



NORTH CAROLINA

Department of Transportation



NC MOVES ²⁰⁵⁰

Drivers and Opportunities Funding

May 2019

Table of Contents

- Executive Summary
- Introduction
- Where Are We Today?
- Where We Are Going
- Findings and Future Direction for North Carolina

EXECUTIVE SUMMARY

NC Moves 2050 Drivers and Opportunities

The current funding picture for transportation in North Carolina is not sustainable. Needs for investment will outpace funding levels due to a changing marketplace. Several items are expected to influence the current transportation funding landscape in North Carolina:

- Increased travel demand due to population and employment growth will increase state-of-good-repair spending needs for the second-largest state-owned highway network in the country.³
- The declining value of fuel taxes is driven by fuel-efficiency improvements and lack of action at the federal level.
- Increases in vehicle miles traveled (VMT) and improvements in fuel efficiency put the sustainability of state motor fuel tax indexing at risk.
- Other risks to state highway use taxes include shifts toward shared-market economy, increased urbanization and potential economic down-turns.

North Carolina has several potential opportunities for enhancing transportation revenues, consistent with efforts taking place in other states around the country. While there is no set formula for long-term transportation funding, opportunities include:

- Adjusting state tax revenues and fees to mitigate the shift in market dynamics.
- Utilizing public-private partnerships (P3s) and encouraging private sector involvement in operations and maintenance.
- Increased use of tolling for major corridors and leasing of existing facilities to offset declining revenues.
- Mileage-based user fees or other fees to better link travel demand with transportation funding.
- Local and regional partnerships for multimodal investments through the use of mechanisms such as value capture, special taxes/fees or local/regional ballot initiatives.

INTRODUCTION

How this Paper Links to NC Moves 2050

The financial backbone of the federal highway and transit programs is at a tipping point.

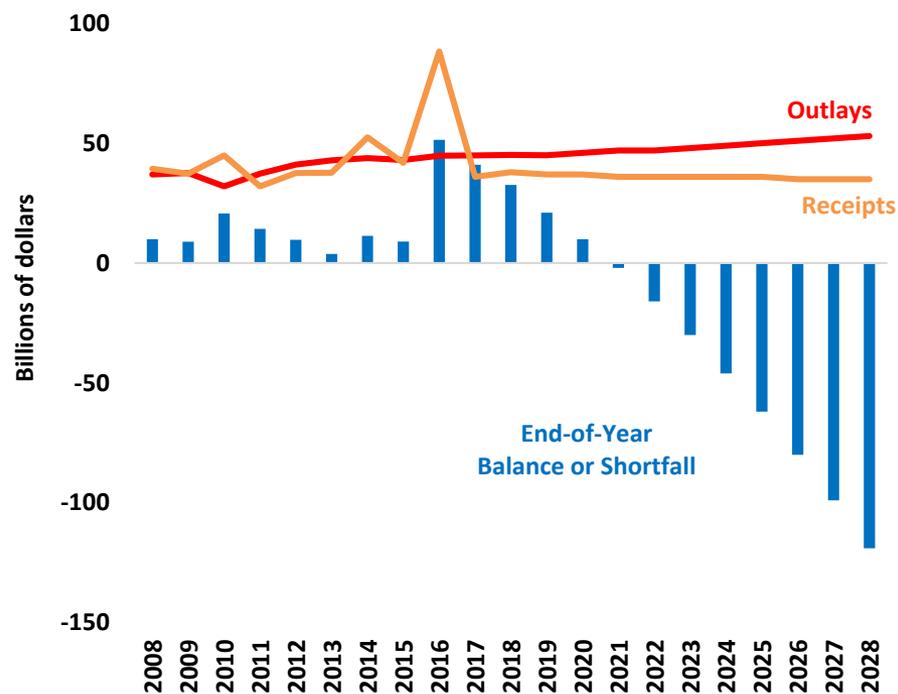
Underlying concerns regarding the viability of transportation funding to meet long-term needs persist at national and state levels:

- What is the federal and state government's role regarding transportation funding in the future?
- How will federal and state governments generate the required revenue for investments?

Federal regulations and requirements are rooted in long held expectations for a "federally-assisted, state-administered" program. Recent developments in the post-Fixing America's Surface Transportation (FAST) Act era have signaled revenue-neutral proposals that would be off-set through budget cuts.

