART SCALE projects only as presented in the below table.

FY 2022-2027 SYIP Summary



* *Includes Research and Planning, and Other Regional Funds*

More information on CTB actions regarding SMART SCALE and the SYIP is available on the CTB website, at the below link:

http://www.ctb.virginia.gov/public_meetings/agendas_and_meeting_minutes/default.asp

ROUND	INFORMATION AND ACCESS
Round 1 FY 2017	All projects selected through SMART SCALE that were approved in FY 2017 are preceded by #HB2. Type #HB2 in the SYIP database Keyword box. FY 2017 SMART SCALE projects were selected in SMART SCALE Round 1.
Round 2 FY 2018	For the list of FY 2018 SMART SCALE projects, type #SMART18 in the Keyword box. FY 2018 Projects are inclusive of projects selected in SMART SCALE Round 2 programmed in the FY 2018-2023 SYIP adopted by the CTB in June 2017.
Round 3 FY 2020	For the list of FY 2020 SMART SCALE projects, type #SMART20 in the Keyword box. FY 2020 Projects are inclusive of projects selected in SMART SCALE Round 3 programmed in the FY 2020-2025 SYIP adopted by the CTB in June 2019.
Round 4 FY 2022	For the list of FY 2022 SMART SCALE projects, type #SMART22 in the Keyword box. FY 2022 Projects are inclusive of projects selected in SMART SCALE Round 4 programmed in the FY 2022-2027 SYIP adopted by the CTB in June 2021.

SMART SCALE

Overview

Virginia's SMART SCALE (§33.2-214.1) program is about prioritizing the right transportation projects for funding and ensuring the best use of limited tax dollars. It is the method of scoring projects that are ultimately funded for implementation through the Construction District Grant Program (DGP) and the High-Priority Projects Program (HPPP) within the Six-Year Improvement Program (SYIP). **Projects are scored based on an objective, outcome-based process that is transparent to the public and allows decision-makers to be held accountable to taxpayers.** Once projects are scored and prioritized, the CTB uses the information to select the right projects for funding. For more information visit smartscale.org.

History

SMART SCALE was established by the Virginia General Assembly in 2014 (§33.2-214.1) to ensure a transparent decision-making process. The Secretary's Office, in partnership with VDOT and DRPT, worked with Virginia's 15 MPOs and 21 Planning District Commissions (PDCs) as well as local partners including counties, cities, towns, and transit operators, to develop the process, seek input on the proposed methodology, and ultimately test implementation.

By The Numbers

Four rounds of SMART SCALE application solicitations and project selections were completed in 2016, 2017, 2019 and 2021, funding more than $4.7 billion in multimodal transportation investments across 611 projects.

Summary by Round

PROJECT APPLICATIONS	ROUND 1	ROUND 2	ROUND 3	ROUND 4
Submitted	321	436	468	406
Scored	287	404	433	397
Funded	162	147	134	167
Total Funding Allocated	**$1.42B**	**$1.03B**	**$0.86B**	**$1.39B**
Total Funded Project Costs	**$2.65B**	**$2.35B**	**$5.08B**	**$1.92B**
Success Rate	56%	36%	31%	42%

The number of project applications submitted and scored increased through the first three rounds of SMART SCALE. This trend coupled with reduced available funding resulted in fewer funded projects and a lower success rate in each successive round.

This trend changed in Round 4. Round 4 coincided with the passing of the 2020 Omnibus Transportation Package by the General Assembly and the COVID-19 pandemic. This led to an increase in funding to support SMART SCALE for Round 4.

COVID-19 created uncertainty, particularly for regional and local revenues, and private sources. As a result, there was a decrease in submitted applications and a decrease in the amount of leveraged funding across all funded projects.

Applicants are encouraged to leverage other funding sources to improve SMART SCALE project cost effectiveness – this occurred at the lowest level of all four rounds in Round 4, with 76 percent of total project costs being supported by the SMART SCALE program. These factors also led to a higher success rate than the two previous rounds and the lowest average total project cost.

Across the four rounds, federal, state, and local funding sources have been leveraged to advance $12.0 billion in total project costs.

Share of Funding by Mode

MODE	ROUND 1	ROUND 2	ROUND 3	ROUND 4
Highway	92.0%	81.3%	67.4%	71.7%
Bicycle & Pedestrian	3.3%	4.5%	14.2%	19.0%
Bus Transit	1.9%	4.1%	14.2%	4.4%
Rail Transit	0.7%	9.0%	2.9%	3.6%
TDM	2.1%	1.1%	1.4%	1.3%

SMART SCALE is truly a multimodal investment program. The share of funding by mode has continued to show more balance over each round, while still meeting the most critical needs and funding the most cost-effective projects. This is highlighted by the steady increase in the share of bicycle and pedestrian projects in the last two rounds and stable funding shares for transit and TDM projects.

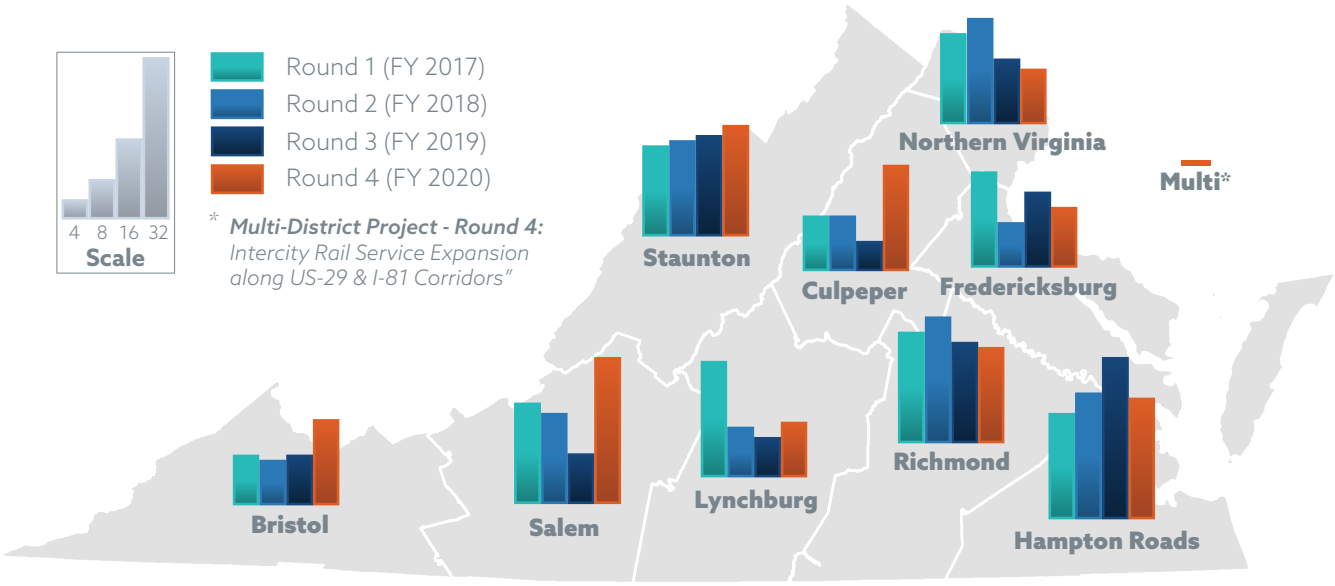
When looking deeper into the multimodal balance, in Round 4, 39 percent of submitted highway projects included at least one multimodal element, resulting in nearly $530 million in funding for these projects. Common multimodal elements included sidewalks, shared-use paths, and bus stops or shelters. 11 percent of all funded highway projects incorporated a combination of bicycle/pedestrian and transit components. Including multimodal elements in the scope of highway projects helps to close gaps in local networks and increase access to destinations and supports competitive scoring in SMART SCALE.

Funding by Highway Construction District (Round 4)

DISTRICT	# OF PROJECTS	TOTAL ALLOCATED FUNDING (MILLIONS)
Bristol	17	$90.2
Culpeper	21	$164.2
Fredericksburg	12	$113.3
Hampton Roads	24	$168.4
Lynchburg	11	$154.5
Northern Virginia	11	$238.4
Richmond	19	$186.6
Salem	29	$142.8
Staunton	22	$79.1
Multi	1	$50.0
Total	**167**	**$1,397.5**

This map presents the number of funded SMART SCALE projects by District for each of the four rounds. The results show the variability of funded projects for each round by District, indicating that success in a prior round is not necessarily indicative of success in the next round. Note that funding for SMART SCALE comes through two main pathways —the Construction District Grant Program (DGP) and the High-Priority Projects Program (HPPP). Projects applying for DGP funds compete with other projects from the same District, while projects applying for HPPP funds compete with projects from across the Commonwealth.

Number of Funded SMART SCALE Projects Per Round by Construction District



Share of Funding by Project Cost

The distribution of funded projects by number and cost have varied through four rounds of SMART SCALE.

SMART SCALE Cost: In Round 4 a greater share of mid-range projects between $10 to $50 million were funded compared to previous rounds, while the number of smaller projects under $10 million remain in the same range. The $4.7 billion in four rounds of SMART SCALE funding is nearly evenly distributed between project requests $10 million or less, between $10 to $50 million, and $50 million or more as shown below.

Funded Projects by Number and Value – SMART SCALE Request Only

SMART SCALE COST	ROUND 1	ROUND 2	ROUND 3	ROUND 4	DISTRIBUTION $ VALUE (ALL ROUNDS, IN BILLIONS)
$10M or less	128	125	119	127	$1.77
$10M-$50M	30	17	12	37	$1.74
$50M or more	4	5	3	3	$1.18
Total	**162**	**147**	**134**	**167**	**$4.69**

Note: The SMART SCALE request only, not including leveraged federal, state, local, or private sources of funds.

Total Project Cost: In Round 4 a larger share of mid-range projects between $10 to $50 million were funded compared to previous rounds, while the number of smaller projects under $10 million increased only slightly. The $12.0 billion in four rounds of projects is progressively distributed between project requests $10 million or less, between $10 to $50 million, and $50 million or more as shown below.

Funded Projects by Number and Value – Total Project Cost

TOTAL PROJECT COST	ROUND 1	ROUND 2	ROUND 3	ROUND 4	DISTRIBUTION $ VALUE (ALL ROUNDS, IN BILLIONS)
$10M or less	118	114	113	120	$1.69
$10M-$50M	32	24	17	43	$2.28
$50M or more	13	9	4	4	$8.04
Total	**163**	**147**	**134**	**167**	**$12.00**

Note: Includes leveraged federal, state, local, or private sources of funds.

Nearly 70 percent of the $12.0 billion total project cost across four rounds is associated with projects over $50 million. The number of these projects have decreased by number through each successive round. 45 percent of the total project cost for the 29 projects over $50 million is associated with one project – the Hampton Roads Bridge-Tunnel/I-64 Expansion project funded in Round 3. Projects in this size range represent some of the most complex, multimodal investments in Virginia's history and are leveraged significantly by other federal, state, regional, local, and private funds.

