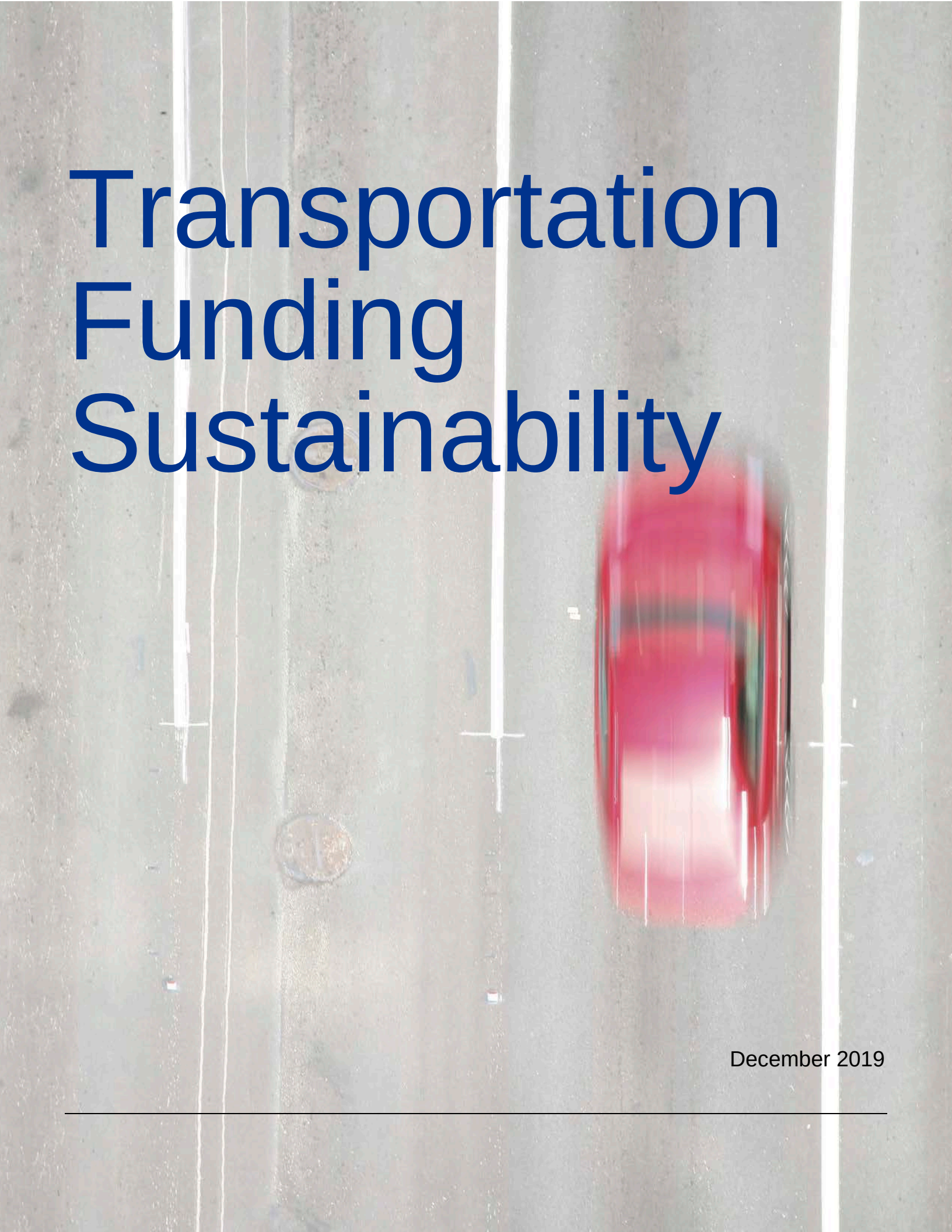
Transportation Funding Sustainability



December 2019

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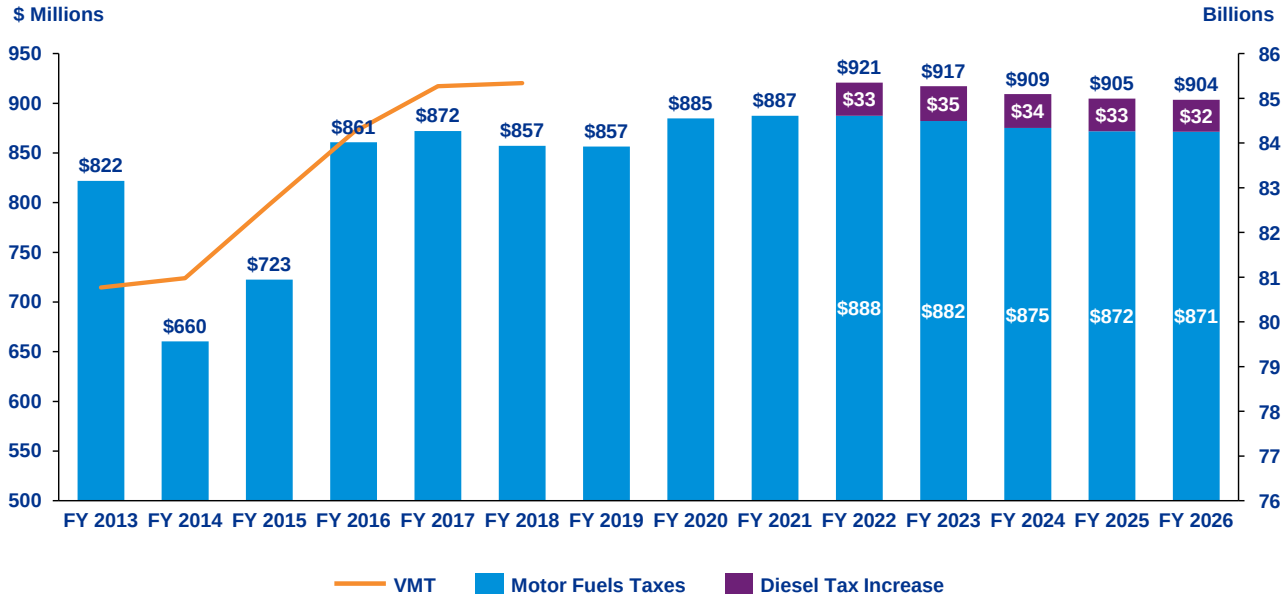
1. Executive Summary

A Historic Moment for Transportation

For the first time in Virginia's history, vehicle miles traveled (VMT) increased and motor fuels tax collections declined in FY 2018. Data for the period between FY 2016 – FY 2018 reflects a 3.2% increase in VMT and a 0.4% decrease in motor fuels tax collections. In FY 2018, had motor fuels tax collections kept pace with the increased VMT, it is estimated that there would have been an additional $31 million per year collected in transportation revenue.

Figure 1 | A Historic Moment for Transportation
Historical Vehicle Miles Traveled and Motor Fuels Tax Collections



Sources: CTF Revenue Reporting by DOA; VDOT VMT Report 2200 - DVMT by Maintenance Jurisdiction All Roads, annualized total (VMT reflects calendar year reporting); Tax Forecast

The decline in motor fuels taxes is a significant issue for Virginia as this revenue source generated $857 million for the Commonwealth Transportation Fund (CTF) in 2018. In recent years, gasoline taxes and vehicle registration fees, another important funding source, have not kept pace with inflation. During the past ten years, motor fuels taxes have grown approximately 0.2% while inflation over the same time period has averaged 1.8%.

As a result of these trends, the General Assembly enacted Item 433 K. of the Appropriations Act (Chapter 854), which requested the Secretary of Transportation (Secretary) and the Commonwealth Transportation Board (CTB) to direct the Virginia Department of Transportation (VDOT) to establish a working group to evaluate (i) the impact of increased fuel efficiency and increased use of electric vehicles (EV) on transportation

revenues, and (ii) options to provide a sustainable funding stream for transportation infrastructure. The Appropriations Act further directed that the working group include, at a minimum, representatives of local government associations, the regional transportation authorities, the trucking industry, the motor dealer industry, and the motor fuels industries.

The Working Group was convened on August 15, 2019, October 2, 2019, and December 11, 2019, and engaged in communications throughout that period to provide input, review trends, and discuss options in response to the Item 433K requirements. The process utilized multiple sources of input, including information from VDOT, the Virginia Department of Motor Vehicles (DMV), the Virginia Department of Taxation, and external data compiled by groups including the U.S. Federal Highway Administration, U.S. Energy Information Agency, National Conference of State Legislatures, and the American Association of State Highway Transportation Officials (AASHTO). In addition, KPMG LLP (KPMG) was contracted to support the Working Group with specific research and analysis.