Due to lack of long-term funding solutions at the federal level, financing mechanisms such as **debt tools** (Private Activity Bonds, GARVEES) and **credit assistance tools** (TIFIA, State Infrastructure Banks) have been getting more attention.

Status Of The Highway Account Of The Highway Trust Fund: 2008-2028



Source: Congressional Budget Office

How this Paper Links to NC Moves 2050

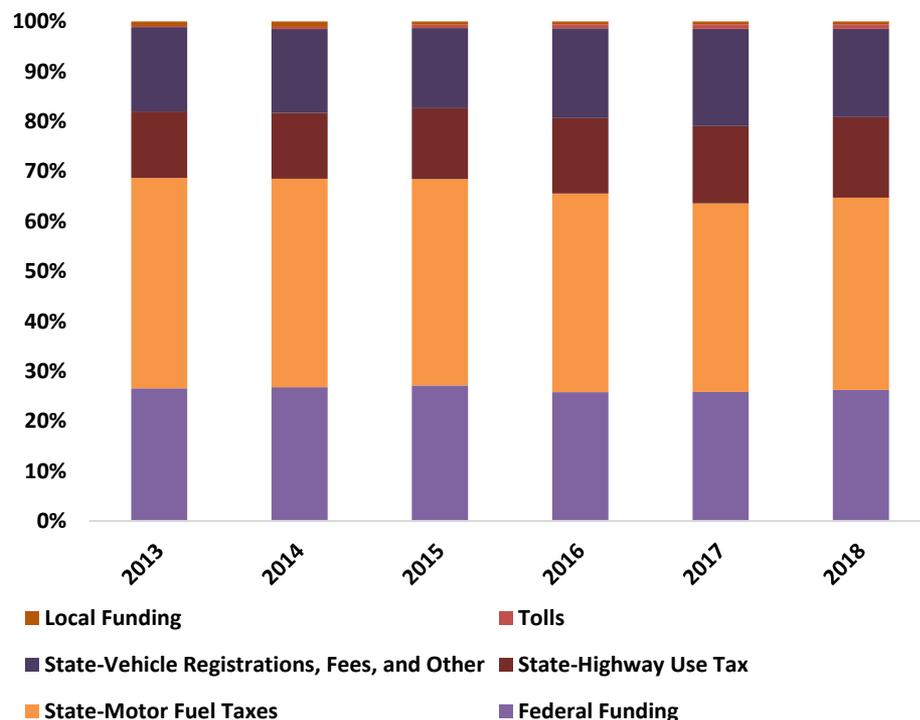
Considering significant unfunded needs, state and local jurisdictions have taken steps to enact various taxes and fees (sales tax, use tax, tolls, etc.) to supplement federal funds and support capital and operating expenditures.

The 2040 North Carolina Transportation Plan estimated that at least **\$86.3 billion** (in 2011 dollars) is needed to maintain existing conditions and between **\$114.1 billion** and **\$148.2 billion** is needed to improve the transportation network's performance and capacity.²

This paper:

- Draws on historical funding trends and describes various influencing factors that affect intermediate- and long-term funding for the NC Moves 2050 Plan.
- Focuses on historical funding trends and potential implications for future funding enumerating from fuel efficiency improvements, changing market conditions, and population growth.
- Evaluates these trends in comparison with U.S. and Southeast U.S. (A.L., F.L., G.A., N.C., S.C., T.N., T.X., V.A.) averages.

Distribution of North Carolina DOT's Historical Transportation Funding Sources



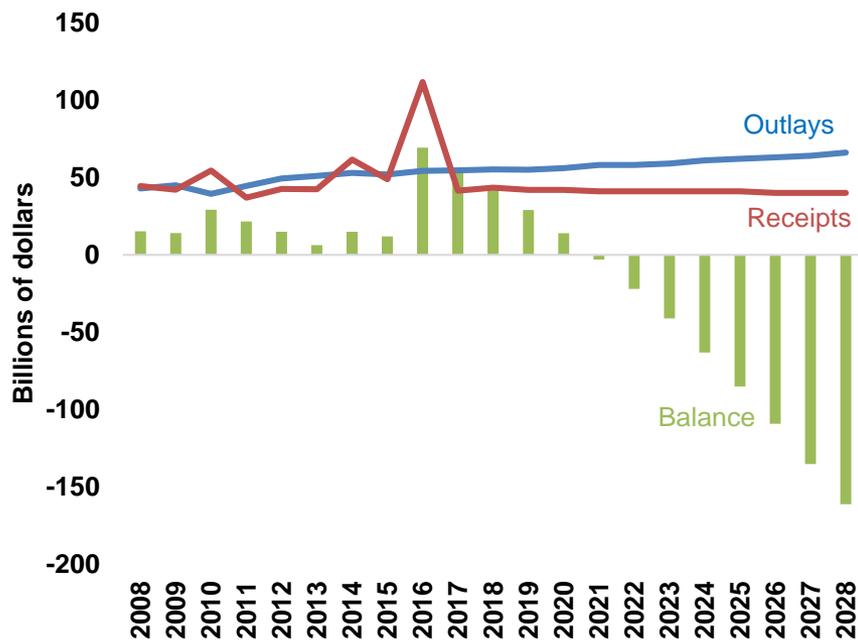
Source: North Carolina DOT Annual Reports