Measuring SMART SCALE Funded Project Benefits

A key facet of the data-driven approach to analyzing and prioritizing each project in SMART SCALE is a focus on quantifying the expected project benefits. Projects are evaluated based on 14 measures across six factor areas, consistent with VTrans goals and objectives. The projects selected through the SMART SCALE program are expected to yield benefits, such as reductions in hours of delay and reduced crashes on Virginia roadways.

Some of the estimated SMART SCALE project benefits for the 167 funded projects in Round 4 include*:

- Provides new mobility for **almost 12,000** daily peak period person trips;
- Reduces **over 3,000** daily person hours of peak period delay;
- Helps avoid **over 300** annual fatal or injury crashes anticipated on Virginia roads; and
- Increases multimodal access to jobs, supports efficient goods movement and improved travel time reliability, provides direct access to economic development, and mitigates impacts to the environment.

** Due to differences in the definition of measures to estimate benefits for SMART SCALE projects, the above measures should not be compared to other performance measures in this Report.*

OIPI, working with VDOT and DRPT, continue to assess SMART SCALE projects before and after implementation as a means to better understand how well the prioritization methodology is matching up with real world project results. This includes development of a pre- and post-implementation project methodology to support post-implementation studies as a greater diversity of projects are completed over the coming years.

Project Delivery

Completed SMART SCALE Projects; 2016-2021

DISTRICT	NUMBER OF COMPLETED PROJECTS
Bristol	5
Culpeper	3
Fredericksburg	2
Hampton Roads	6
Lynchburg	10
Northern Virginia	3
Richmond	5
Salem	10
Staunton	14
Grand Total	**58**

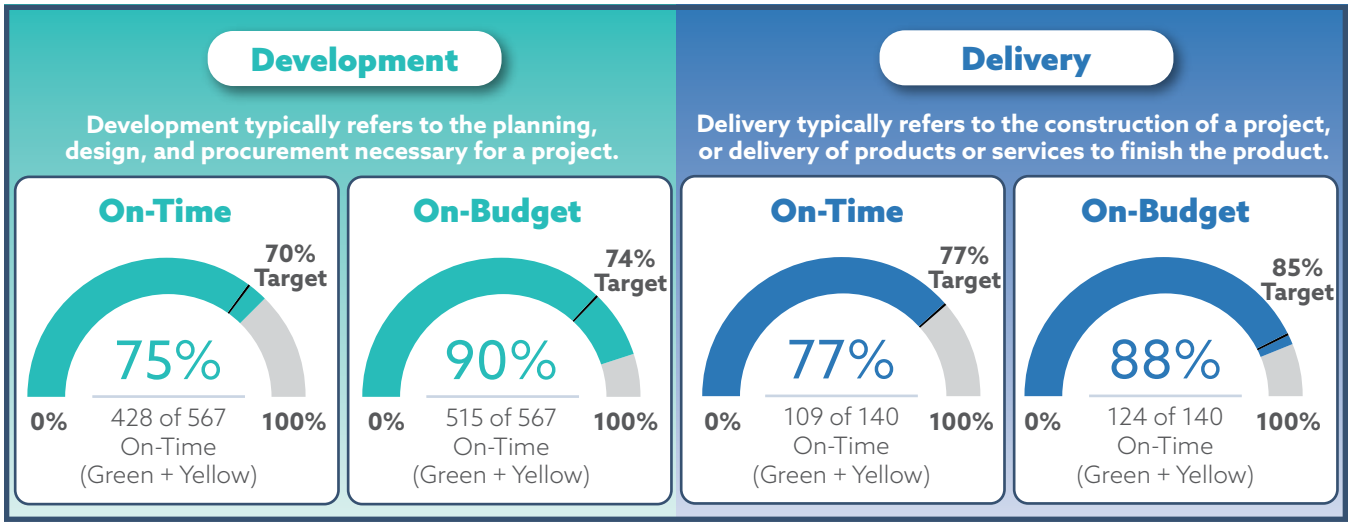
A total of 58 projects funded within the first three rounds of SMART SCALE have been completed as of August 2021. These projects are multimodal and across different systems, including safety, capacity and operational improvements on Interstates, primary, and secondary roadways, as well as TDM program investments in specific corridors, transit vehicle purchases, park-and-ride lots, and shared use paths.

There are 168 funded SMART SCALE projects that will be completed, are under construction, or will be under construction through 2021. This means that out of a total of 444 projects funded in the first three rounds, almost 40 percent are complete, soon to be completed, or under construction.

OIPI, VDOT, and DRPT collaboratively track "on-time" and "on-budget" measures to ensure transparency to the public as it relates to project delivery and schedule. This information is regularly updated through the SMART SCALE Dashboard, available here: (http://dashboard.vasmartscale.org/). Each agency also tracks project status.

- VDOTs Project Dashboard, which tracks implementation of all VDOT administered SYIP projects, is available here: https://virginiadot.org/dashboard/projects.asp.
- DRPTs SMART SCALE Dashboard is updated quarterly and tracks implementation of all DRPT administered projects here: http://www.drpt.virginia.gov/media/3549/smart-scale-dashboard_final-2.pdf

VDOT Project Dashboard Snapshot – October 2021



Key Outcomes

OIPI, VDOT, and DRPT have committed to a regular process of review, lessons learned, and continuous improvement to the entirety of the SMART SCALE process, from application, to scoring, to presentation of results, and to programming decisions. Key outcomes from the overall process, since 2016, include:

- Fostering greater partnership between applicants, VDOT, and DRPT.
- Creating a distinct connection to VTrans and supports regional and local plans.
- Providing a high-level of transparency to decision makers and the public.
- Featuring a commitment to continuous process improvement which regularly generates new recommendations to the CTB for changes to policy and procedures.
- Requiring earlier project development activity between applicants, VDOT, and DRPT, which has led to early identification of risks and feasibility concerns.
- Including an application validation process which helps ensure fairness and minimizes risk early in project development.
- Encouraging more targeted and cost-effective transportation investments.
- Fully funding and committing to the implementation of selected projects.
- Enabling VDOT, DRPT, and applicants to track project development progress to ensure on time/on budget completion.
- Leveraging more than $7.3B from regional and local funding sources and allocating $4.7B in funding for $12.6B in operational and capacity transportation improvements.

Example Diverse SMART SCALE Projects Under Construction in 2021

I-64 Southside / High Rise Bridge (Chesapeake)

Construction began in summer 2018 on this $409.6 million project funded by SMART SCALE, the Hampton Roads Transportation Accountability Commission (HRTAC), and FHWA. This design-build project is scheduled for completion in December 2022. The project will improve safety and mobility along 9 miles of I-64, including a new High Rise Bridge span, an express lane in each direction from Bowers Hill to 1 mile past I-464, bridge widenings, and new stormwater management facilities and noise walls.

Pedestrian Intersection Improvements (Saluda)

VDOT funded the construction of 1,100 feet of sidewalk, six pedestrian crossings and signals, and one pedestrian crossing refuge at the intersection of Route 17 and 17B in the Gloucester Courthouse area. This infrastructure connects residential and commercial areas, which contains a grocery store, which will improve multimodal accessibility and safety in the area.

Lighting on I-95 (Richmond)

VDOT upgraded and supplemented existing lighting on the entire I-95/I-64 Overlap Corridor, which runs through downtown Richmond. The $7 million safety project began in July 2019 and was completed in September 2020. Improving lighting will increase safety along the corridor, which has numerous segments identified within the top 100 segments with known safety issues.

Transportation Infrastructure Bank

Virginia Transportation Infrastructure Bank (VTIB)

Section 33.2-1500 of the Code of Virginia establishes the VTIB. As required within this report, OIPI is reporting on the status of the VTIB, including the balance, funding commitment made in the prior fiscal year, and performance of the current loan portfolio.

VTIB is a special non-reverting, revolving loan fund and is a sub-fund of the Transportation Trust Fund. The Bank was created for the purpose of making loans and other financial assistance to localities, private entities and other eligible borrowers for multimodal transportation projects.

The Virginia Resources Authority (VRA), as manager of the VTIB, is required to submit Biennial Reports to the General Assembly. The data included below summarizes information included in the July 29, 2021 Biennial Report, available here.[38]

VTIB Status and Balance

- As of June 30, 2021 the total VTIB funds available for award are $117.7 million.

Funding Commitments

- There are five closed loans totaling $298.7 million, of which $200.0 million has been disbursed.
- There is one pending application. Capital Beltway Express LLC (a subsidiary of Transurban USA) submitted an application on July 13, 2021, requesting up to $98 million (plus capitalized interest) to help finance the construction of 495 NEXT.[39]

Performance of Loan Portfolio

- Interest earnings to date (June 30, 2021) total $70.7 million. These earnings include VTIB Fund interest earnings as well as interest earnings from the Transportation Trust Fund and Highway Maintenance and Operating Fund.
- Projected loan repayments through FY 2031 total $85.5 million.

VTIB Outstanding Loans

Complete – U.S. Route 17/Dominion Boulevard: Expand Dominion Boulevard, replace the "Steel Bridge" over the Elizabeth River, and other improvements.

Amount Disbursed: $119,700,130

Loan Balance: $125,157,883, payback ongoing (debt service ramp-up scheduled to begin in 2030)

Ongoing – Parallel Thimble Shoals Tunnel: Build a new two-lane tunnel on U.S. 13.

Loan Amount: $50,000,000 construction loan (plus capitalized interest)

Amount Disbursed to Date: $1,336,490 (remaining VTIB loan disbursements are expected to be drawn close to project completion)

Status: Completion estimated in 2024 (pending ongoing project delays)

Complete – Pacific Boulevard Extension and Expansion: Expand Pacific Boulevard from two to four lanes and extend to Russell Branch Parkway.

Amount Disbursed: $34,991,791

Loan Balance: $17,674,542, payback ongoing

Ongoing Project – Potomac Yard Metrorail Station: Build the Potomac Yard Metrorail Station.

Loan Amount: $50,000,000

Amount Disbursed to Date: $0 (disbursements expected to commence in the next 12 months)

Status: Completion planned for 2022

Ongoing Project – I-395 Express Lanes: I-95 Express Lanes extension 8 miles north on I-395.

Amount Disbursed: $45,000,000

Loan Balance: $46,360,149 (including capitalized interest), interest payments ongoing, principal payments start June 30, 2024

Toll Facilities Revolving Account (TFRA)

Statutory requirements and authorization for the TFRA is set out under §33.2-1529 of the Code of Virginia. As required, OIPI is reporting on the status of the TFRA, including the balance, project commitments from the account, repayment schedules, and the performance of the current loan portfolio.

VDOT annually reports the status of the TFRA. The data included below summarizes information as of June 30, 2021.