Impact of Fuel Efficiency and EVs on Transportation Revenues

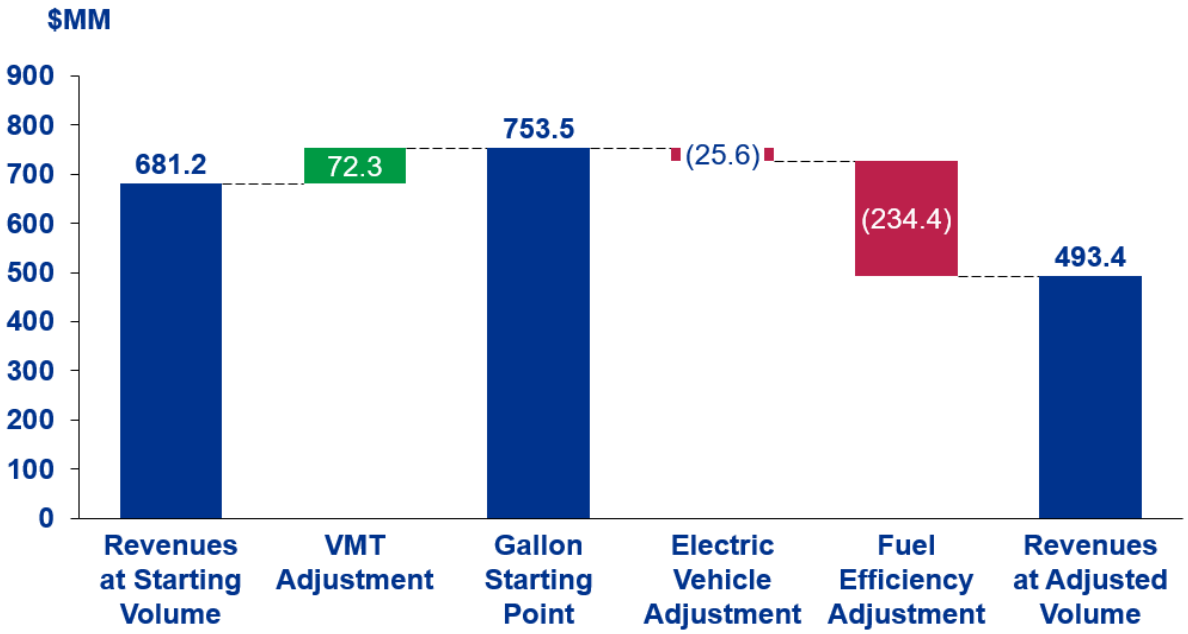
In order to address this element of the evaluation, the Working Group reviewed emerging trends, taking into consideration future transportation demand, increases in internal combustion engine (ICE) fuel efficiency, and potential adoption rates of electric vehicles, and assessed the impact of those trends on transportation revenues.

Although VMT has historically increased and is projected to continue to rise, the fuel efficiency of the automobiles driving those miles has increased even more rapidly. As new technologies become more widely adopted and consumers shift towards more fuel efficient ‘cross-over’ SUVs, the rate of fuel efficiency improvement is expected to accelerate. The U.S. Energy Information Agency (EIA) predicts fuel efficiency will increase by approximately 2.6% per year through 2030.

Electric vehicles currently represent a small percentage of the overall vehicle fleet. However, consumer preferences, auto manufacturers’ investments in new models, and technological improvements will lead to increased adoption of electric vehicles in the Commonwealth as in other states. A regression model presented by KPMG suggested that EVs may represent up to 12% of annual new car sales in Virginia by 2030.

The improved fuel efficiency of the ICE fleet and increased penetration of electric vehicles will significantly decrease gasoline consumption in Virginia. It is estimated that gasoline consumption could decline by more than 25% by 2030. The decline in fuel consumption translates to a net loss of approximately $260 million in annual gasoline tax revenue by 2030. As Figure 2 illustrates, it is the improved fuel efficiency of the internal combustion engine fleet that will drive revenue decline over the next ten years; electric vehicle adoption will become a larger issue in future periods.

Figure 2 | Forecast Gasoline Tax Revenue in 2030



Source: KPMG analysis

Options for Sustainable Transportation Funding

In order to identify options to provide a sustainable funding stream for transportation infrastructure, the Working Group reviewed a comprehensive list of options which included multiple funding alternatives defined in an annual report prepared by AASHTO. In order to evaluate that list, the Working Group considered four primary assessment criteria:

(i) Materiality – provide adequate revenue to support necessary transportation projects throughout the Commonwealth;

(ii) Sustainability – establish long-term stable transportation funding;

(iii) Economy – support existing and future industry critical to the overall economic health of Virginia;

(iv) Equity – promote greater fairness and address social and financial inequality where possible.

The Working Group, in order to consider viable funding options, reviewed legislation enacted during the past five years in other states and identified three legislative trends: (i) gas tax increases, (ii) gas tax indexing, and (iii) new funding sources including electric vehicle fees and mileage-based user fee programs and pilots.

Bridge to a Sustainable Funding Stream for Transportation Infrastructure

As the Working Group reviewed potential funding options, the discussions suggested that a sustainable funding program required a bridge of near-term actions to increase transportation funding for the next ten years while longer-term solutions, such as a Mileage-Based User Fee (MBUF), are further studied and considered for future implementation. In addition, the Working Group discussions emphasized the importance of considering the assessment criteria and ensuring the design of equitable funding mechanisms. The Working Group discussed the following potential options for meeting those criteria and establishing a sustainable and equitable funding bridge:

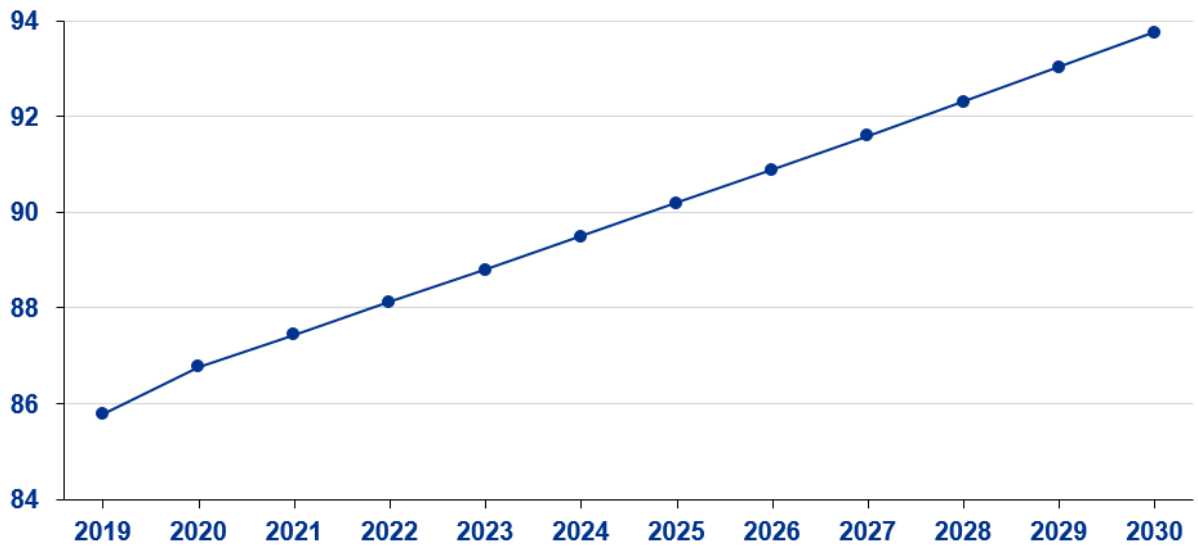
Potential Elements of a Sustainable Funding Bridge
Increasing gasoline tax rates to meet future funding requirements
Indexing gasoline tax rates to inflation in order to better align future revenues with future costs
Introducing a new revenue mechanism based on vehicle fuel efficiency to sustain funding as autos become more fuel efficient and more electric vehicles enter the fleet
Conducting an in-depth study of auto fleet electrification and options for related infrastructure build-out
Taking an active role in the I-95 Corridor Coalition as that partnership tests the viability and inter-operability of potential Mileage-Based User Fee Programs

2. Impact of Fuel Efficiency and Electric Vehicles on Transportation Revenues

In order to address this element of the evaluation, the Working Group reviewed emerging trends, taking into consideration future transportation demand, increases in internal combustion engine (ICE) fuel efficiency, and potential adoption rates of electric vehicles, assessing the impact of those trends on transportation revenues. Further discussions centered on changing business models, such as on-demand car and ride share and personal vehicle subscriptions – longer-term outcomes that are likely to mature beyond the next decade.

The Working Group discussed several factors, including population growth, economic expansion, and the increased use of new mobility options such as transportation network companies (TNCs), that will increase the use of Virginia's transportation system. In order to estimate this increased use, a population-based regression model was used to establish a forecast of VMT in the Commonwealth. As Illustrated in Figure 3, VMT is projected to increase in the Commonwealth to nearly 95 billion miles by 2030.