WHERE ARE WE TODAY?

National Trends

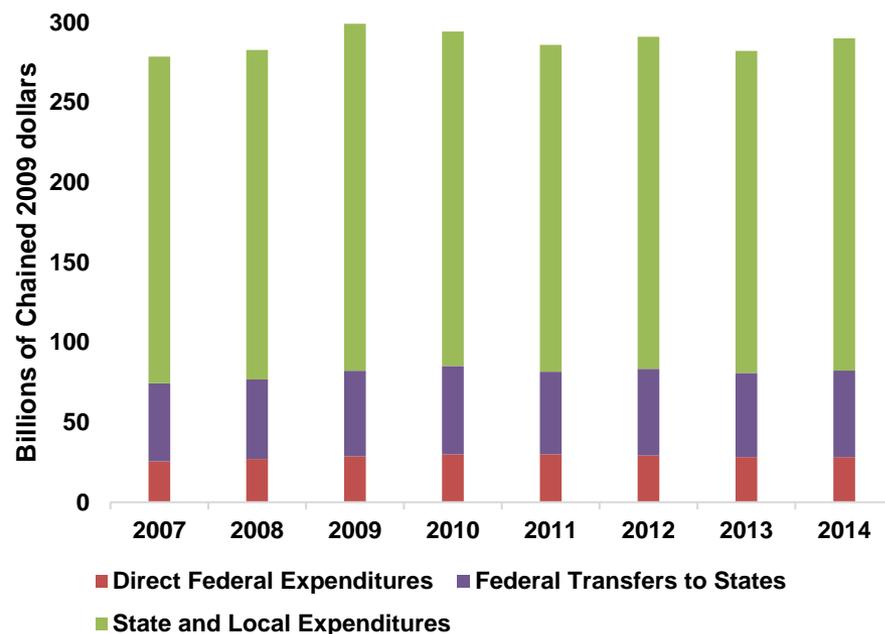
Over the past decade federal fuel taxes, a once reliable revenue source, have not kept up with spending. Short term transfers of general fund have been necessary to keep the Highway Trust Fund (HTF) solvent. Since 2008, the Fund's spending has exceeded its revenues by \$103 billion. The Congressional Budget Office estimates that the total shortfall of the HTF account will amount to \$161 billion by 2028.⁴ Federal funds continue to be a major revenue source, but states have recently increased transportation spending.⁵ The notable trend is that inflation adjusted spending has been relatively constant with little to no growth.