TFRA provides a method to finance and/or refinance existing and potential toll facilities. The TFRA is a separate finance approach from the Federally codified loan programs such as the State Infrastructure Bank approach in 23 USC 610. Funds allocated from TFRA intended for planned or operating toll facilities are considered advance funding and are expected to be repaid.

TFRA Balance

» The fund balance in the Toll Facilities Revolving Account as of June 30, 2021 was $62.6 million.

Funding Commitments

» There are nine projects funded through the TFRA totaling $240.3 million in future repayments. These advance allocations are actively being repaid, with at least three project advances repaid by 2022.

Current Balances and Anticipated Repayment (Inter-fund transfers maintained by VDOT)

FUND/FACILITY DUE FROM	AMOUNT (IN MILLIONS)	ANTICIPATED REPAYMENT DATE
E-ZPass / Toll Collection Support (Working Capital)	**$27.3**	On-going
Highway Construction Fund Legacy Projects	**$23.1**	Addressing through project closeout process
I-95 Fredericksburg Extension Procurement	**$12.0**	2021
Powhite Parkway Extension Toll Facility	**$7.6**	Annual payments: Current – 2023
Coleman Bridge Toll Facility	**$39.0**	Annual payments: 2022 – 2032
I-66 Inside the Beltway Express Toll Facility	**$72.0**	Annual payments: 2023 – 2047
Hampton Roads Express Lanes Network	**$59.4**	Annual payments: 2028 – 2037 (governed by Master Tolling Agreement with HRTAC)
Total	**$240.3**	

The Toll Facility Revolving Account has one outstanding Loan Receivable. On April 1, 1999, the Virginia Department of Transportation entered into an agreement with the City of Chesapeake. The loan was for the Chesapeake Expressway construction in the amount of $33,708,000. VDOT and the City also agreed to a loan in 2011 for the construction of Dominion Boulevard. The City did not draw on this loan and it was extinguished.

VDOT and the City acknowledged via a City-State Agreement in 2012, that the funding of the repayment of the 1999 TFRA Payments shall be pursuant to the terms of the 2012 Indenture for the Chesapeake Transportation System bonds. The 2012 Indenture requires that all Revenues of the Chesapeake Transportation System be deposited with the Bond Trustee. The repayment of the Virginia Transportation Infrastructure Bank (VTIB) Loan shall be a subordinate obligation under the Indenture. No repayments with respect to the 1999 TFRA Payments shall be made until the VTIB Loan has been repaid in full. VDOT acknowledged that it will look solely to Revenues generated by the Project for the repayment of the VTIB Loan, the 1999 TFRA Payments and the payment of interest thereon and will not hold the City responsible for repayment of the VTIB Loan or the 1999 TFRA Payments. The lien of the 2012 Indenture shall not be released until provision is made for the repayment of the VTIB Loan, all TFRA Payments and the City contribution to the project.

The 1999 TFRA Payment accrues interest at a rate of three percent per year, compounded semi-annually on each Interest Payment Date. The outstanding principal and interest accrued as of June 30, 2021 is $31.3 million.

Priority Programs

Virginia's performance-based planning and programming cycle implements an objective and quantitative process that brings transparency and accountability to projects selected for transportation funding. Through OIPIs three major program areas, VTrans, SMART SCALE, and Performance Management, OIPI seeks to:

- Analyze the current conditions of the transportation network and identify key needs, assisting the CTB in the development of a comprehensive, multimodal transportation policy.
- Formalize connection between VTrans (PLAN) and programming (INVEST), focusing planning funds on priority VTrans needs through the Project Pipeline.
- Evaluate specific projects to address those needs and fund cost-effective projects.
- Develop measures and targets related to the performance of the Commonwealth's surface transportation network to track progress over time and estimate future system performance based on funded projects.

OIPI takes a leadership role across three key steps within the performance-based planning and programming process, planning, investing, and managing. This section highlights the planning and investing programs.

PLAN

VTrans is Virginia's statewide transportation plan that establishes the overarching vision and goals for transportation in the Commonwealth, developed and updated by the CTB pursuant to § 33.2-353 of the Code of Virginia. The plan identifies the most critical needs as well as long-term risks and opportunities to improve the Commonwealth's transportation system. VTrans has four major elements: Vision and Goals, Mid-term Needs and Priorities; Long-term Needs; and, Strategic Actions. More information on VTrans is available here: https://www.vtrans.org/.

The objective of the Multimodal Project Pipeline is to focus limited planning/project development resources on priorities established by the CTB through VTrans. The Program, led by OIPI, is built around a performance-based planning process to support streamlined project planning and improve project readiness. The goal is to develop projects and investment strategies that can be considered for funding in SMART SCALE, Revenue Sharing, Interstate, and other programs. More information on this Program is available here: https://vaprojectpipeline.org/.

VDOT's Transportation and Mobility Planning Division (TMPD) STARS (Strategically Targeted Affordable Roadway Solutions) Program brings together planners, engineers, and maintenance specialists, along with local stakeholders, to jointly identify cost-effective solutions aimed at improving safety and reducing congestion. STARS projects typically result in multiple recommended improvements that may be eligible for funding through various funding programs such as SMART SCALE, Highway Safety Improvement Program, Revenue Sharing, among others. More information on the STARS Program is available here: https://www.virginiadot.org/projects/stars.asp.

The Virginia Transit Equity and Modernization Study, is aimed at identifying opportunities to advance equitable transit within the Commonwealth. There has been a renewed focus in recent years on the advancement of equity, accessibility, and technology. The study team will explore a wide variety of topics and engage heavily with the public to create a proactive plan for the equitable advancement and modernization of transit in Virginia. More information on the Transit Equity and Modernization Study is available here: https://www.vatransitequity.com/.

DRPT is currently developing the Virginia Statewide Rail Plan for 2022. The Statewide Rail Plan will provide long-term guidance for Virginia's transportation leadership to ensure that the Commonwealth's rail needs for people, communities, and commerce are addressed, policies for future rail investments are consistent, the public is educated on current rail issues, and that rail transportation continues to be a safe, economical, and environmentally friendly mode choice. More information on the Statewide Rail Plan is available here: https://drpt-srp-2022-hdr.hub.arcgis.com/.

OIPI's Multimodal Planning Grant Program provides funding to state, regional, and local staff to collect data, and develop implementable plans that advance context sensitive and multimodal solutions; access management; coordination of land use and transportation efforts; congestion reduction; and community visions of a balanced, multimodal transportation system. Starting in 2021, to support Virginia localities and the goals of OIPI, the Growth and Accessibility Planning Technical (GAP) Assistance Program was started. In FY 2021, 16 unique grants were funded, covering a diverse set of topics across a balance of urban and rural locations. More information on OIPI's GAP technical assistance is available here: https://vtrans.org/about/gap-ta.

Growth & Accessibility Planning
TECHNICAL ASSISTANCE PROGRAM

The Transit Ridership Incentive Program (TRIP) is a new statewide grant program dedicated to improving transit's regional connectivity in urban areas with a population in excess of 100,000 and reducing barriers to transit use by supporting low income and zero-fare programming. The TRIP program was established by Chapters 1230 and 1275 of the 2020 Session of the General Assembly and is set out in §33.2-1526.3. More information on TRIP is available here: http://www.drpt.virginia.gov/transit/trip-transit-ridership-incentive-program/.

MERIT is DRPT's statewide public transportation grants program. The MERIT program consists of operating, capital, project demonstration, technical assistance, and public transportation intern grant programs. The Capital Assistance program utilizes a prioritization process that allows DRPT to allocate and assign limited resources to projects and investments identified as the "most critical." The Operating Assistance program uses a performance-based formula to determine the specific allocation of funds to each operating agency throughout the state. More information on MERIT is available here: http://www.drpt.virginia.gov/transit/merit/.

The Revenue Sharing Program, administered by VDOT in cooperation with participating localities, provides additional funding for use by a county, city, or town to construct or improve the highway systems within such locality, with statutory limitations on the amount of state funds authorized per locality. Revenue Sharing is a 50/50 cash match program governed by Section 33.2-357 of the Code of Virginia. Projects are selected through an application process, and funds are allocated by the CTB. More information on VDOT's Revenue Sharing program is available here: https://www.virginiadot.org/local_assistance_division-revenue_sharing.asp.

The Transportation Alternatives Set-Aside reimbursement program is intended to help local sponsors fund community based projects that expand non-motorized travel choices and enhance the transportation experience by improving the cultural, historical and environmental aspects of the transportation infrastructure. The program does not fund traditional roadway projects nor does it provide maintenance for these facilities. Instead it focuses on providing pedestrian and bicycle facilities, community improvements and mitigating the negative impacts of the highway system. More information about the Transportation Alternatives Program (TAP) is available here: https://www.virginiadot.org/business/prenhancegrants.asp.

The Interstate Operations and Enhancement Program (IOEP) has been established pursuant to § 33.2-372 to improve the safety, reliability, and travel flow along interstate highway corridors in the Commonwealth. Program funds are used to address identified needs in the Statewide Transportation Plan or an approved interstate corridor plan through operational and transportation demand management strategies and other transportation improvements, strategies, or services. The CTB approved in September 2021 the I-64 and the I-95 corridor improvement plans and approved a suite of projects to be funded by the IOEP. These were the first projects approved by the CTB selected using the Program's selection policy adopted by the CTB in June 2021. Many of these projects will be initiated as soon as fall 2022. The final corridor plans and the list of funded projects are available here[40].

The Shortline Railway Preservation and Development Fund[41], established pursuant to § 33.2-1602, benefits the nine short line railroads operating in Virginia, which provide the "local" network and the "last mile" of service for rail freight to reach its destination. The fund promotes the continuation of rail service by achieving Federal Railroad Administration Class 2 track safety standards, allowing freight service to operate at speeds up to 25 mph. It also promotes the development of rail transportation support facilities, encouraging industrial growth and promoting truck diversion from Virginia's highways. A minimum of 30 percent cash or in-kind contribution from private sources is required for this grant. No more than 50 percent of the total annual funds available for the RPF can be dedicated to any one project.

The 2020 General Assembly established the Commonwealth Rail Fund, set out in § 33.2-1526.4, to replace the Intercity Passenger Rail Operating and Capital and Rail Enhancement Funds. Of the funds allocated to CRF, 93 percent is dedicated to the new Virginia Passenger Rail Authority (VPRA). The remaining seven percent remains with DRPT for planning purposes and grants not administered by the VPRA. Additionally, up to $4 million may be used for the purposes of the Rail Preservation Fund. DRPT is currently developing guidelines for this new program for the Commonwealth Transportation Board's approval. More information on the Commonwealth Rail Fund is available here: http://www.drpt.virginia.gov/rail/grants/.