Figure 3 | Forecast Vehicle Miles Traveled (Billion Miles)

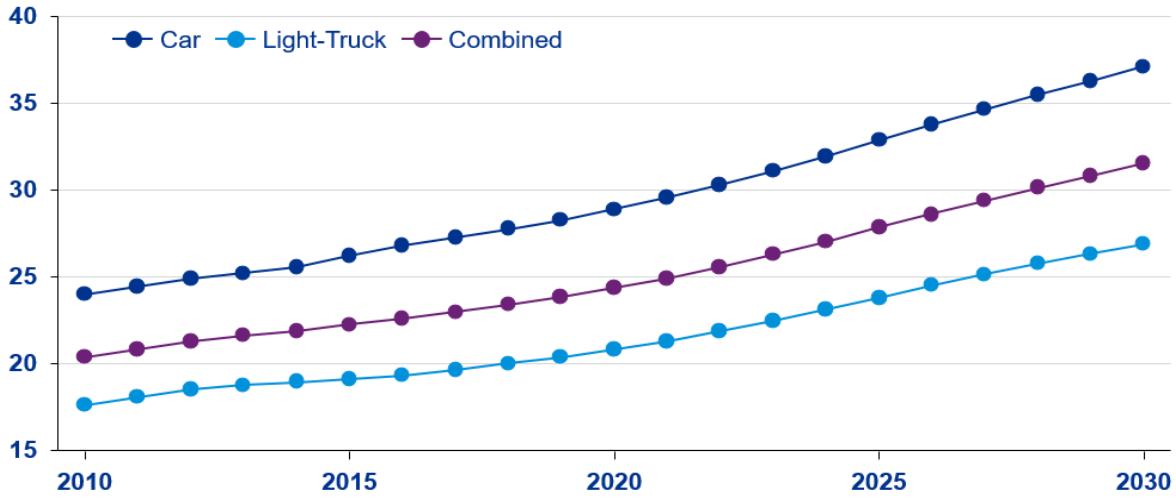


Sources: Virginia DMV; U.S. Census Bureau; KPMG analysis (population regression)

Although VMT has historically increased and is projected to continue to rise, the fuel efficiency of the automobiles driving those miles has increased even more rapidly. A 2019 report by the U.S. Environmental Protection Agency (EPA) found that new vehicle fuel economy has grown from 19.3 miles per gallon (MPG) in 2004 to 24.9 MPG in 2017, representing a 29% increase during that time period.

As new technologies become more widely adopted, the rate of fuel efficiency improvement is expected to accelerate. As depicted in Figure 4, the U.S. Energy Information Agency (EIA) predicts fuel efficiency will increase by approximately 2.6% per year through 2030. This improvement is projected across all vehicle classes.

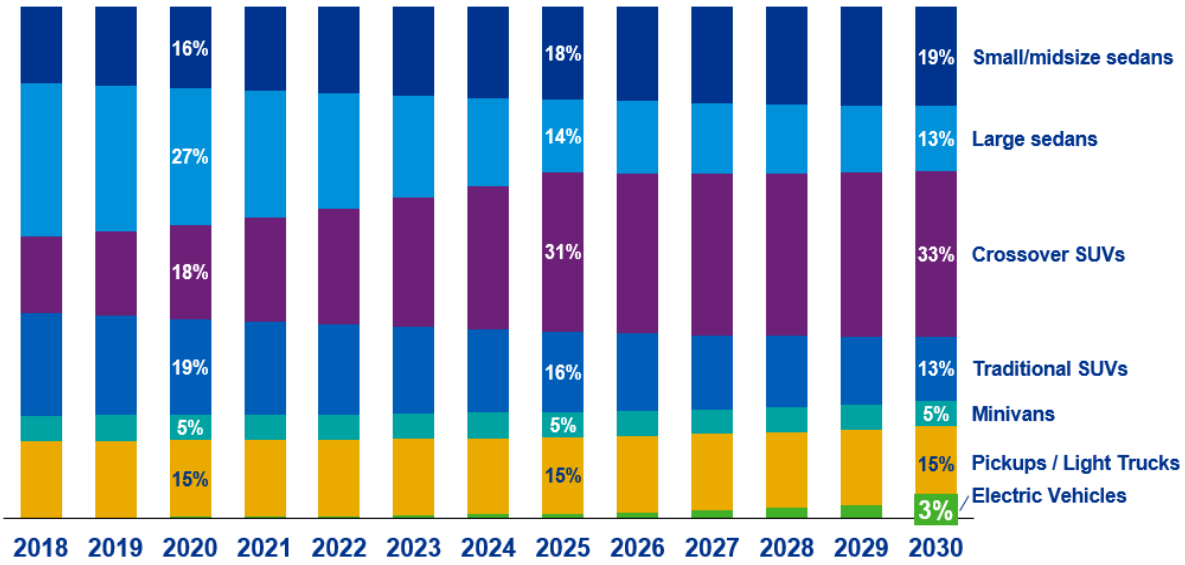
Figure 4 | Forecast Fuel Efficiency (Miles per Gallon)



Source: U.S. Energy Information Agency

In addition to technological improvements, American consumers' shift towards higher fuel efficiency car-based or 'cross-over' sport utility vehicles (SUVs) is influencing fuel efficiency improvements. As widely reported in the media, SUVs represent the fastest-growing vehicle type in the U.S. However, the fact less often realized is that approximately four out of every five SUVs purchased are car-based or 'cross-over' SUVs. The top-selling SUVs in the U.S. include the Toyota RAV4, Nissan Rogue, and Honda CRV. These vehicles realize approximately 27 MPG. Based on multiple data sources, including Virginia's Department of Motor Vehicles, a forecast was developed to illustrate the changing make-up of the auto fleet by vehicle type in the Commonwealth (see Figure 5).

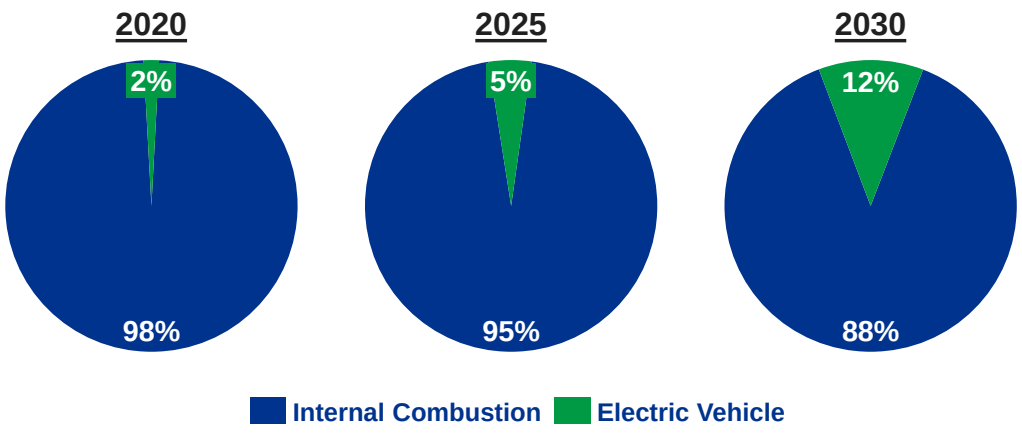
Figure 5 | Forecast Auto Fleet by Vehicle Class (% of Total VA Fleet)



Sources: EPA 2018 Automotive Trends Report; Virginia MV Statistics; Virginia DMV; FHWA VMT by vehicle type (2017); KPMG analysis

As illustrated, electric vehicles currently represent a small percentage of the overall vehicle fleet. However, consumer preferences, auto manufacturers' investments in new models, and technological improvements will lead to increased adoption of electric vehicles in the Commonwealth as in other states. Based on KPMG's proprietary regression model incorporating multiple data sources, the Working Group reviewed the forecast of the adoption of electric vehicles in the Commonwealth (see Figure 6).

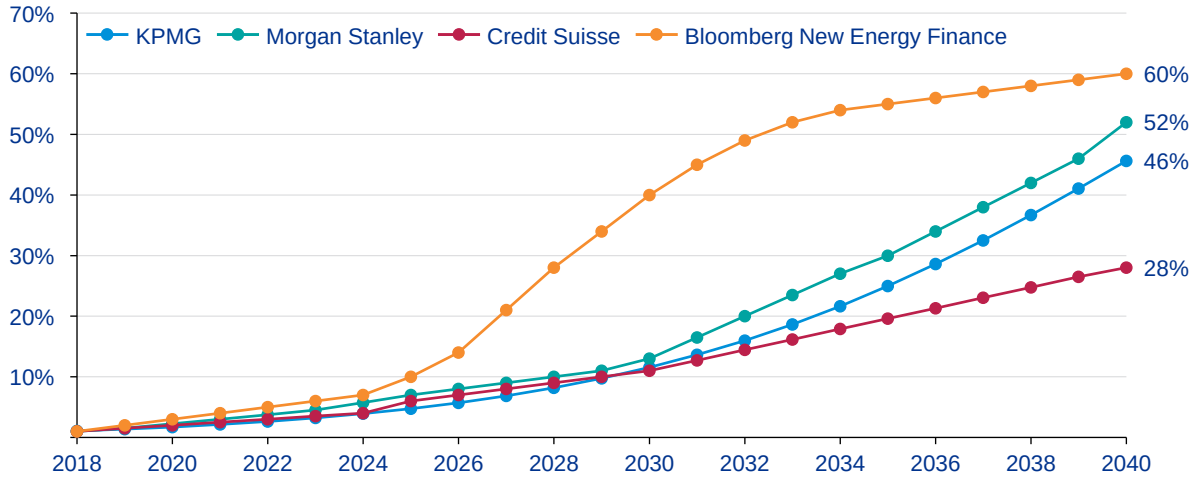
Figure 6 | Forecast Electric Vehicle Adoption (% New Car Sales)



Source: KPMG Analysis

The forecast from this analysis was also compared to other third-party analyses. As illustrated in Figure 7, many EV adoption projections are fairly consistent through the 2030 time period at which point different perspectives regarding the rate of technological improvement and infrastructure build-out lead to variance in adoption assumptions in the 2030 – 2040 time period.