Highway Trust Fund



Source: Congressional Budget Office

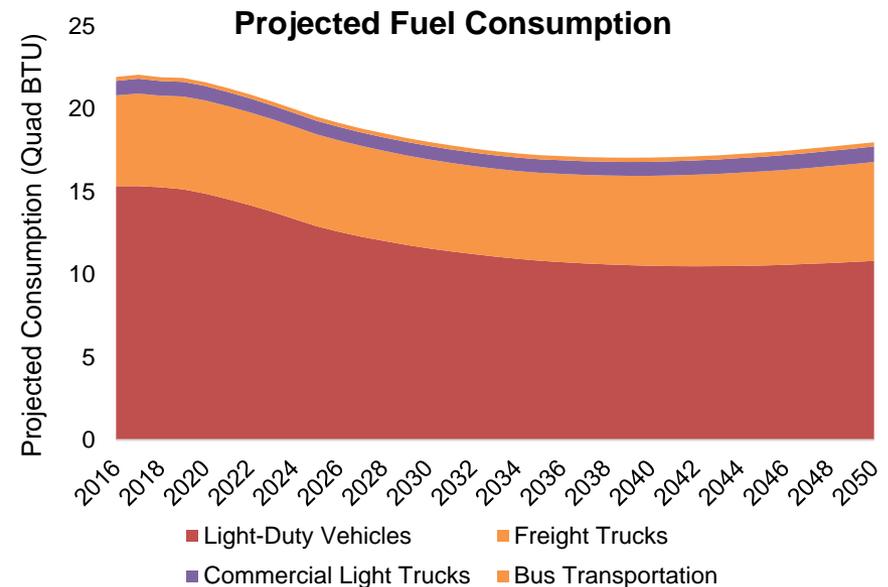
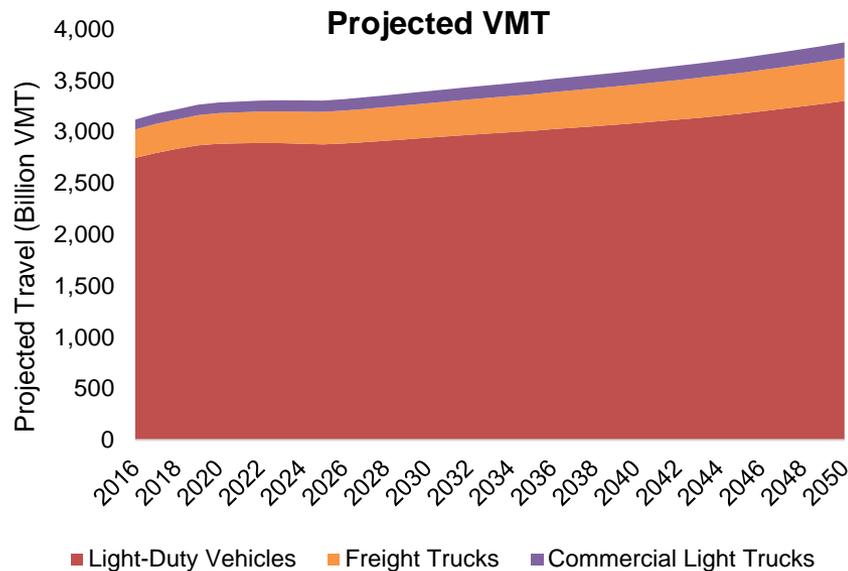
Transportation Spending



Source: USDOT Bureau of Transportation Statistics

Travel Statistics and Fuel Consumption

The U.S. Energy Information Administration (EIA) projects that national VMT by light duty and freight vehicles will increase by 0.5% with a 1.2% compound annual growth rate (CAGR) in the 2016-2050 period.⁶ The EIA projects that while gasoline vehicles remain the dominant vehicle type, combined sales of new electric, plug-in hybrid electric and hybrid vehicles will grow in market share from 4% in 2017 to 19% in 2050. The significant increase in VMT due to population growth, increased urbanization and changing shared-economy market conditions coupled with reduction in fuel consumption are expected to result in reduced gas tax revenues and increased funding gaps for much needed infrastructure improvements.