FEDERAL PERFORMANCE SUMMARY – FHWA MEASURES | A

STATEWIDE MEASURES	DIRECTION	RECENT PROGRESS
Highway Safety (all public roads)		*Decreasing trend and below target desired*
Fatalities (five-year average)	**Challenging**	Fatalities have steadily **increased** since 2017, however performance continues to fall **below** established targets.
Fatality Rate (five-year average)	**Challenging**	Fatality rate has steadily **increased** since 2017 and performance fell **above** the target in 2019 and just **below** the target in 2020.
Serious Injuries (five-year average)	**Improving**	Serious injuries have steadily **decreased** since 2017 and performance continues to fall **below** established targets.
Serious Injury Rate (five-year average)	**Improving**	Serious injury rate has steadily **decreased** since 2017, however continues to fall **above** established 2019 and 2020 targets.
Non-Motorized Fatalities and Serious Injuries (five-year average)	**Improving**	Non-motorized fatalities and serious injuries have steadily **decreased** since 2017 and performance continues to fall **below** targets.
Highway Asset Condition		*Increasing trend and above target desired (% good)* *Decreasing trend and below target desired (% poor)*
Interstate Pavement in Good Condition	**Challenging**	Interstate pavement in good condition **decreased** in 2020 after three years of steady performance but remains **above** established targets.
Interstate Pavement in Poor Condition	**Improving**	Interstate pavement in poor condition has **decreased** since 2017 and remains **below** established targets.
Non-Interstate NHS Pavement in Good Condition	**Improving**	Non-interstate NHS pavement in good condition has **increased** since 2017 and continues to fall **above** established targets.
Non-Interstate Pavement in Poor Condition	**Improving**	Non-interstate NHS pavement in poor condition has **decreased** since 2017 and remains **below** established targets.
NHS Bridge Deck Area in Good Condition	**Challenging**	NHS bridge deck area in good condition has **decreased** since 2017 and falls **below** established targets.
NHS Bridge Deck Area in Poor Condition	**Maintaining**	NHS bridge deck area in poor condition was **steady** since 2017 and falls **below** the 2019 target but is at risk to fall **above** the 2021 target.
Highway System Performance	*Since 2017*	*Increasing trend and above target desired (person miles)* *Decreasing trend and below target desired (truck*
Percent of reliable person miles traveled on Interstates	**Maintaining**	Reliable person miles traveled on interstates was **steady** through 2019 and increased in 2020, with performance **above** targets.
Percent of reliable person miles traveled on non-Interstate NHS	**Improving**	Reliable person miles traveled on non-interstate NHS has **increased** since 2017 and falls **above** established targets.
Truck Travel Time Reliability Index on Interstates	**Maintaining**	Truck travel time reliability **increased** through 2019, then **decreased** in 2020, and falls **above** the established 2019 target

Introduction and Background

This appendix documents performance across the Commonwealth for transportation performance measures that are required by the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA). The Virginia Department of Transportation (VDOT), Virginia's 15 metropolitan planning organizations (MPOs), and applicable public transportation providers are required to monitor and report on performance and must apply a transportation performance management (TPM) approach to transportation planning and programming. TPM requires agencies to use a coordinated, data-driven approach to make transportation investment decisions that support national goals established in Moving Ahead for Progress in the 21st Century (MAP-21) for the Nation's federal-aid highway and public transportation programs. These national goals, aligned with the current VTrans goals are depicted in the table below.

NATIONAL GOAL AREA	NATIONAL GOAL	VTrans Goals
Safety	To achieve a significant reduction in traffic fatalities and serious injuries on all public roads and public transportation systems	
Infrastructure Condition	To maintain the highway infrastructure and transit capital asset systems in a state of good repair	
Congestion Reduction	To achieve a significant reduction in congestion on the National Highway System (NHS)	
System Reliability	To improve the efficiency of the surface transportation system	
Freight Movement and Economic Vitality	To improve the national freight network, strengthen the ability of rural communities to access national and international trade markets, and support regional economic development	
Environmental Sustainability	To enhance the performance of the transportation system while protecting and enhancing the natural environment	
Reduced Project Delivery Delays	To reduce project costs, promote jobs and the economy, and expedite the movement of people and goods by accelerating project completion through eliminating delays in the project development and delivery process, including reducing regulatory burdens and improving agencies' work practice	

VTrans Goals

Economic Competitiveness and Prosperity – Invest in a transportation system that supports a robust, diverse, and competitive economy

Accessible and Connected Places – Increase opportunities for people and businesses to efficiently access jobs, services, activity centers, and distribution hubs

Safety for All Users – Provide a safe and secure transportation system for passengers and goods on all travel modes

Proactive System Management – Maintain the transportation system in good condition and leverage technology to optimize performance of existing and new infrastructure

Healthy Communities and Sustainable Transportation Communities – Support a variety of community types promoting local economies and healthy lifestyles that provide travel options, while preserving agricultural, natural, historic, and cultural resources

Federal Performance Measures

The US Department of Transportation (USDOT), in consultation with states, MPOs, and other stakeholders, established performance measures relevant to the national goals through a series of federal rulemakings. States, MPOs, and providers of public transportation must set performance targets for each measure, and then monitor performance and periodically report to USDOT on progress achieved toward meeting the targets.

Definitions Used in the TPM Framework

Performance measure: an expression based on a quantifiable indicator of performance that is used to establish targets and to assess progress toward meeting established targets.

Target: a quantifiable level of performance, expressed as a value for a measure, to be achieved within a time period.

The federal performance measure rules fall into five performance areas – highway safety, highway asset management, highway system performance, transit asset management, and public transportation safety.

PERFORMANCE AREA	WHAT IS MEASURED	WHERE IT IS MEASURED
Highway Safety	Roadway fatalities and serious injuries for motorized vehicles, bicyclists, and pedestrians	All public roads
Highway Asset Management	Physical condition of pavement and bridges	All National Highway System (NHS) roads
Highway System Performance	Reliability of highway passenger travel	All Interstate and non-Interstate NHS roads
	Reliability of highway truck freight travel	Interstate System
	Highway congestion and emissions	NHS roads in air quality non-attainment and maintenance areas
Transit Asset Management	Physical condition of transit vehicles, equipment, and facilities	Public transportation providers operating in Virginia
Transit Safety	Transit related fatalities, serious injuries, and incidents	Public transportation providers operating in Virginia

Establishing Performance Targets for the Federal Measures

OIPI, VDOT, and the Department of Rail and Public Transportation (DRPT) work closely with the MPOs and local public transportation providers to incorporate the TPM requirements into planning and programming activities. The Commonwealth Transportation Board (CTB) has provided direction to OIPI, VDOT, and DRPT and has adopted statewide performance targets, starting in 2017, for several performance measures, consistent with Federal requirements.

The CTB, in cooperation with OIPI, VDOT, and DRPT, establishes performance targets on an ongoing basis, as follows:

» For the highway safety performance measures, OIPI, VDOT and the Department of Motor Vehicles (DMV) establish statewide safety targets and reports them to the National Highway Transportation Safety

Administration (NHTSA) as part of the Highway Safety Plan (HSP) annually by June 30, and as part of the annual Highway Safety Improvement Program (HSIP) report to FHWA annually by August 31.

» For the highway asset management and highway system performance measures, OIPI and VDOT established statewide targets on May 20, 2018. These targets were revisited in 2020 and in some cases the targets were adjusted to reflect the most recent performance and investment information.

» For the transit asset measures, DRPT initially developed a Group Transit Asset Management Plan for Virginia's 34 applicable transit agencies in 2018 and updated it with new available data in October 2019. DRPTs next TAM Plan update is due in October 2022.

» For the transit safety targets, DRPT developed a Group Public Transit Agency Safety Plan (PTASP) in July 2020 covering 15 transit agencies.

Highway Safety

FHWA established the following five highway safety performance measures:

1. Number of fatalities
2. Rate of fatalities per 100 million vehicle miles traveled (VMT)
3. Number of serious injuries
4. Rate of serious injuries per 100 million VMT
5. Number of combined non-motorized fatalities and non-motorized serious injuries

Highway Safety Performance

Virginia's statewide safety performance for 2018 through 2019 is presented in the table below, along with safety targets for calendar year 2021. Performance is expressed as an annual five-year rolling average, which is the average of five individual, consecutive annual points of data. A five-year rolling average provides a smoothing effect for variations in safety data from year to year and helps to better evaluate performance over time.

PERFORMANCE MEASURE (FIVE-YEAR ROLLING AVERAGE)	2013 - 2017	2014 - 2018	2015 - 2019	2019 TARGET	2016 - 2020	2020 TARGET	*2021 TARGET*
Number of Fatalities	759.2	775.2	800.8	840.0	819.4	857.0	***852.0***
Rate of Fatalities per 100 million VMT	0.916	0.924	**0.944**	**0.940**	0.990	0.995	***0.984***
Number of Serious Injuries	7,994.4	7,754.2	7,674.8	7,689.0	7,431.6	7,641.0	***7,451.0***
Rate of Serious Injuries per 100 million VMT	9.660	9.264	**9.072**	**8.750**	**8.924**	**8.871**	***8.615***
Non-Motorized Fatalities and Serious Injuries	731.2	729.0	727.0	714.0	704.2	724.0	***725.0***

Note: *Fatality rate and serious injury rate performance in 2019 did not meet the established target (although, the 2019 serious injury rate did fall below the 2017 baseline value). Serious injury rate is expected not to meet the established target for 2020 (pending FHWA official notice), although the rate continues to decline compared to prior years.*

Fatalities – Annual motorized fatalities in Virginia increased 2.4 percent from 2019 to 2020, while annual VMT decreased by 11 percent. The result is a higher annual fatality rate (increase from 0.97 fatalities per 100 million VMT to 1.12 fatalities per 100 million VMT). As indicated in the above table, this increase in 2020 fatalities led to an increase in the five-year average (2016-2020), up to 819.4 fatalities and 0.990 fatalities per 100 million VMT. Overall, Virginia has experienced an increase in fatalities and fatality rate between 2017 and 2020.

Serious Injuries – Annual serious injuries are trending down (a 16 percent decrease from 2016 to 2020), but the 2020 rate increased slightly from 2019 due to lower VMT resulting from the pandemic. As indicated in the above table, the continued decrease in annual serious injuries led to a continuing decline in the five-year average (2016-2020). The annual increase in serious injury rate resulted in an increase in the five-year average to 8.924 serious injuries per 100 million VMT (which does exceed the 2020 target, however, falls well below the baseline five-year average (2013-2017).

Non-Motorized Fatalities and Serious Injuries – Annual non-motorized fatalities and serious injuries are trending down since 2016, decreasing from 739 fatalities and serious injuries in 2016 to 613 fatalities and serious injuries in 2020. As indicated in the above table, this downward trend has led to a steady decline in the five-year average (2016-2020) to a low point of 704.2 in 2020.