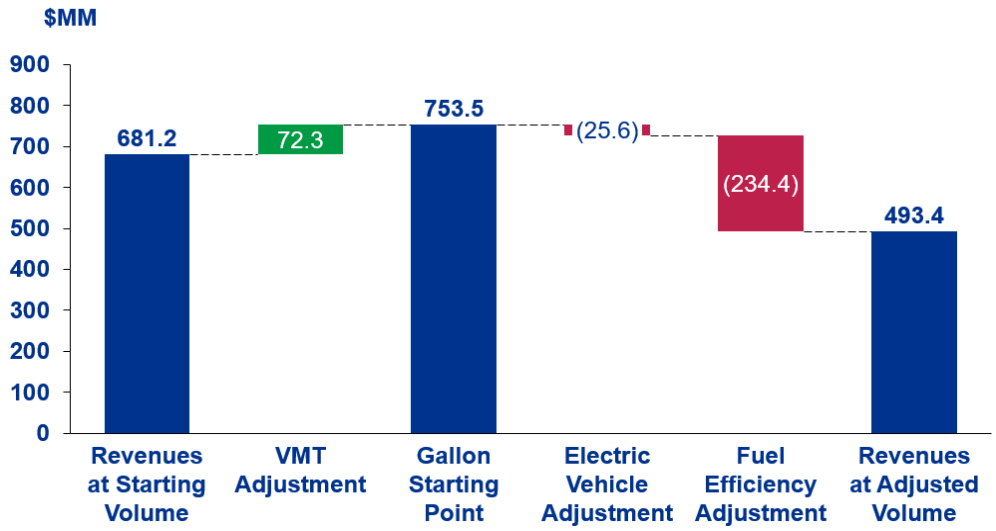
Figure 7 | Electric Vehicle Adoption Forecast Comparison (% New Car Sales)



Sources: Morgan Stanley Electric Vehicle Market Monitor (June 2019); Bloomberg New Energy Outlook (May 2019); KPMG Analysis

The improved fuel efficiency of the ICE fleet and increased penetration of electric vehicles will significantly decrease gasoline consumption in Virginia. It is estimated that gasoline consumption could decline by more than 25% by 2030. The decline in fuel consumption translates to a net loss of approximately $260 million in annual gasoline tax revenue by 2030. As Figure 8 illustrates, it is the improved fuel efficiency of the internal combustion engine fleet that will drive revenue decline over the next ten years; electric vehicle adoption will become a larger issue in future periods.

Figure 8 | Forecast Gasoline Tax Revenue in 2030



Source: KPMG analysis

3. Options for Sustainable Transportation Funding

In order to identify potential options to provide a sustainable funding stream for transportation infrastructure, the Working Group reviewed a comprehensive list of options which included multiple funding alternatives defined in an annual report prepared by AASHTO (see Figure 9).

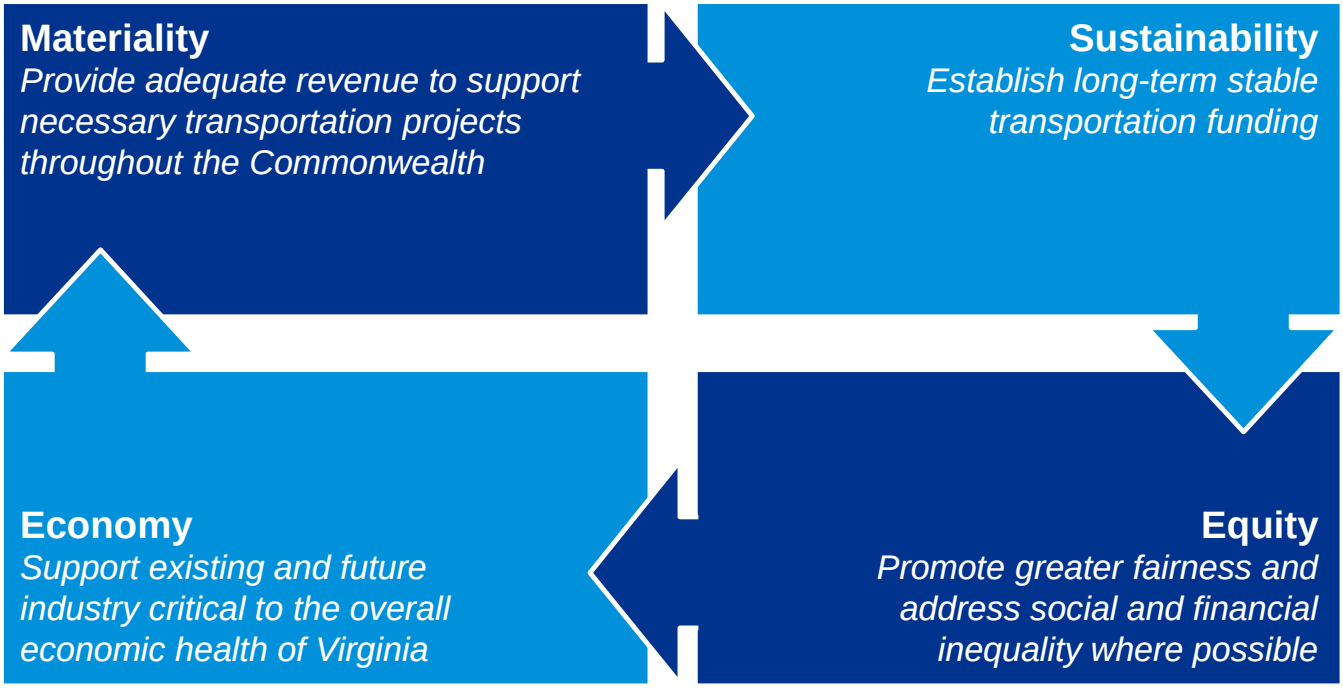
Figure 9 | Funding Options

Consumption	Fuel Sales Tax
	Fuel Excise Tax
	Road Pricing/Tolls
VMT-based	Road User Charges
	VMT Emissions
	Real-time Electronic Charges
Emerging Businesses + Modes	Electric / High Efficiency Fees
	Alternative Fuel Decal Fee
	Ride-hailing / Carsharing Fees
	Home Rental Fees
	E-commerce Fees
	Bicycle Fees
Value Capture	Assessment / Development Fees
	Retail Sales Tax
	Vehicles Sales/Transfer Tax
	Minerals-Related
	Destination Fees
Truck & Freight	Overweight Registration
	Weight-mile Tax
	Diesel Heavy Duty Fee
Other Mechanisms	Tire Tax
	Rental Car Tax
	Hotel Occupancy Tax
	Vanity Plate Fees
	Container Tax
	Inspection Fees
	Drivers License Surcharge
	Harbor Maintenance Tax
	Income Tax Fees
	Vehicle Age Fee

Sources: AASHTO, National Conference of State Legislatures, Working Group Input

To evaluate the above list, the Working Group considered four primary assessment criteria as illustrated in Figure 10.

Figure 10 | Assessment Criteria



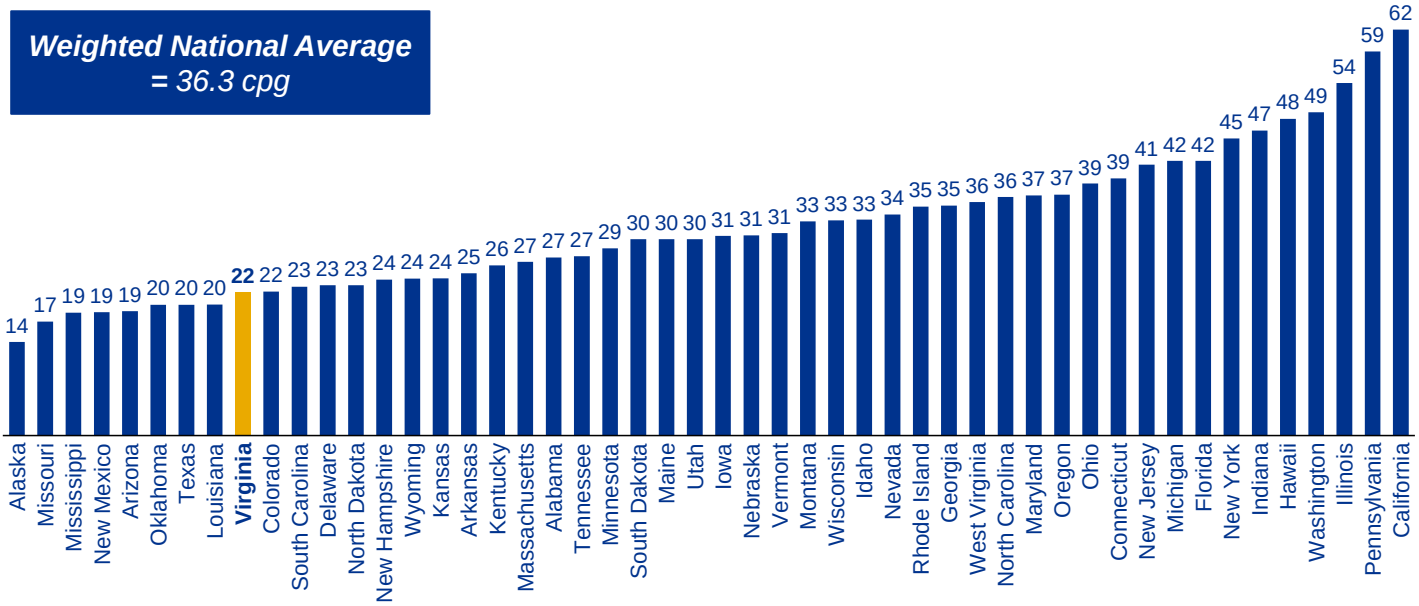
Source: Working Group Input

The assessment studied the existing transportation funding mechanisms employed by other states and recent revisions or additions to those mechanisms as one means of identifying the most viable funding options for the Commonwealth. According to information compiled by AASHTO, all fifty states employ motor fuels taxes as a transportation funding source.