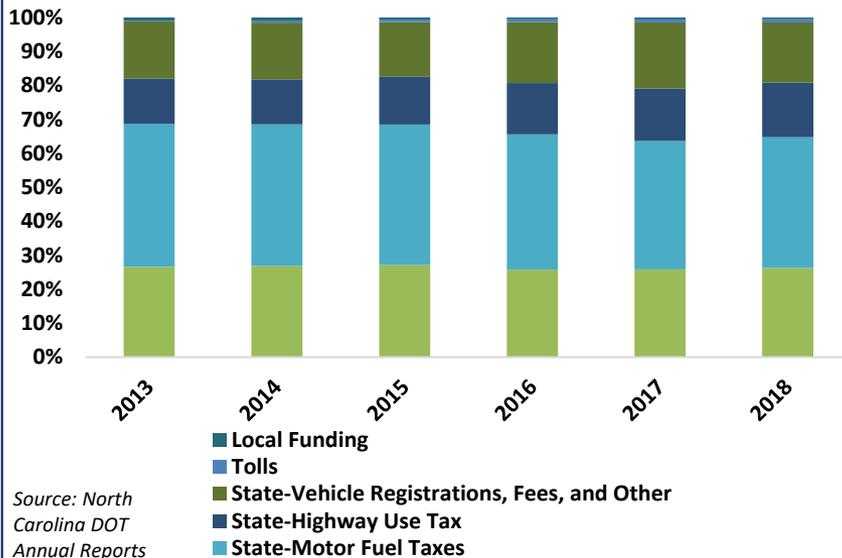


Source: U.S. Energy Information Administration

North Carolina Transportation Funding

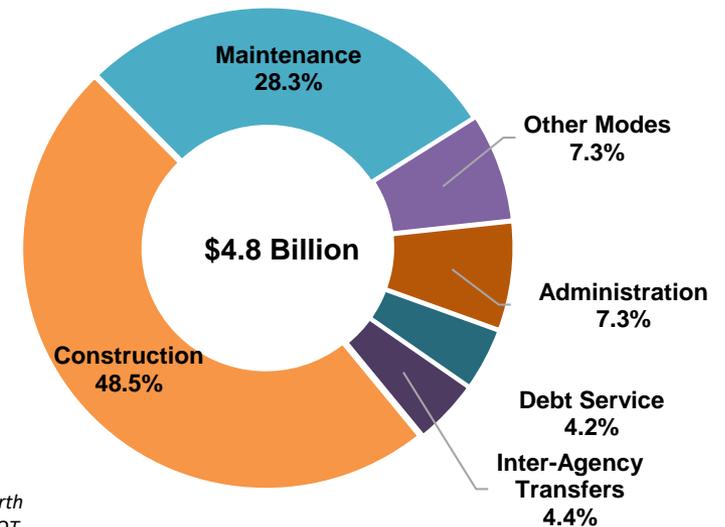
Federal funds account for 26% of North Carolina’s annual funding portfolio, while state highway user taxes and fees account for 74% (including local funds at approximately 1%)⁷. In nominal dollars, transportation funding increased from \$4.4 billion in FY 2013 to \$5.1 billion in FY 2018, a 3.0% compound annual growth rate (CAGR). Adjusted for inflation, funding increased only at a 1.2% CAGR in real dollars.

NC Statewide Funding Breakdown



NCDOT’s 2017 budget allocates 48.5% for construction and 28.3% to maintenance. The rest of the budget (23.2%) is allocated to debt service, administration, inter-agency transfers and other transportation modes⁷. While the North Carolina transportation infrastructure is predominantly in fair or good condition, increased spending in O&M in the future may be inevitable to meet overall federal performance requirements.

Transportation Spending Breakdown 2017

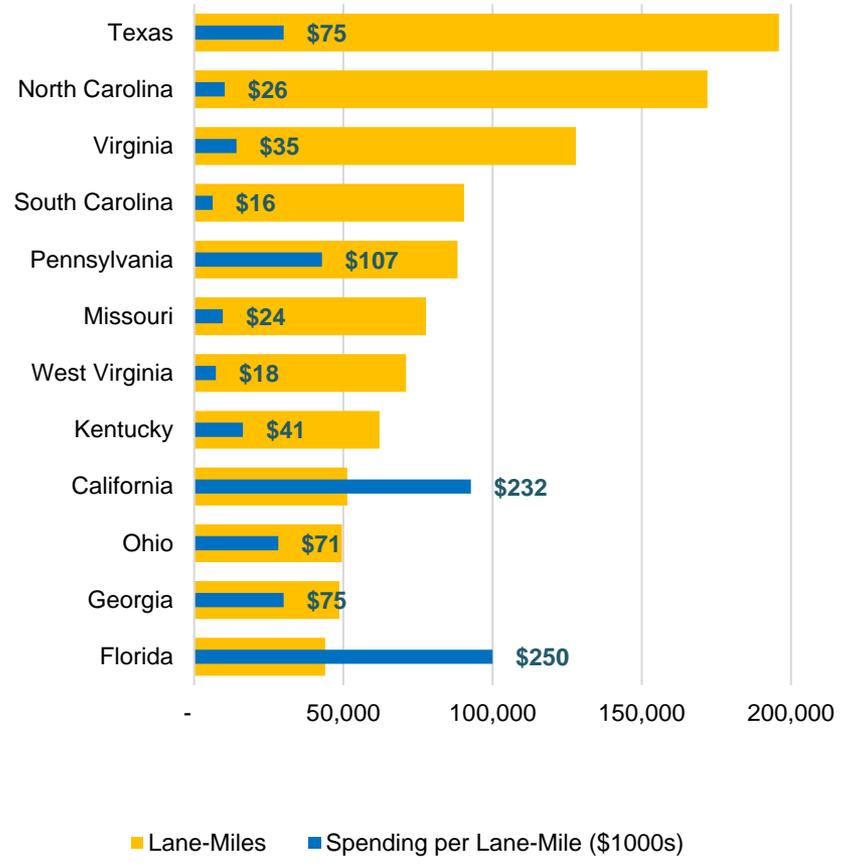


Factors Driving North Carolina as a Leader

NCDOT operates the second largest statewide highway system after Texas, with over 170,000 lane-miles.