Significant Progress

Each year, FHWA completes an assessment of progress for each state toward achieving statewide safety targets. FHWA determines that a state made significant progress toward its statewide safety targets when at least four of the five targets were met, or the actual outcome was better than the baseline performance. In 2021, FHWA assessed Virginia's progress toward achieving its 2019 safety targets. Based on FHWA's review, Virginia demonstrated significant progress toward achieving its 2019 safety targets. Based on initial review of 2020 performance and established targets, Virginia is expected to make significant progress again (pending FHWA review).

Recently, safety performance data and statewide targets were reviewed as part of the annual process to submit targets within Virginia's HSP and the HSIP. Virginia submitted its HSP to NHTSA by June 30th. The HSIP annual report was submitted to FHWA by August 31, 2021. These reports identify strategies and countermeasures to improve safety on Virginia's roads and established the 2022 targets for the five federally required measures.

Highway Asset Management

FHWA established six performance measures to assess pavement condition and bridge condition for the National Highway Performance Program:

1. Percent of Interstate pavements in good condition
2. Percent of Interstate pavements in poor condition
3. Percent of non-Interstate National Highway System (NHS) pavements in good condition
4. Percent of non-Interstate NHS pavements in poor condition
5. Percent of NHS bridges by deck area classified as in good condition
6. Percent of NHS bridges by deck area classified as in poor condition

The four pavement condition measures represent the percentage of lane-miles on the Interstate or non-Interstate NHS that are in good and poor condition based on an assessment of roughness and cracking, rutting, faulting, or serviceability. The bridge condition measures represent the percentage of bridges on the NHS, by deck area, that are in good or poor condition based on an assessment of primary bridge components. Pavement and bridges in good condition do not require major investment, while those in poor condition will need substantial reconstruction or replacement.

Highway Asset Performance

With over 129,000 lane miles of roadway and more than 20,000 bridges, VDOT maintains and operates the third largest highway system in the nation. Additionally, localities and others operate and maintain over 30,000 lane miles of roadway and 140 bridges on the National Bridge Inventory (NBI). Of the 159,000 lane miles maintained by VDOT and localities, approximately 18,700 lane miles are on the NHS (or 12 percent of the roadway inventory). Of the bridges, approximately 3,700 are NBI structures on the NHS (or 17 percent of the bridge inventory).

Virginia collects and reports pavement and bridge condition data to FHWA each year through annual NBI and highway performance monitoring system (HPMS) submissions. This data is used as the basis for establishing two-year and four-year targets and for tracking performance and progress toward the targets. The targets originally set in 2018, and reviewed in 2020, represent expected pavement and bridge condition at the end of 2019 and 2021, respectively.

The table below presents statewide pavement and bridge performance for the 2017 baseline year and for 2018 through 2020, the most recent year of available data. The 2019 and 2021 statewide targets that Virginia established on May 18, 2018, are also shown.

PERFORMANCE MEASURE	2017	2018	2019	VIRGINIA 2-YEAR TARGET (2019)	2020	VIRGINIA 4-YEAR TARGET (2021)
Pavement Condition						
Percent of Interstate pavements in good condition	57.8%	57.5%	57.9%	n/a	56.3%	45.0%
Percent of Interstate pavements in poor condition	0.5%	0.3%	0.3%	n/a	0.2%	3.0%
Percent of non-Interstate NHS pavements in good condition (full distress + IRI)	35.4%	34.8%	36.7%	25.0%	36.6%	25.0%
Percent of non-Interstate NHS pavements in poor condition (full distress + IRI)	1.0%	0.9%	0.9%	5.0%	0.8%	5.0%
Bridge Condition (VDOT owned and maintained bridges only)						
Percent of NHS bridges (by deck area) in good condition	33.7%	32.6%	32.1%	33.5%	29.4%	30.5%*
Percent of NHS bridges (by deck area) in poor condition	3.4%	2.7%	2.3%	3.5%	3.1%	3.0%

** Note: Four-year target was adjusted from 33.5 percent to 30.5 percent in September 2020.*

Pavement Condition – As shown in the table, pavement condition on the Interstate system fluctuated slightly between 2017 and 2020. The percent in good condition decreased from 57.8 percent to 56.3 percent while the percent in poor condition decreased from 0.5 percent to 0.2 percent. On the non-Interstate NHS, pavement in good condition increased to 36.6 percent, while pavement in poor condition decreased to 0.8%.

For the Non-Interstate NHS pavement measures, performance in 2019 exceeded the 2019 targets for good and poor condition. Across all four pavement measures, 2019 performance also well exceeds the established four-year targets (2021). Based on VDOT's maintenance strategy and funding, these results were expected and there is high confidence that performance in 2021 will also exceed the four-year targets.

Bridge Condition – The federal measures require that Virginia include federally owned bridges and bridges owned by adjacent states in the performance calculations. The performance data for 2017 through 2020 in the above table reflect only the portion of the NHS that Virginia is responsible for and do not include any federally owned bridges and bridges owned by adjacent states. However, the 2019 and 2021 targets in the table are inclusive of the additional bridges.

For the bridge condition measures, the percent of bridge deck area in good condition declined between 2017 and 2020, from 33.7 percent to 29.4 percent. The percent of NHS bridge deck area in poor condition decreased from 3.4 percent to 3.1 percent, which shows improved performance.

These performance trends and targets were presented to the CTB in July 2020 and a revised four-year good condition target for bridges was adopted through a CTB resolution in September 2020. OIPI, VDOT and the CTB decided to adjust the four-year target from 33.0 percent to 30.5 percent for several reasons:

- Virginia's primary funding source for bridge maintenance, the State of Good Repair Program, is only available for bridges in poor condition, limiting VDOT's ability to maintain bridges in fair and good condition and prevent those structures from falling into worse condition.
- VDOT's investment strategy has prioritized reducing the number of bridges in poor condition, lessening emphasis on maintaining bridges in good condition. The results of this are reflected in the improved performance data shown above.
- Data issues in VDOT's bridge condition database, combined with a fuller accounting of border and federal bridges, contributed to inflated bridge condition performance for the baseline year. This, in turn, influenced the selection of two- and four-year targets.

Significant Progress

Every other year, FHWA completes an assessment of progress for each state toward achieving statewide bridge and pavement targets. In fall 2020, FHWA reviewed 2019 performance results for applicable bridge and pavement measures with two-year targets. Virginia met each of its two-year targets for the applicable measures with the exception of the two-year performance target (established in 2018) for National Highway System (NHS) bridges in good condition. Performance decreased slightly between 2017 and 2019, from 33.7 percent to 32.1 percent, falling short of the 33.5 percent target.

Highway System Performance

FHWA established six measures to assess performance of the National Highway System, freight movement on the Interstate system, and the Congestion Mitigation and Air Quality Improvement (CMAQ) Program:

National Highway System Performance

1. Percent of person-miles on the Interstate system that are reliable
2. Percent of person-miles on the non-Interstate NHS that are reliable

Freight Movement on the Interstate

1. Truck Travel Time Reliability Index (TTTR)

Congestion Mitigation and Air Quality Improvement (CMAQ) Program

1. Annual hours of peak hour excessive delay per capita (PHED)
2. Percent of non-single occupant vehicle travel (non-SOV)
3. Cumulative two-year and four-year reduction of on-road mobile source emissions for CMAQ funded projects (CMAQ Emission Reduction)

The first two performance measures assess the reliability of travel time on the Interstate and non-Interstate NHS. Reliability is a measurement of how much travel times on a given route differ from day to day. Travel is reliable when the time it takes to travel along a corridor or system is usually consistent from day to day for similar time periods, whereas unreliable travel is when trips more frequently experience unusually long travel times, usually due to non-recurring bottlenecks, crashes and other incidents, or weather. These two measures are expressed in person-miles, which considers the number of people traveling in vehicles on these roads. A higher percentage for these measures means better performance.

The freight movement performance measure assesses reliability for trucks traveling on the Interstate system. A TTTR index is generated based on the ratio of actual truck travel times to normal travel times. A lower TTTR value means better performance, i.e., more reliable truck travel.

PHED measures the hours of delay resulting from excessive traffic congestion on the NHS during peak travel times, on a per capita basis. The non-SOV travel measure quantifies the percent of travel that occurs by any mode other than driving alone in a motorized vehicle, such as carpool, vanpool, public transportation, commuter rail, walking, bicycling and telecommuting. The CMAQ Emission Reduction measure assesses performance of the CMAQ Program through measurement of total cumulative reductions of on-road mobile source emissions resulting from CMAQ funded projects.

In Virginia, the PHED, non-SOV, and CMAQ Emission Reduction measures apply only to the Northern Virginia portion of the Washington, DC-VA-MD urbanized area. All states and MPOs within the urbanized area must coordinate to set a single, unified four-year target for PHED, and single, unified two- and four-year targets for non-SOV travel.

System Performance

Virginia collects and reports performance data for the system performance measures to FHWA each year. This data is used as the basis for establishing two-year and four-year targets and for tracking performance and progress toward the targets. The targets represent expected performance at the end of 2019 and 2021, respectively.

The table below presents statewide performance for the 2017 baseline year and for 2018 through 2020, the most recent year of available data. Also shown are the 2019 and 2021 statewide targets that Virginia established on May 18, 2018.

PERFORMANCE MEASURE	2017	2018	2019	VIRGINIA 2-YEAR TARGET (2019)	2020	VIRGINIA 4-YEAR TARGET (2021)
Percent of person-miles on the Interstate system that are reliable	84.3%	82.4%	83.6%	82.2%	93.8%	82.0%
Percent of person-miles on the non-Interstate NHS that are reliable	87.5%	87.6%	88.9%	n/a	94.8%	82.5%
Truck Travel Time Reliability Index	1.48	1.58	1.55	1.53	1.32	1.56

For all three measures, performance improved considerably between 2017 and 2020. Performance in 2020 was much higher than the 2017 baseline year due to the travel-related impacts of the pandemic. Prior to 2020, the percent of person-miles traveled in reliable conditions improved on both the Interstate and non-Interstate NHS systems between 2017 and 2019. In 2019, Virginia exceeded its target by reaching a performance of 83.6 percent reliable person-miles traveled on the Interstate and is positioned to achieve the four-year targets on the Interstate system and Non-Interstate NHS. For TTTR, performance in 2019 was slightly worse than the 2017 baseline as well as the 2019 target of 1.53.

CMAQ Measures

The table below presents performance for the CMAQ PHED and non-SOV measures in the Washington, DC-VA-MD urbanized area for the 2017 baseline year and for 2018 through 2020, the most recent year of available data. Also shown are the 2019 and 2021 targets that were established on May 18, 2018. PHED increased from 2017 to 2018 but then decreased in 2019 and dropped dramatically in 2020 due to the pandemic. The percentage of non-SOV travel remained constant from 2017 to 2018 and then rose in 2019. Data to calculate non-SOV travel for 2020 is not expected to be available until December 2021.