The General Assembly established the I-81 Corridor Improvement Program and Fund and designated funding to the Interstate system (Chapters 837 and 846 of the 2019 Virginia Acts of Assembly), using registration fees for heavy trucks and diesel taxes as a funding source. Hence, the Working Group focused its discussions on gasoline specific trends and funding mechanisms.

Virginia has a multimodal transportation platform that includes the third largest state-maintained highway system, a spaceport, airports, seaports, transit, and rail, all reliant on fuels tax revenues. Yet, Virginia has one of the lowest gasoline tax rates, as depicted in Figure 11.

Figure 11 | Current Gasoline Tax Rates by State (Cents per Gallon)



Note: Includes state excise taxes for gasoline (excludes diesel) plus other applicable taxes and fees collected on gasoline such as local taxes. Excludes federal excise tax of 18.4 cpg. National average represents approximate volume-weighting
Source: American Petroleum Institute - State Motor Fuels Taxes (rates effective as of 10/1/2019)

In addition to motor fuels taxes, states employ a wide variety of other revenue sources to provide a diversified funding source for transportation infrastructure. For example, at least six states, including Virginia, utilize a portion of general sales tax proceeds to support transportation. Other states use a portion of oil and gas or other natural resources taxes, hotel taxes, gaming revenue, or other income streams to fund transportation infrastructure as illustrated in Figure 12.

Figure 12 | Example Transportation Funding Mechanisms by State

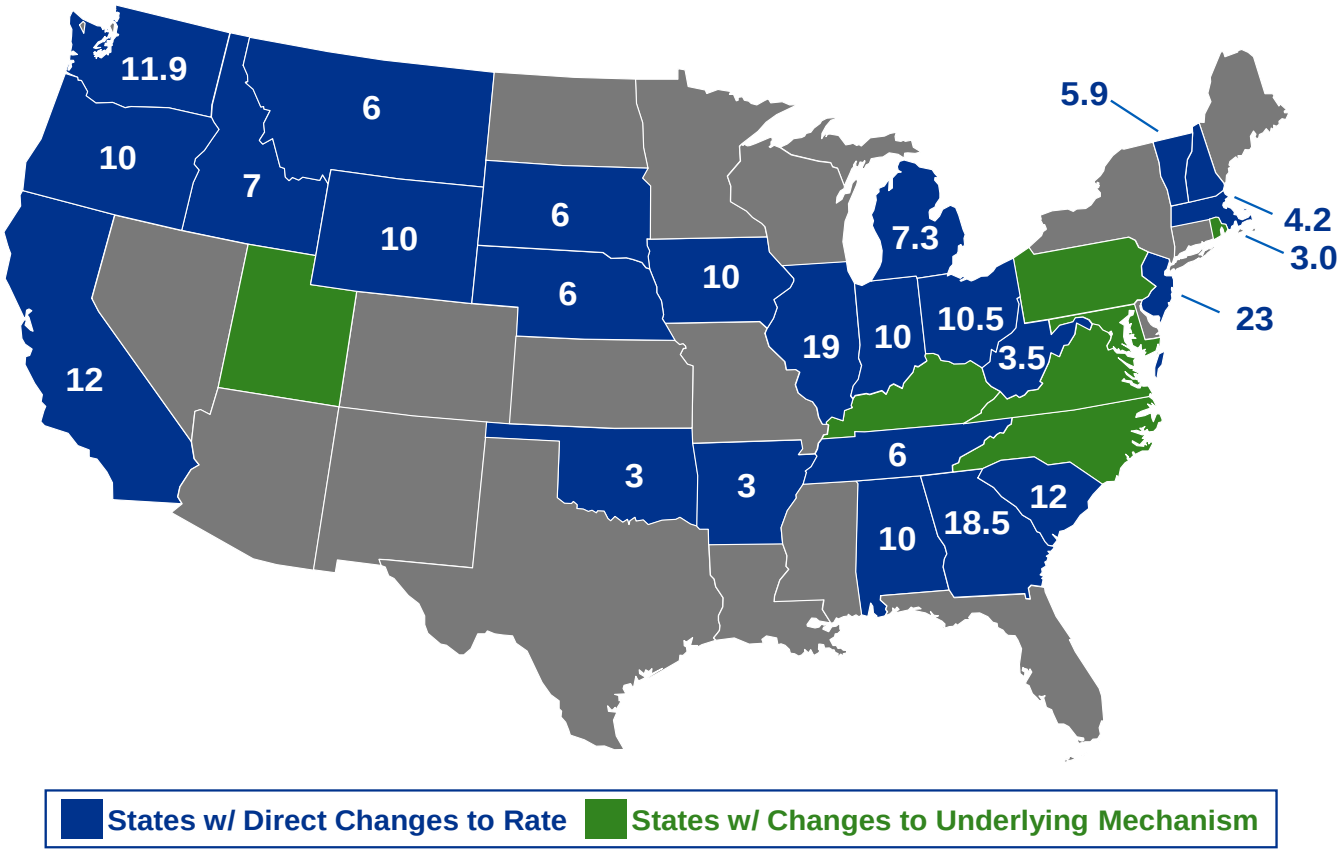
	Motor Fuels	Vehicle Fees	Tourism	Natural Resources	HOT / Tolls	General Sales	Other
Arkansas	X	X		X		X	*Natural gas severance*
Colorado	X	X			X		*Rental vehicles*
Connecticut	X	X				X	*Watercraft fees; property sales*
Florida	X	X			X		*Aviation fuels, rental cars*
Georgia	X	X	X		X		*Hotel taxes*
Kansas	X	X			X	X	*Outdoor advertising*
Maine	X	X			X		*Liquor distribution*
Maryland	X	X			X		*Corporate income taxes*
Massachusetts	X	X	X		X		*Gaming Revenues*
North Carolina	X	X			X		*Business license fees*
South Carolina	X	X			X		*Title/ vehicle transfer (5%)*
Texas	X	X		X	X	X	*General sales, oil & gas*
Virginia	X	X			X	X	*General sales, insurance prem.*
West Virginia	X	X			X		*Title/vehicle transfer + rentals*
Utah	X	X			X	X	*General Retail Tax*

Sources: BATIC/AASHTO "50 States Report"; state-published information

All states are considering the impact of increased fuel efficiency and EV adoption on infrastructure funding and considering means by which to sustain future revenues. In examining options to provide for sustainable transportation funding, the Working Group reviewed legislation enacted during the past five years in other states and identified three key legislative trends: (i) gas tax increases, (ii) gas tax indexing, and (iii) new funding sources.

As illustrated in Figure 13, thirty-one states have implemented gas tax increases or changes to gasoline tax calculation methodologies since 2013. The average state-wide gasoline tax increase has been almost 10 cents per gallon. The four most recent state-wide gasoline tax increases, all of which occurred in 2019, took place in Alabama, Arkansas, Illinois, and Ohio.