Spending on highways on a per lane-mile basis is smaller than regional and national averages⁸:

- U.S. average: \$106,000
- Southeast average: \$74,000
- North Carolina: \$26,000



Source: Federal Highway Administration Highway Statistics Series

Factors Driving North Carolina as a Leader

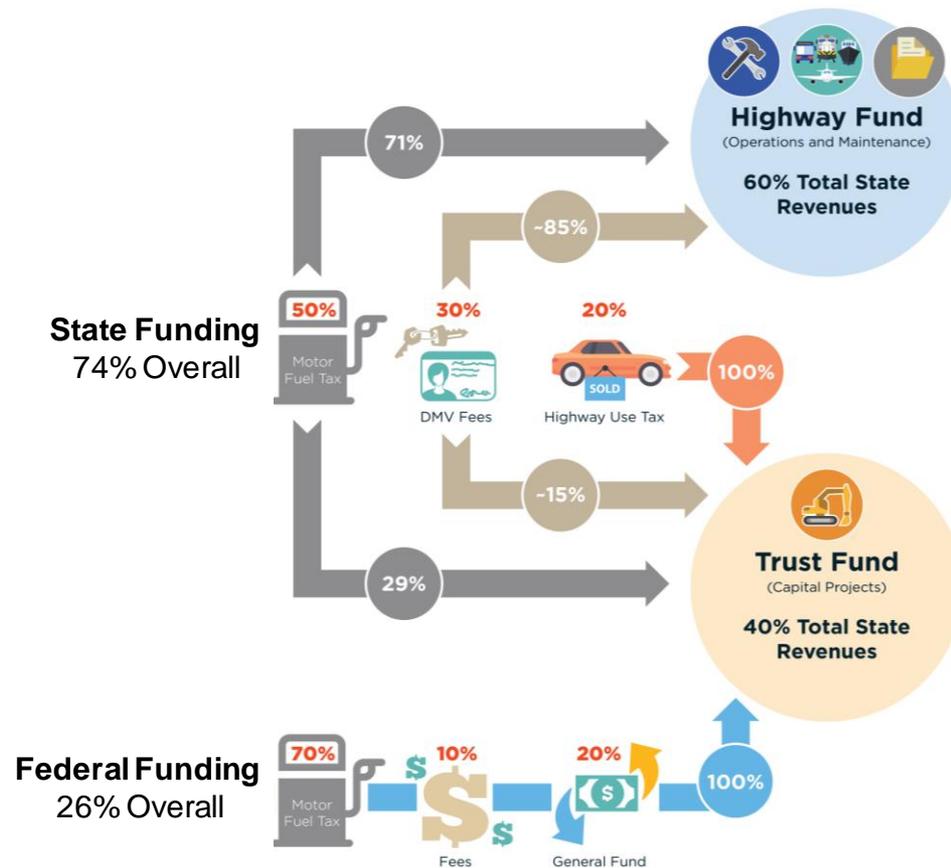
The Highway Trust Fund (HTF) supports maintenance, administrative and multimodal programs. The HTF supports capital spending programs including Strategic Transportation Investments (STI), providing local and regional input into project ranking.

North Carolina is one of the few states that indexes its motor fuels tax to inflation and population. Other taxes and fees have also recently increased.

Toll revenues have increased from \$10.4 million in 2013 to approximately \$47.0 million in 2018, a 35% CAGR.⁹

The North Carolina Turnpike Authority (NCTA) is overseeing the Triangle Expressway (18.8 miles) and Monroe Expressway (20 miles) operations, and has the I-77 Express Lanes (27 miles) under construction.

NCTA has 5 more projects under development and 2 under consideration.