PERFORMANCE MEASURE	2017	2018	2019	2020	2-YEAR TARGET (2019)	4-YEAR TARGET (2021)
PHED (hours)	23.0	24.2	22.1	9.1	n/a	26.7
Percent Non-SOV travel	36.6%	36.6%	37.0%	Not yet available	36.9%	37.2%

Performance for the CMAQ emission reduction measure is shown in the table below for the 2017 baseline year and for 2019, the most recent year of available data, along with the 2019 and 2021 targets that were established on May 18, 2018. The targets are reflective of the anticipated emission reductions from all CMAQ projects programmed in the Virginia portion of the National Capital Region Transportation Planning Board transportation improvement programs (TIPs) covering FY 18-21, while the data for 2019 reflects the actual emission reductions. As shown in the table, the 2019 targets were met.

PERFORMANCE MEASURE	2017	2019	2-YEAR TARGET (2019)	4-YEAR TARGET (2021)
CMAQ VOC Cumulative Emission Reductions (kg/day)	2.532	4.491	1.721	1.985
CMAQ NOx Cumulative Emission Reductions (kg/day)	4.074	9.068	3.744	4.230

Significant Progress

Every other year, FHWA completes an assessment of progress for each state toward achieving the system performance and CMAQ measure targets. In fall 2020, FHWA reviewed 2019 performance results for applicable highway system performance, freight, and CMAQ measures with two-year targets. Virginia met each of its two-year targets for the applicable measures with the exception of the two-year performance target (established in 2018) for TTTR Index on the Interstate system. The TTTR Index increased in 2018 to 1.58 and slightly decreased in 2019 to 1.55, just eclipsing the 2019 target of 1.53.

Transit Assets

FTA requires public transportation providers that receive federal transit funding to develop and implement Transit Asset Management (TAM) plans to maintain transit assets in a state of good repair (SGR). FTA created TAM performance measures for four asset categories:

- Rolling Stock: percent of revenue vehicles exceeding useful life benchmark (ULB)
- Equipment: percent of non-revenue service vehicles exceeding ULB
- Facilities: percent of facilities rated under 3.0 on FTA's Transit Economic Requirements (TERM) scale
- Infrastructure: percent of track segments under performance restrictions

Useful life benchmark (ULB) is defined as the expected lifecycle of a capital asset, or the acceptable period of use in service, for a particular transit provider's operating environment.

FTA defines two tiers of public transportation providers for TAM purposes and categorizes providers based on size parameters. Tier I providers are those that operate rail service or more than 100 vehicles in all fixed route modes, or more than 100 vehicles in one non-fixed route mode. Tier II providers are those that are a subrecipient of FTA 5311 funds, or an American Indian Tribe, or have 100 or less vehicles across all fixed route modes or have 100 vehicles or less in one nob-fixed route mode.

Transit Asset Performance Targets

A Tier I provider must establish its own TAM Plan and transit asset targets. A Tier II provider has the option to establish its own TAM plan and targets, or to participate in a Group TAM Plan with other Tier II providers. A plan sponsor, typically a state DOT, develops a group plan for Tier II providers.

DRPT developed a Group TAM Plan for Tier II providers in Virginia. The Group TAM Plan includes 34 participating transit agencies that operate in the Commonwealth. The 2018 and 2019 targets for the Tier II providers are available for review, as is the data and rationale supporting the targets, within DRPTs plan, available here.[42] A 2020 Group Plan Addendum, available here,[43] contains updated 2020 TAM targets. The targets are summarized in the table on the next page.

The Tier I providers include Virginia Railway Express (VRE), Washington Metropolitan Area Transit Authority (WMATA), Hampton Roads Transit (HRT), Greater Richmond Transit Company (GRTC), Fairfax County, and the Potomac and Rappahannock Transportation Commission (PRTC).

ASSET CATEGORY PERFORMANCE MEASURE (34 VIRGINIA TIER II PROVIDERS)	ASSET CLASS	FY 2020 TARGET
Revenue Vehicles		
Age: % of revenue vehicles within a particular asset class that have met or exceeded their Useful Life Benchmark (ULB)	AB – Articulated Bus	15%
	BU – Bus	10%
	CU – Cutaway	10%
	MB – Minibus	20%
	BR – Over-the-Road Bus	15%
	TB – Trolley Bus	10%
	VN – Van	25%
Equipment		
Age: % of vehicles that have met or exceeded their Useful Life Benchmark (ULB)	Non-Revenue/Service Automobile	25%
	Trucks and other Rubber Tire Vehicles	25%
Facilities		
% of facilities with a condition rating below 3.0 on the FTA TERM Scale	Administrative and Maintenance Facility	10%
	Administrative Office	10%
	Maintenance Facility	10%
	Passenger Facilities	10%

Aggregated asset inventory condition assessments for Tier II providers are published in the National Transit Database consistent with the group Transit Asset Management (TAM) Plan developed by DRPT for these 34 providers in October 2019. Based on this information, FY 2020 performance outcomes indicate:

- An average performance of 18 percent of revenue vehicles meeting or exceeding their useful life benchmark
- An average performance of 24 percent of equipment (non-revenue vehicles) meeting or exceeding their useful life benchmark
- An average performance of 7 percent of facilities with a condition rating below 3.0 on the FTA TERM scale

Transit Safety

FTA's Public Transportation Agency Safety Plan (PTSAP) rule requires operators of public transportation systems that receive federal financial assistance to develop and implement a PTASP based on a safety management systems approach. The PTSAPs is anticipated to help ensure that public transportation systems are safe nationwide. Transit providers subject to the rule set targets in the PTASP annually based on the following safety performance measures established by FTA:

- Total number of reportable fatalities and rate of reportable fatalities per total vehicle revenue miles by mode.
- Total number of reportable injuries and rate of reportable injuries per total vehicle revenue miles by mode.
- Total number of reportable safety events and rate of reportable events per total vehicle revenue miles by mode.
- System reliability - Mean distance between major mechanical failures by mode.

Providers initially were required to certify a PTASP and targets by July 20, 2020. However, on April 22, 2020, FTA extended the deadline to December 31, 2020 to provide regulatory flexibility due to the extraordinary operational challenges presented by the COVID-19 public health emergency. On December 11, 2020, FTA extended the PTASP deadline for a second time to July 20, 2021.

The PTASP rule provides two tiers of compliance. Tier I agencies are defined as large transit agencies operating rail fixed guideway transit and having greater than 101 transit vehicles in peak revenue service. Tier I agencies in the Commonwealth include:

- Hampton Roads Transit (HRT)
- Greater Richmond Transit Company (GRTC)
- Potomac and Rappahannock Transportation Commission PRTC

Tier II agencies are defined as a small transit agency not operating rail fixed guideway and running 100 or fewer vehicles in total during peak revenue service. Under the PTASP rule, State Departments of Transportation are tasked with developing the PTASP for all eligible Tier II agencies unless the agency chooses to develop its own plan.

DRPT sponsors the Statewide PTASP for Tier II Small Public Transportation Providers in the Commonwealth. The Statewide Tier II PTASP plan, available here,[44] includes safety performance targets and describes safety management systems in place at the 15 agencies who participated in the Statewide Plan. While DRPT is the sponsor of the group plan, each transit agency is responsible for the plan's implementation and annual review.

The following transit agencies are covered by the Statewide PTASP:

- Blacksburg Transit
- Blue Ridge Intercity Transit Express (BRITE)
- City of Bristol Virginia Transit (Bristol Transit)
- Charlottesville Area Transit (CAT)
- Fredericksburg Regional Transit (FRED Transit)
- Greater Lynchburg Transit Company (GLTC)
- Greater Roanoke Transit Company (Valley Metro)
- City of Harrisonburg Department of Public Transportation (HDPT)
- Jaunt, Inc.
- District Three/Mountain Lynx Transit
- Petersburg Area Transit (PAT)
- Radford Transit
- Suffolk Transit
- Williamsburg Area Transit Authority (WATA)
- Winchester Transit (WinTran)

The PTASP targets for each provider are available in the Statewide PTASP. As this is a brand-new performance measure, safety performance and progress toward targets will be identified in future updates to the Statewide PTASP.

PERFORMANCE MEASURE METHODOLOGY | B

Overview

This Appendix provides technical details regarding the methodology supporting the development of performance measure trends within the 2021 Biennial Report. Technical details include definitions, data sources, and methodologies for the measures identified as "Virginia" or "Both." Federal measure documentation is available in Appendix A, the System Performance Report.

Measures were identified based on three unique sources and organized into the five VTrans goals:

- **Virginia –** These measures were developed for inclusion within the report consistent with CTB direction and OIPI, VDOT, and DRPT staff recommendations. These include unique statewide safety, bridge, and pavement measures and targets adopted by the CTB (these measures and targets are related to, but different from Federally required measures in these same topics).
- **Federal –** These measures are exclusively unique to the Federal transportation performance management requirements specified through MAP-21 and the FAST Act. For FHWA measures, some measures apply only to the Federal system in Virginia (Interstates and National Highway System), which represents roughly 15 percent of all lane miles owned and maintained by VDOT. Also, there are several FHWA measures that only apply to the National Capital Transportation Planning Board region in Virginia. FTA asset condition and safety measures apply to eligible transit agencies in Virginia. These measures are highlighted in more detail in Appendix A, the Federal Performance Report.
- **Both –** Transit asset measures and transit safety measures currently address both Virginia and Federal performance reporting goals. Highway safety measures include unique targets set by the CTB for annual performance as well as targets based on five-year averages consistent with the FHWA performance approach.

Performance Measures

GOALS	SPECIFIC PERFORMANCE MEASURES	PAGE
Economic Competitiveness and Prosperity		
Invest in a transportation system that supports a robust, diverse, and competitive economy	• Person Miles Traveled in Excessively Congested Conditions	9
	• Travel Time Index	9
	• Person Miles Traveled in Reliable vs. Unreliable Conditions	12
	• Rail On-Time Performance	14
	• Mean Distance Between Major Mechanical Failure by Transit Mode	17
Accessible and Connected Places		
Increase opportunities for people and businesses to efficiently access jobs, services, activity centers, and distribution hubs	• Accessibility to Activity Centers for Workers	18
	• Annual Transit Ridership	20
	• Transit Level of Service	23
	• Annual Intercity Passenger Rail Ridership	26
Safety for All Users		
Provide a safe and secure transportation system for passengers and goods on all travel modes	• Roadway Fatalities and Fatality Rate	27
	• Roadway Serious Injuries and Serious Injury Rate	27
	• Non-Motorized Fatalities and Serious Injuries	30
	• Transit Fatalities and Fatality Rate	32
	• Transit Injuries and Injury Rate	32
Proactive System Management		
Maintain the transportation system in good condition and leverage technology to optimize performance of existing and new infrastructure	• Percentage of Sufficient Bridges and General Condition Rating (Interstate, Primary, Secondary)	34
	• Percentage of Sufficient Lane Miles (Interstate, Primary, Secondary)	37
	• Transit Rolling Stock, Equipment, Facilities, and Track Segment Condition	39
Healthy Communities and Sustainable Transportation Communities		
Support a variety of community types promoting local economies and healthy lifestyles that provide travel options, while preserving agricultural, natural, historic, and cultural resources	• Vehicle Miles Traveled (VMT) and VMT per Capita	42
	• On-Road Criteria Pollutant Emissions	44
	• Greenhouse Gas Emissions	46
	• Non-Single Occupant Vehicle Commute Share	48
	• Percentage of Passenger Fleet Composed of Low-Emission Vehicles	50
	• Public Transit Fleet Zero Emission Buses	52

Virginia Performance Measures

Percent Person Miles Traveled in Excessively Congested Conditions – Limited Access Roadways

Definition: Excessively Congested Conditions: Travel times that are 75 percent longer than free-flow travel time during the peak hour (anytime within the 14-hour period, 6AM to 8PM).