Figure 13 | Recent Revisions to Gas Tax Rates and Mechanisms (Cents per Gallon)

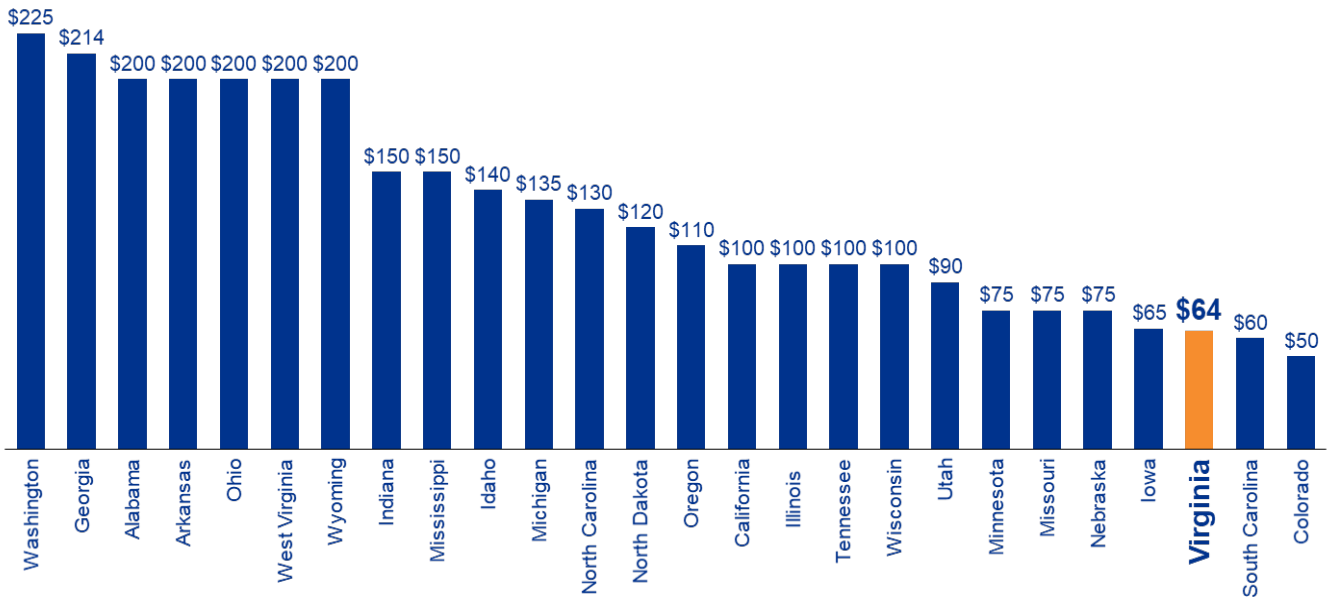


Source: National Conference of State Legislatures

In addition to tax increases, many states have attempted to more closely link future gas tax revenue and infrastructure expenditures. Twenty-two states currently have a variable component to their fuel tax rate and at least eleven of those 22 states link the gas tax to an inflation-related index.

In order to supplement fuel tax funding, many states have introduced new funding mechanisms, several of which are an attempt to address transportation trends including fleet makeup. For example, as shown in Figure 14, at least 26 states have enacted special registration fees for electric vehicles.

Figure 14 | Electric Vehicle Fees by State ($ Paid Annually)



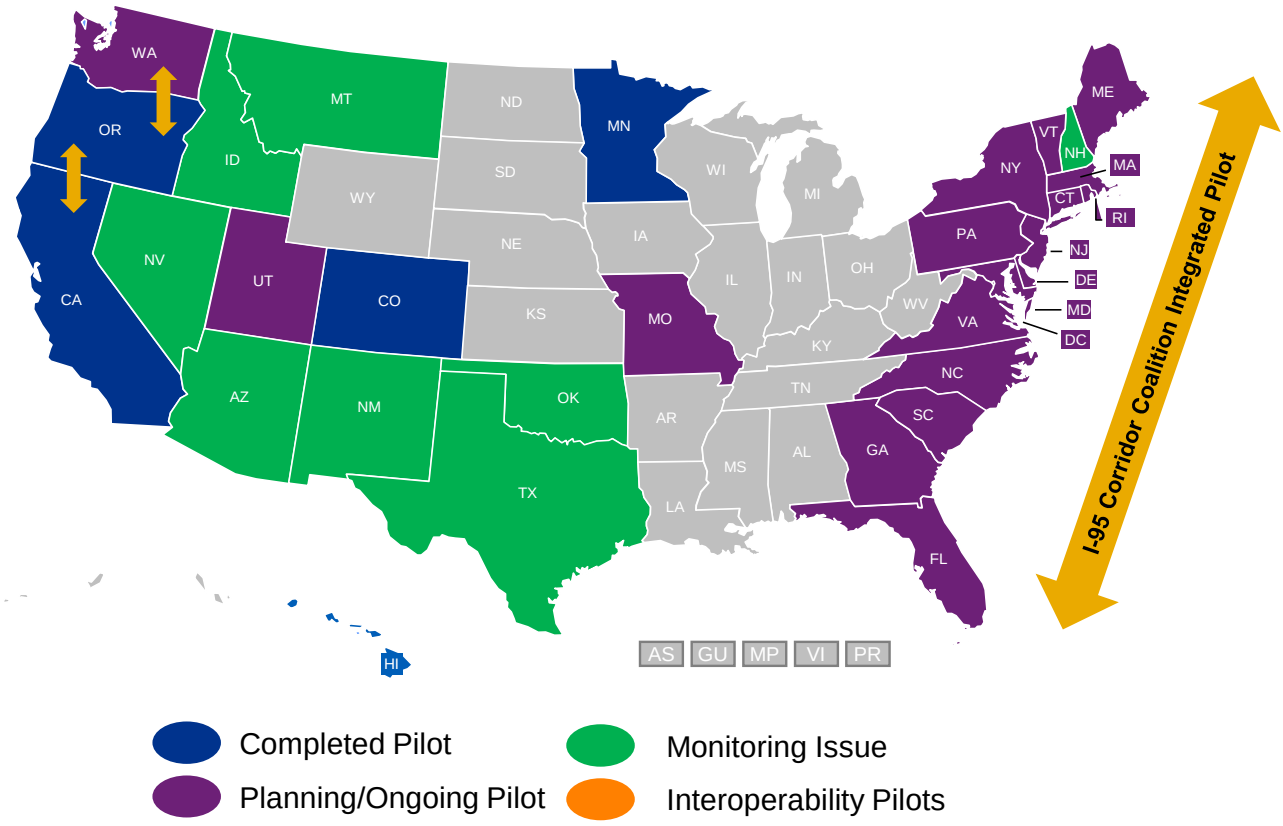
Sources: National Conference of State Legislatures; Consumer Reports EV Fee Report (September 2019), state published information
Note: Chart includes fees specific to Electric Motor Vehicles (does not include fees specific to Plug-in Hybrid Electric Vehicles). South Carolina charges a $120 biennial fee but represented here on an annual equivalent basis.

MBUFs, which are based on the distance traveled, provide an alternative means of maintaining the user-equals-payer concept of transportation funding and mitigate against declining fuel consumption. Several states are considering Mileage-Based User Fees (MBUFs). Oregon maintains the nation's only fully operational program; however, Utah is launching a program focused initially on alternative fuel vehicles (cars and trucks that operate on electricity, natural gas, propane, biodiesel, ethanol, or hybrid fuels) in January 2020.

MBUF pilots and programs have taken steps to attempt to address commonly cited issues with such programs, including data privacy, equity, and inter-operability. Utah's upcoming program will provide multiple data collection alternatives, including the use of third-party vendors for data collection. Another example is the MBUF pilot conducted by the I-95 Corridor Coalition, a partnership of 16 state DOTs including Virginia, which examined the feasibility of a mileage-based solution to address the need to find alternatives to the gas tax. Phase I of the pilot was launched in May 2018; in October of the same year, Phase II was launched, which included a multi-state truck pilot.

Figure 15 provides a summary of the multiple states which have piloted MBUF programs.

Figure 15 | Mileage Based User Fee Programs and Pilots



Sources: Oregon Department of Transportation; National Conference of State Legislatures

4. Bridge to a Sustainable Funding Stream for Transportation Infrastructure

As the Working Group reviewed potential funding options, the discussions suggested that a sustainable funding program required a bridge of near-term actions to increase transportation funding for the next ten years while longer-term solutions, such as a Mileage-Based User Fee (MBUF), are further studied and considered for future implementation. In addition, the Working Group discussions emphasized the importance of considering the assessment criteria and ensuring the design of equitable funding mechanisms. The Working Group discussed the following potential options for meeting those criteria and establishing a sustainable and equitable funding bridge:

Potential Elements of a Sustainable Funding Bridge
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Taking an active role in the I-95 Corridor Coalition as that partnership tests the viability and inter-operability of potential Mileage-Based User Fee Programs

APPENDIX A – Working Group Representation

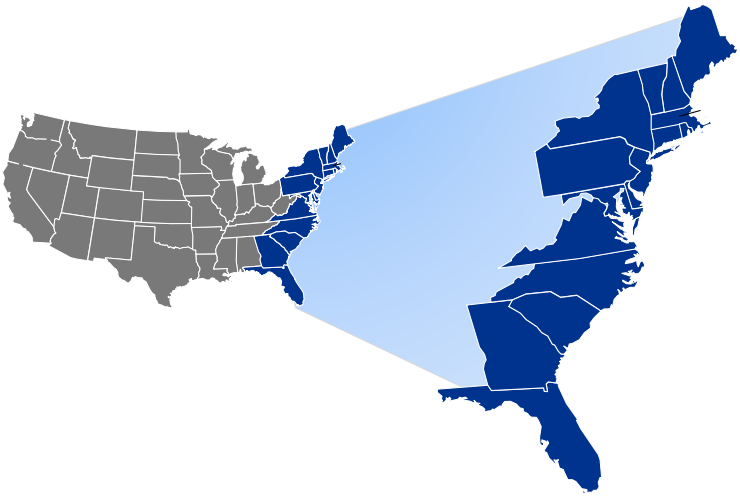
Organization Name
Representative of the Alliance of Auto Manufacturers
Hampton Roads Transportation Accountability Commission *
Representative of Lyft
Northern Virginia Transportation Authority *
Southern Environmental Law Center
Representative of Uber
Virginia Association of Counties *
Virginia Automotive Dealers Association *
Representative of the Virginia Business Council
Virginia Department of Motor Vehicles
Virginia Department of Rail and Public Transportation
Virginia Department of Transportation
Virginia General Assembly House Appropriations Committee
Virginia General Assembly Senate Finance Committee
Virginia Municipal League *
Virginia Petroleum and Convenience Marketers Association*
Virginia Transit Authority
Virginia Transportation Construction Alliance
Virginia Trucking Association *
Virginians for High Speed Rail

**designated by budgetary language*

APPENDIX B – Additional Analysis Reviewed

During the course of its discussions, the Working Group reviewed additional research and analysis not included in the main body of this report. Appendix B includes a representative sample of that material.