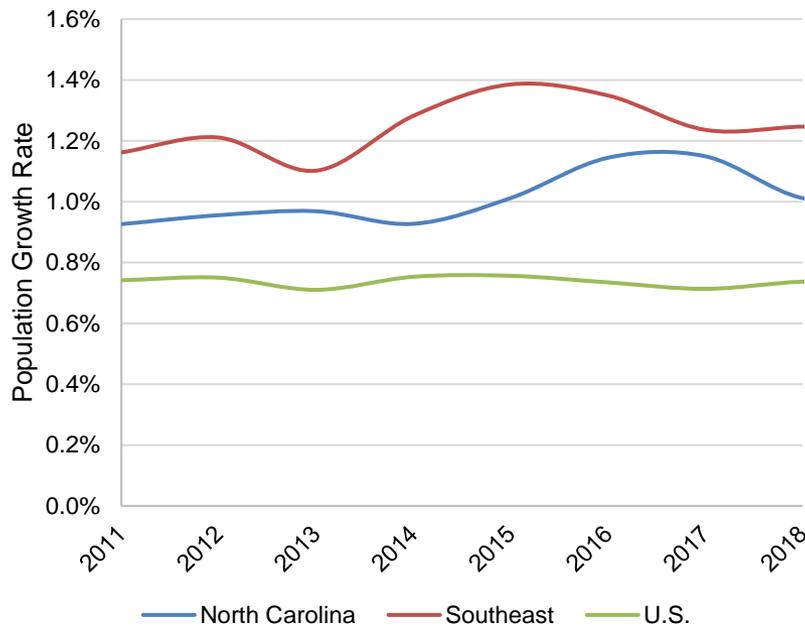


Source: North Carolina DOT Annual Report

WHERE WE ARE GOING

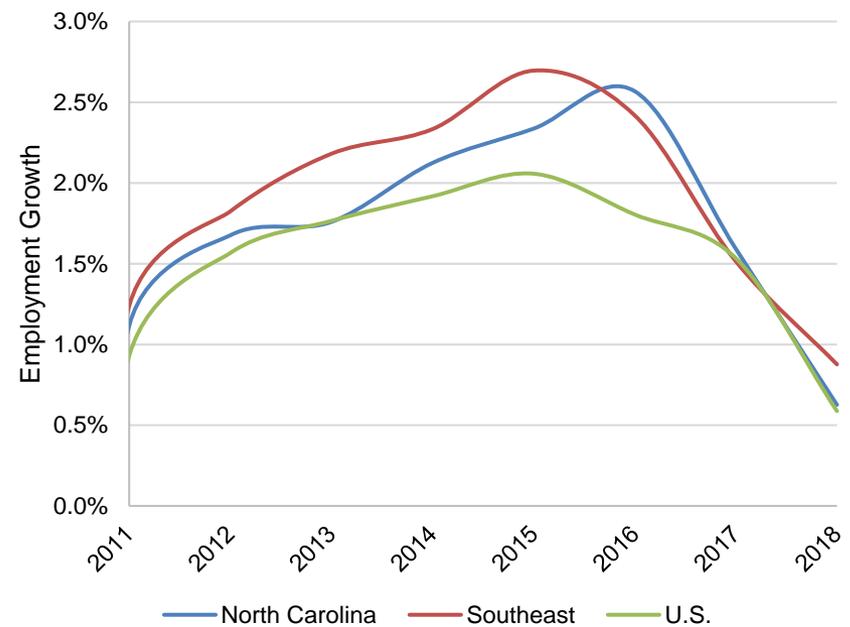
Population and Employment Trends

North Carolina population growth in the post-Great Recession period is estimated at 1.0%, which surpasses the U.S. average of 0.7%, but is below the Southeast average of 1.2%.



Source: U.S. Census Bureau

Employment growth in North Carolina during the post-Great Recession period is estimated to be 1.9% per year, which surpasses the U.S. average of 1.7%, but is on par with Southeast average of 2.0%.