System Description: Interstates and Limited Access Roadways.

Data sources: INRIX observed speed data and Average Daily Traffic Volumes with Vehicle Classification data on Interstate, Arterial, and Primary Routes from VDOT's Traffic Monitoring System (TMS).

Methodology: Traffic count data is merged with the INRIX data by highway links (organized by traffic message channel (TMC) codes) to calculate the share of peak-hour person miles traveled (within the 14-hour period, 6AM to 8PM) on facilities experiencing excessively congested conditions (75 percent longer than free flow travel time).

Travel Time Index (TTI) – Non-Limited Access Roadways

Definition: Travel Time Index (TTI): The ratio of the peak-hour travel time to the free-flow travel time.

System Description: Non-Limited Access Roadways.

Data sources: INRIX observed speed data and Average Daily Traffic Volumes with Vehicle Classification data on Interstate, Arterial, and Primary Routes from VDOT's Traffic Monitoring System (TMS).

Methodology: After assigning traffic count data to the INRIX data, by individual highway links (organized by traffic message channel (TMC) codes), the peak hour TTI was weighted by peak hour (within the 14-hour period, 6AM to 8PM) VMT in order to estimate average TTI at the statewide level and for Northern Virginia and the Urban Crescent (Urban Crescent includes all jurisdictions with the Hampton Roads, Richmond, Fredericksburg, and Washington D.C. urbanized areas in Virginia).

Person Miles Traveled in Reliable and Unreliable Conditions

Definitions: Level of Travel Time Reliability (LOTTR): The ratio of the 80th percentile travel time compared to the 50th percentile travel time for an average weekday and weekend.

System Description: Interstates and Limited Access Roadways.

Data sources: INRIX observed speed data and Average Daily Traffic Volumes from VDOT's Traffic Monitoring System (TMS).

Methodology: Speed data for the 80th and 50th percentile speeds, based on an annual average for weekdays and weekends, was used to calculate the LOTTR for each hour during the 14-hour period from 6AM to 8PM. Results are presented as the share of person miles traveled by reliability threshold, classified as follows:

- Extremely Unreliable Travel (80th percentile travel time is 50 percent higher than median travel time), LOTTR greater than or equal to 1.5.
- Moderately Unreliable Travel (80th percentile travel time is between 30 to 50 percent higher than median travel time), LOTTR greater than or equal to 1.3.
- Reasonably Reliable Travel (80th percentile travel time is less than 30 percent higher than median travel time).

Passenger rail on-time performance (OTP)

Definitions: The percentage of time a passenger rail service arrives and departs within a designated window of time of its scheduled arrival or departure.

System Description: Amtrak Virginia intercity rail routes and VRE commuter rail routes.

Data sources: VRE OTP data (from VRE website) and Amtrak OTP Data (from DRPT).

Methodology: OTP tolerance for Amtrak (Virginia routes) is 15 minutes within the scheduled time. For VRE, OTP tolerance is five minutes within the scheduled arrival. While the average annual OTP is shown for Amtrak routes (by line by direction – northbound/southbound), VRE data is shown by month to show the variation due to ongoing improvements.

Mean distance between major mechanical failures by transit mode

Definitions: Mean distance between failure (MDBF) measures the transit fleet's mechanical reliability and success of preventative maintenance efforts. A higher MDBF value indicates improving mechanical performance of our fleet and better service reliability for customers.

System Description: Reliability of transit fleets across Virginia's 40 transit agencies.

Data sources: Data on major transit failures is maintained as part of the National Transit Database and updated annually. The Mean Distance Between Failure metric correspond to the required targets in the Public Transportation Agency Safety Plan.

Methodology: MDBF is determined by the total vehicle mileage divided by the total disruptions due to mechanical failures and is reported by mode.

Accessibility to VTrans activity centers (auto and transit)

Definitions: Activity Center: Defined as part of VTrans, they are areas of regional importance that have a high density of economic and social activity concentrated in VTrans Regional Networks.

Accessibility to Jobs: Number of workers who can access jobs in VTrans Activity Centers within a 45-minute drive or 45-minute transit trip (including up to 30 minutes of walking).

System Description: VTrans Activity Centers identified within the 15 Regional Networks.

Data sources: Auto access and transit access by Census Block Groups (aligned with Activity Centers) was provided by VDOT's Accessibility model. The model was calibrated for the VTrans accessibility measure, which measures the cumulative number of workers that have access to Activity Center jobs within 45 minutes of driving or 45 minutes of transit (which includes up to 30 minutes of walking). The model employed LEHD LODES data to determine workers by workplace and by residential location.

Methodology:

» VTrans Activity Center Transit Access to Driving Access Ratio: To determine this ratio, the number of workers accessing jobs by transit in an Activity Center was divided by the number of workers accessing jobs by auto in an Activity Center. For each Regional Network, the number of workers accessing jobs by transit in each of the Regional Network's Activity Centers was summed, then divided by the number of workers accessing jobs by auto in each of the Regional Network's Activity Centers.

Annual transit ridership and service characteristics

Measures:

» Ridership, in the form of unlinked passenger trips (UPT), offers a snapshot of accessibility outcomes, especially the usefulness of transit services to Virginia residents.

» Vehicle revenue miles (VRM) measure the mileage of transit vehicles while in passenger service and can indicate the amount of transit service provided.

» Vehicle revenue hours (VRH) measure how much time transit vehicles spend in passenger service, serving as an alternate indicator of transit service provided.

» Transit level of service measures are based on an analysis using general transit feed specification (GTFS) data from each transit agency operating fixed-route service in Virginia. This enables measurement of how many hours transit operates as well as how well it connects residents to critical goods and services and jobs to workers.

System Description: Virginia's 40 public transportation agencies.

Data Sources: Ridership, VRM, and VRH are all sourced from DRPT's statewide annual reporting. GTFS-based measures use GTFS from each of the state's agencies and also rely on data from the Census Bureau, as well as LEHD LODES data to determine workers by workplace and by residential location.

Intercity passenger rail ridership

Definition: Unlinked Passenger Trips is the number of times passengers board public transportation vehicles. Passengers are counted each time they board vehicles no matter how many vehicles they use to travel from their origin to their destination and regardless of whether they pay a fare, use a pass or transfer, ride for free, or pay in some other way.

System Description: VRE and Amtrak.

Data sources: DRPT, through annual reporting.

Methodology: DRPT provided unlinked passenger trips for both Virginia's Amtrak service and in Virginia.

Total motorized fatalities and total motorized serious injuries

Definitions: Fatality/Injury: The total number of people killed (a fatality is an injury that results in death within 30 days after the motor vehicle crash in which the injury occurred) or seriously injured (a serious injury is any injury other than fatal, resulting in one or more of the following: severe laceration or significant loss of blood; broken or distorted extremity; crush injuries; suspected skull, chest, or abdominal injury; significant burns; unconsciousness when taken from the crash scene; or, paralysis in a motor-vehicle crash).

System Description: All public roads in Virginia.

Data sources (Fatalities): National Highway Traffic Safety Administration (NHTSA) Fatality Analysis Reporting System (FARS) 2016-2019, Virginia DMV TREDS System via VDOT's Crash Analysis Tool (Tableau workbook) 2020.

Data sources (Serious Injuries): DMV TREDS System via VDOT's Crash Analysis Tool (Tableau workbook).

Methodology: Targets are based on CTB presentations and action items. 2022 targets are based on a presentation and discussions during the June 2021 CTB meeting.[45]

Fatality rate and serious injury rate (per 100 million vehicle miles traveled)

Definitions: This measure utilizes the same definitions for fatalities and serious injuries as detailed in the total motorized fatality/serious injury measure divided by annual statewide public road vehicle miles traveled.

System Description: All public roads.

Data sources (Fatalities): National Highway Traffic Safety Administration (NHTSA) Fatality Analysis Reporting System (FARS) 2016-2019, DMV TREDS System via VDOT's Crash Analysis Tool (Tableau workbook) 2020.

Data sources (Serious Injuries): DMV TREDS System via VDOT's Crash Analysis Tool (Tableau workbook).

Data sources (VMT): VDOT Traffic Data publications.

Methodology: Targets are based on CTB presentations/action items.

Total non-motorized fatalities and serious injuries

Definitions: Bicycle or Pedestrian Fatality/Serious Injury Incidents: The total number of bicyclists and pedestrians killed or seriously injured utilizing the same definitions for fatalities and serious injuries as detailed in the motorized safety measure.

System Description: All public roads.

Data sources (Fatalities): National Highway Traffic Safety Administration (NHTSA) Fatality Analysis Reporting System (FARS) 2016-2019, DMV TREDS System via VDOT's Crash Analysis Tool (Tableau workbook) 2020.

Data sources (Serious Injuries): DMV TREDS System via VDOT's Crash Analysis Tool (Tableau workbook).

Methodology: Targets are based on CTB presentations/action items.

Transit fatalities and injuries: Rate per total VRM by mode

Definitions: Bicycle or Pedestrian Fatality/Injury Incidents: The total number of bicyclists and pedestrians killed or seriously injured utilizing the same definitions for fatalities and serious injuries as detailed in the motorized fatality and serious injury measure.

System Description: Virginia public transportation agencies.

Data sources: Public transportation fatality and injury data is sourced from the Federal Transit Administration's National Transit Database (NTD) Safety & Security annual reporting.

Methodology: Fatality and injury totals are divided by the vehicle revenue miles of each transit mode type (fixed-route and demand response) to generate per VRM rate measures.

Percentage of bridges in good or fair condition – Interstate, Primary, Secondary

Definition: The share of bridges in good or fair condition as determined through the General Condition Rating (GCR) and the average weighted statewide GCR.

System Description: This measure tracks the condition of 21,259 bridges and culverts in Virginia, 19,598 which are owned by VDOT, segmented by facility type.