I-95 Corridor Coalition Overview



- Neutral with respect to the "right" solution for transportation funding methods
- Largest coordination of states to determine feasibility of deploying road usage charges
- Incorporates multiple phases and modes (e.g., trucks/motor carriers) for a more robust study
- Phase 2 concludes in October; Phase 3 is set to add partners (TransUrban, NCDOT, etc.) and test associated features such as tolling
- Is anticipating common issues and points of interest such as out-of-state mileage and value-added benefits to motorists
- Strong focus on interoperability across a complex network of assets and regulation

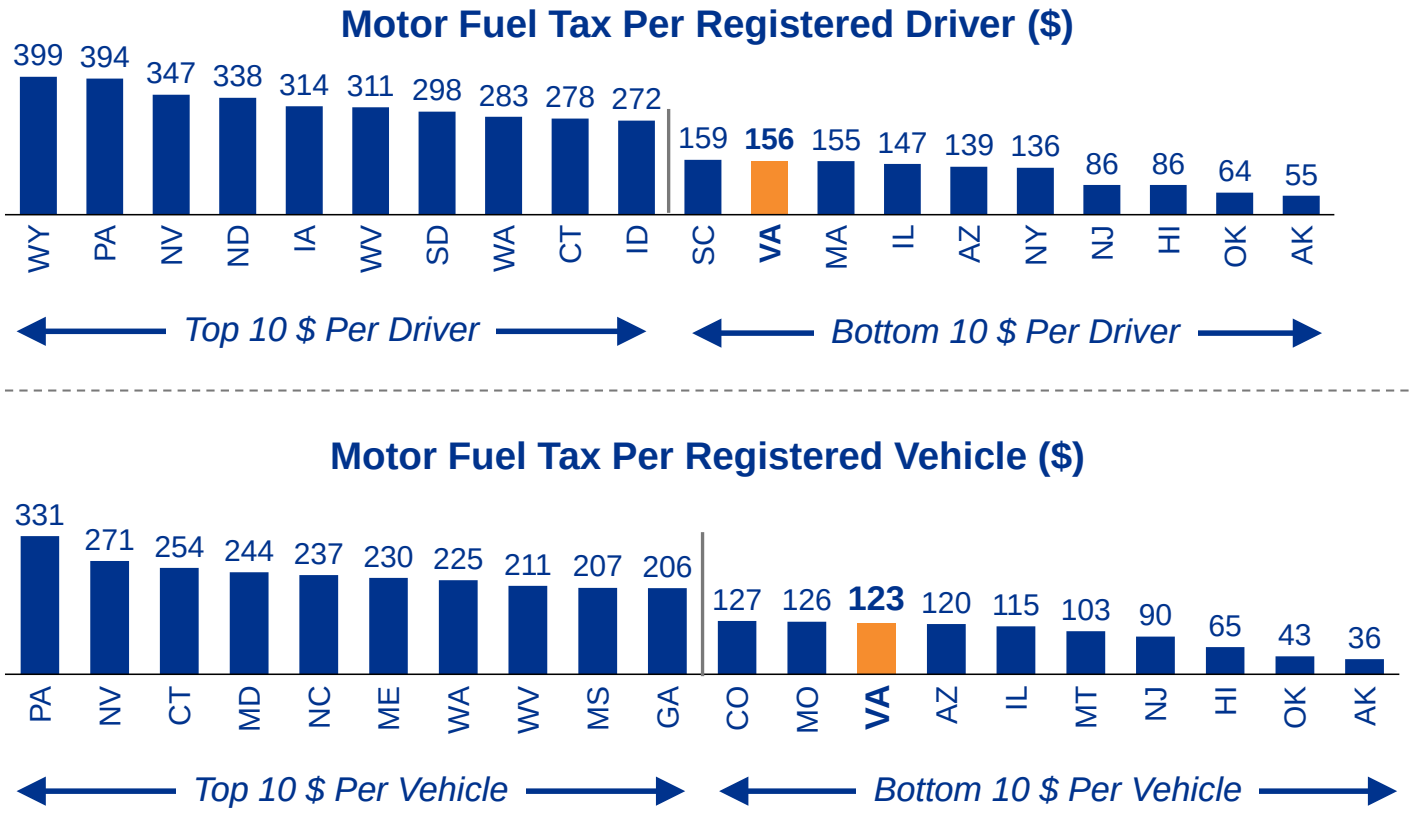
Sources: I-95 Corridor Coalition

Utah MBUF Program Overview

Program Description	*In January 2020, UDOT will launch a voluntary road usage charge program for all alternative fuel vehicles*
Participants	*All alternative fuel vehicle (EV, PHEV, and gas hybrid) owners are eligible representing approximately 2% of statewide vehicle fleet or approximately 45,000 vehicles*
Data Collection	*(1) OBD-II GPS Plug-in device (2) Smart-phone based odometer reading*
Fee Rate(s)	*A per-mile fee at a rate to be determined; total annual fees capped at the amount of annual vehicle fee ($120 indexed to CPI for electric vehicles)*
Status & Next Steps	*UDOT intends to initiate the program in January 2020 as directed in SB 136 passed in 2018*
Key Learnings	▪ *Providing citizens with choices was a key design element* ▪ *Initial program may be scaled to include additional functionality (e.g., out-of-state travel) or additional vehicle types* ▪ *People with privacy concerns may opt for limited data retention or simply pay the fixed annual fee*

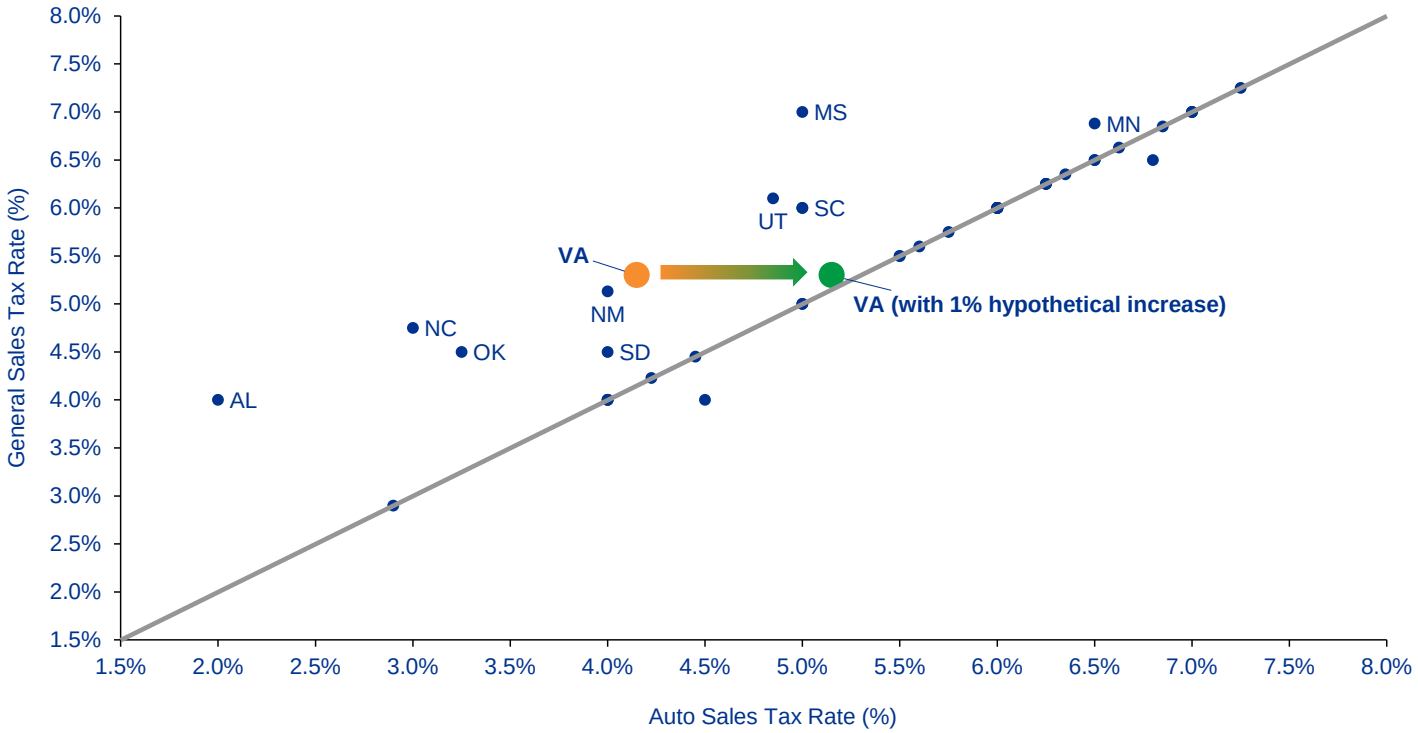
Sources: Utah Department of Transportation

Motor Fuels Tax Collections by State



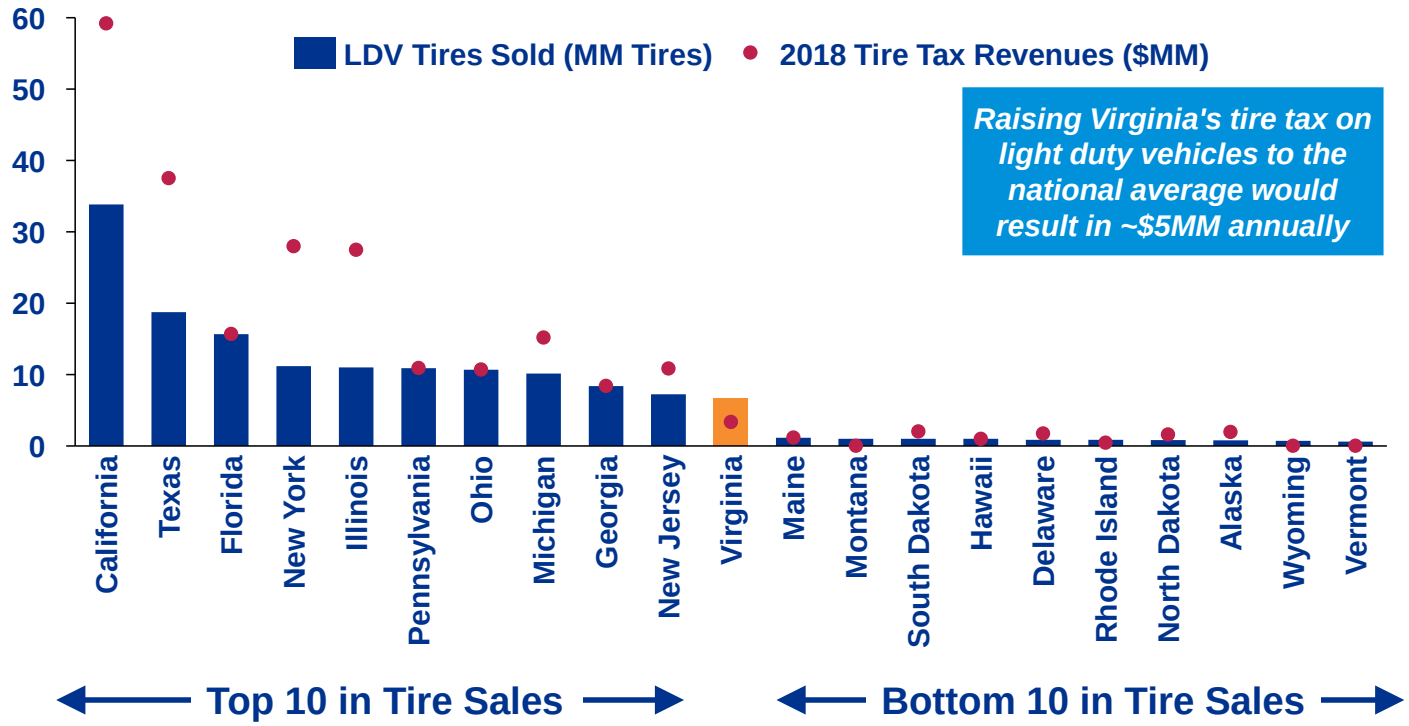
Note: Includes both gas and diesel fuel tax collections as well as any regional collections (per FHWA)
Source: FHWA, 2017

State Auto Sales Tax Rate vs. General Sales Tax Rate



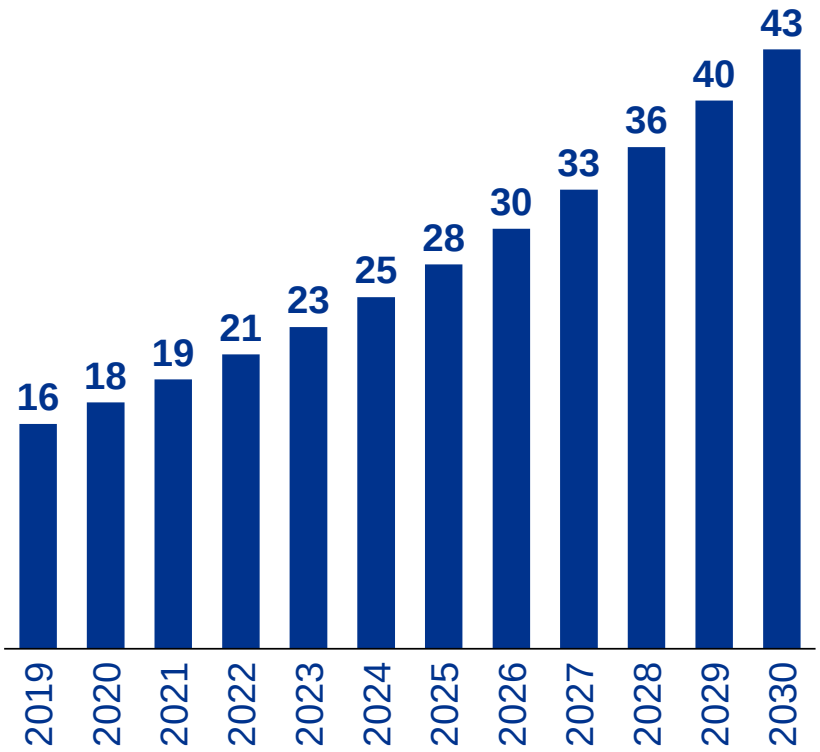
Source: Sales Tax Clearinghouse; Tax Foundation; State Revenue Department websites

Light Duty Vehicle Tire Tax Collections by State



Source: Statista, 2018; Angie's List 2019. State Revenue Departments

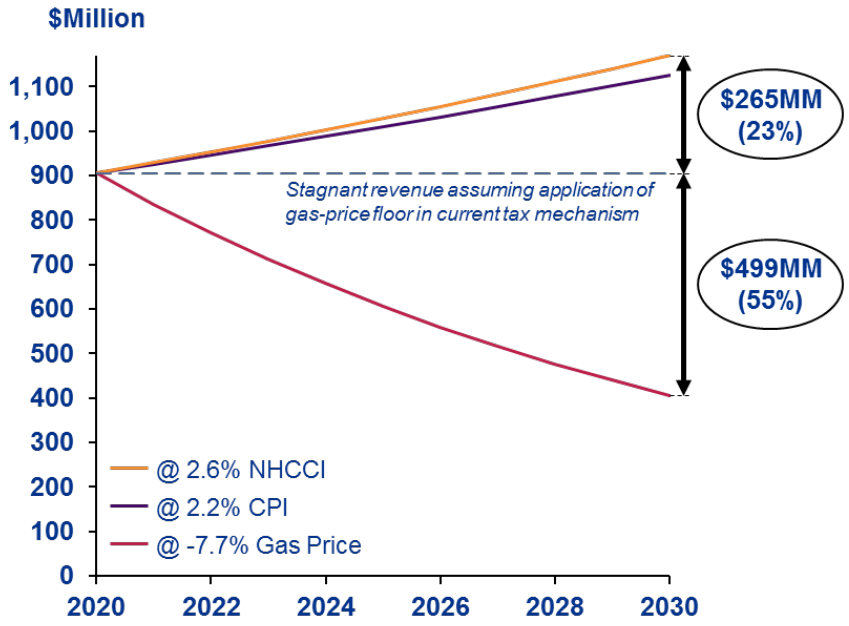
Forecast Transportation Network Company Rides in Virginia
(Million Rides Annually)



Source: George Mason University; Buildfire (consolidated Uber statistics)

Motor Fuel Tax Index Comparison

Notional Growth



Index Comparison

NHCCI

- Follows cost inputs more directly; developed and updated by FHWA
- Updated only quarterly; may be more volatile due to limited focus

CPI

- Updated monthly; variety of specific types of CPIs could be utilized
- Broader CPI measures may not reflect construction inputs as closely

Gasoline

- Can be updated at any frequency; mechanisms already in place
- Gasoline prices have decreased since last change and lagged inflation

Notes: NHCCI and gas prices are based on historical growth rates; CPI is a forecast from VA Tax Department

Sources: VDOT; TAX Forecast; Federal Highway Administration; Bureau of Labor Statistics; Statista; KPMG Analysis