Data sources: VDOT National Bridge Inventory (NBI) data submitted annually to FHWA.

Methodology: Bridge condition is determined through a recurring inspection process. The inspection process develops a General Condition Rating (GCR) for each structure (bridge or culvert) based on the condition of three different components of a bridge (deck, superstructure, substructure) or the condition of the culvert. The GCR scale is from 0 to 9, with 7 to 9 considered "Good," 5 to 6 considered "Fair," and 4 or less considered "Poor" or "Structurally Deficient." Any bridge with at least one component at 4 or less is recorded as a "Poor" bridge. The average weighted GCR is the average GCR across all applicable bridges, weighted by an importance factor incorporating traffic volumes and detour length.

Percentage of sufficient lane miles – Interstate, Primary, Secondary

Definition: The share of pavement (lane miles) determined to be sufficient based on the Critical Condition Index.

System Description: This measure tracks the condition of over 128,000 lane miles of pavement in Virginia segmented by facility type.

Data sources: VDOT pavement condition data as collected annually and processed by VDOT's contractor, Fugro- Roadware Inc., using continuous digital imaging and automated crack detection technology.

Methodology: Pavement condition is determined through the Critical Condition Index (CCI). The CCI aggregates observed pavement distresses, as recorded through automated pavement inspection, into a 0 to 100 scale. Pavement rated at 60 or better on this scale is considered in fair, good, or excellent condition, and is assigned as "sufficient" pavement. All pavement rated below 60 is considered in poor condition, or "not-sufficient."

Transit Asset Management

Definition:

- **Equipment (age):** Percentage of vehicles that have met or exceeded their Useful Life Benchmark (ULB).
- **Rolling Stock (age):** Percentage of vehicles within a particular asset class that have met or exceeded their Useful Life Benchmark (ULB).
- **Infrastructure (performance):** Percentage of rail track segments (by mode) with performance restrictions by class.
- **Facilities (condition):** Percentage of facilities (by group) with a condition rating below 3.0 on the FTA Transit Economic Requirements Model (TERM) scale.

System Description: Virginia public transportation agencies.

Data sources: Tier 1 Agencies: WMATA Transit Asset Management Plan (October 2018), HRT Transit Asset Management Plan (December 2018), GRTC Transit Asset Management Plan (September 2018), VRE Transit Asset Management Plan (September 2018), Fairfax Connector, and PRTC targets established in the Regional Targets for Transit Asset Management adopted by the National Capital Region Transportation Planning Board in May 2017. Tier 2 Agencies: DRPT Group Transit Asset Management Plan, updated in October 2019 for FFY 2020.

Methodology: Tier I provider TAM plans identified current asset inventory conditions, as well as performance targets set by the agency for each measure. Aggregated asset inventory condition assessments and performance targets for Tier II providers were published in DRPT's Group Transit Asset Management Plan (2018). TAM data is available through the National Transit Database including 2019 performance data. DRPT routinely monitors transit asset condition through data populated into DRPTs TransAM system by each transit provider on a regular basis.

Vehicle miles traveled (VMT) per capita

Definition: Annual vehicle miles traveled (VMT) per capita—the total annual miles of vehicle travel in Virginia on all public roads, divided by the total population in Virginia estimated annually.

System Description: All Virginia Public Roadways.

Data sources: VDOT annual VMT data, Weldon Cooper Center Population Estimates.[46]

Methodology: Statewide VMT and per-capita VMT (divided by total population in the state) between 2015 to 2020 was plotted from the data.

Statewide on-road mobile source emissions (criteria pollutants)

Definitions: Criteria Pollutants: They are the six most common air pollutants— carbon monoxide, lead, ground-level ozone, particulate matter, nitrogen dioxide, and sulfur dioxide—for which EPA has established national ambient air quality standards (NAAQS).

System Description: On-road mobile sources in Virginia.

Data sources: EPA's state emissions trend data for criteria pollutants 1990-2020.[47]

Methodology: From the EPA data source, data is extracted for Virginia from the data series for the "Highway Vehicles" source type and plotting the series to visualize the trend of statewide emissions. For the purposes of this report, fine particulate matter (PM 2.5), and ozone precursors—nitrogen oxides (NOx) and volatile organic compounds (VOCs)—are shown, as they are critical to attaining EPA's air quality standards in Virginia.

Greenhouse Gas Emissions

Definitions: GHG emissions from transportation are measured by the Environmental Protection Agency (EPA) through the National Emissions Inventory (NEI) and the Inventory of U.S. Greenhouse Gas Emissions and Sinks.

System Description: On-road mobile sources in Virginia.

Data sources: The EPA NEI is developed every three years in coordination with DEQ. The last NEI was developed for 2017, and 2020 is currently under development. EPA also estimates annual GHG emissions trends through publication of the Inventory of U.S. Greenhouse Gas Emissions and Sinks (last published in 2020, including data through 2018).

Percentage of non-SOV travel

Definition: This measure measures the proportion of trips taken by various transportation options, for example driving alone, sharing a ride (carpooling), using public transportation, and walking and biking.

System Description: Workers in Virginia sampled by the American Community Survey (ACS).

Data sources: Mode share is based on the American Community Survey (ACS) commuting data from the U.S. Census Bureau, which is updated annually, and typically available by October of the following year. Note, due to the COVID-19 pandemic, and 2020 Census effort, 2020 1-year commuting data is not available for this report.

Percentage of passenger fleet composed of low-emitting vehicles (hybrids or EVs)

Definitions: Low Emission Vehicles: For the purposes of this measure, these vehicles include Hybrid Electric Vehicles (HEVs), Plug-in Hybrid Electric Vehicles (PHEV) and Battery Electric Vehicles (BEV).

System Description: Passenger Cars titled and registered in Virginia on an annual basis.

Data sources: Virginia DMV titling and registration data.

Methodology: For compiling the registrations data, DMV used the "RP-PLATE-ORIGINATION-DATE," as every registration record has this date which is when the plate first came into existence. The Report also references and maps electric vehicle charging station locations based on information from the U.S. Department of Energy Alternative Fuels Data Center.

Public transit fleet zero emission buses

Definitions: Number of new, fully electric zero emissions buses (ZEBs) entering transit agency revenue vehicle fleets.

System Description: Virginia's 40 transit agencies.

Data sources: Each transit agency tracks technologies through DRPTs TransAM system. DRPT also tracks progress and outcomes from grant awards managed by DRPT.

Methodology: This measure applies to battery electric transit buses only within the fleets of Virginia's 40 transit agencies. As of September 2021, there are 18 ZEBs in service in Virginia transit fleets and a total of 22 additional vehicles approved for purchase with DRPT transit capital and/or DEQ funds as part of the Volkswagen Environmental Mitigation Trust.

ENDNOTES

1 https://law.lis.virginia.gov/vacode/title33.2/chapter2/section33.2-232/

2 https://law.lis.virginia.gov/vacode/title33.2/chapter2/section33.2-214.1/

3 https://www.mwcog.org/newsroom/2021/03/09/what-did-the-voices-of-the-region-survey-tell-us-about-travel-during-covid-19-and-beyond-tpb-visualize-2045/

4 https://improve81.org/

5 https://www.virginiadot.org/projects/arterial_management_plans.asp

6 https://virginiadot.org/projects/stars.asp#Purpose

7 https://rm3pvirginia.org/

8 https://dashboard.virginiadot.org/pages/operations/operations.aspx

9 https://railroads.dot.gov/elibrary/metrics-and-standards-final-rule-november-16-2020

10 https://transformingrailva.com/

11 http://vpra.virginia.gov/

12 http://www.drpt.virginia.gov/transit/planning/public-transportation-agency-safety-plan-ptasp/

13 http://www.drpt.virginia.gov/3721.aspx

14 https://www.ctb.virginia.gov/resources/2021/june/reso/12.pdf

15 https://www.nhtsa.gov/press-releases/2020-fatality-data-show-increased-traffic-fatalities-during-pandemic

16 https://rosap.ntl.bts.gov/view/dot/56125

17 https://www.dmv.virginia.gov/general/news/pressReleases/#/News_Article:14800

18 https://www.virginiadot.org/business/ted_app_pro.asp

19 https://www.ctb.virginia.gov/resources/2021/june/reso/12.pdf

20 https://www.dmv.virginia.gov/general/news/pressReleases/#/News_Article:14940

21 http://www.drpt.virginia.gov/transit/planning/public-transportation-agency-safety-plan-ptasp/

22 http://www.ctb.virginia.gov/resources/2021/sept/pres/2_september_presentation_09012021_1.pdf

23 https://vdot.maps.arcgis.com/apps/webappviewer/index.html?id=fbf86e85fdcb43e482432f41ddbb51c7

24 http://www.drpt.virginia.gov/transit/major-initiatives/transit-asset-management-plan/

25 https://virginiadot.org/info/ct-TrafficCounts.asp

26 https://demographics.coopercenter.org/virginia-population-estimates/

27 http://oipi.virginia.gov/planning-assistance/grants/default.asp

28 http://www.drpt.virginia.gov/transit/planning/multimodal-guidelines/

29 https://www.virginiadot.org/newsroom/statewide/2020/vdot-awarded-more-than-45-million-in-federal-grants7-28-2020.asp

30 https://lis.virginia.gov/cgi-bin/legp604.exe?212+ful+CHAP0263

31 https://law.lis.virginia.gov/vacode/10.1-1307.04

32 https://lis.virginia.gov/cgi-bin/legp604.exe?201+ful+CHAP1193

33 https://www.virginiaev.org/

34 https://www.virginiaev.org/wp-content/uploads/2020/11/FINAL-EV-Rebate-Report-11.18.pdf

35 http://www.ctb.virginia.gov/resources/2021/march/pres/ev_readiness_study_ctb_presentation_03-17-21_final.pdf

36 https://afdc.energy.gov/stations/states

37 https://www.deq.virginia.gov/programs/air/vwmitigation.aspx#ElectricBuses

38 https://rga.lis.virginia.gov/Published/2021/RD329/PDF

39 https://www.p3virginia.org/projects/495-next/

40 http://www.ctb.virginia.gov/resources/2021/june/reso/16.pdf

41 https://law.lis.virginia.gov/vacode/title33.2/chapter16/section33.2-1602/

42 http://www.drpt.virginia.gov/media/2549/va_group_tamp-final.pdf

43 http://www.drpt.virginia.gov/media/2949/drpttampaddendumffy2020_compressed.pdf

44 http://www.drpt.virginia.gov/media/3158/ptasp-drpt-tier-ii-final-web.pdf

45 https://www.ctb.virginia.gov/resources/2021/june/reso/12.pdf

46 https://demographics.coopercenter.org/virginia-population-estimates/

47 https://www.epa.gov/air-emissions-inventories/air-pollutant-emissions-trends-data