Source: U.S. Bureau of Labor Statistics

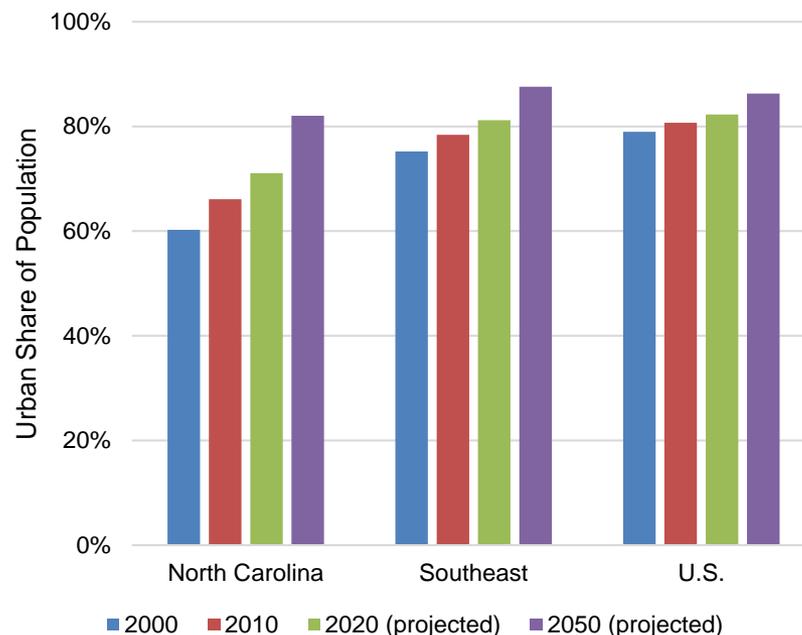
Population and Employment Trends

In the post-Great Recession period, North Carolina demographic changes, significant urbanization and improvements in the labor market are expected to result in increased economic activity.

These demographic trends surpass national averages, are on par with Southeast trends, and are anticipated to result in increased travel on the highway system. This may affect capital and operating backlogs at the state and local levels.

North Carolina urban population share increased from 60% in 2000 to 66% in 2010, which is below U.S. and Southeast averages.

By 2050, North Carolina urban population share is projected to be 82%.



Source: U.S. Census Bureau

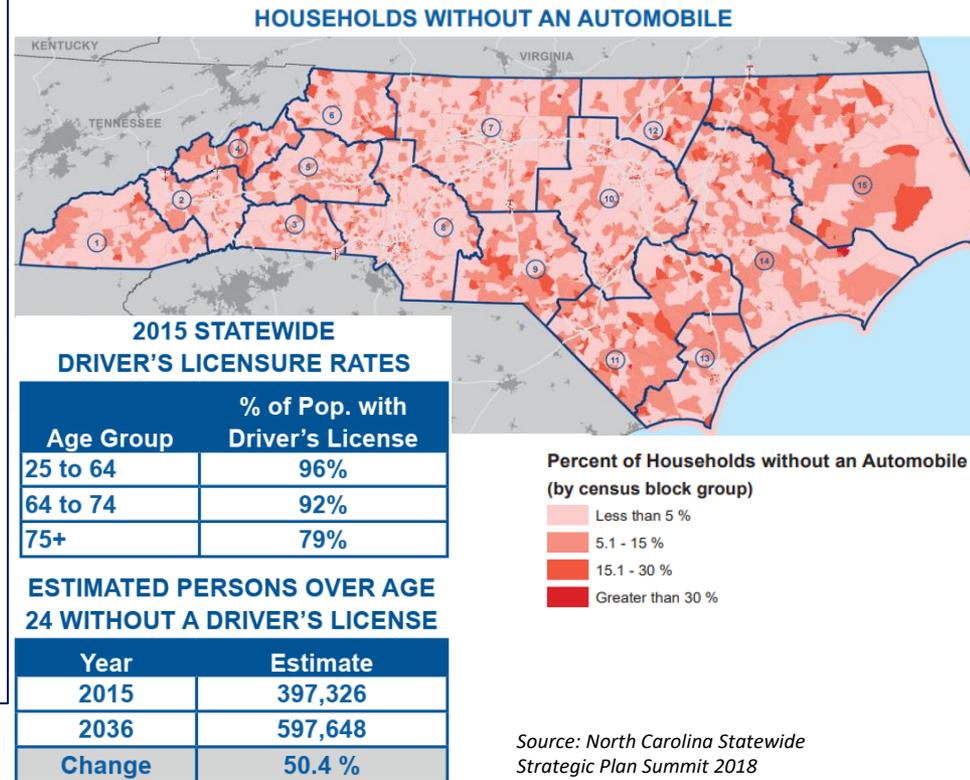
Public Transportation Trends

Metropolitan areas are anticipated to absorb most of the population growth through 2050.

Driven by the education, healthcare and technology sector, both employment and population growth are anticipated to generate significant demand in North Carolina's public transit systems.

Increased public transportation services may become an emerging trend due to the state's aging population and the fact that approximately 50% more residents over age 24 are anticipated to be without a driver's license.

However future competition with autonomous vehicles, ride-hailing and other mobility on demand services could alter this trend over the long term.



Public Transportation Trends

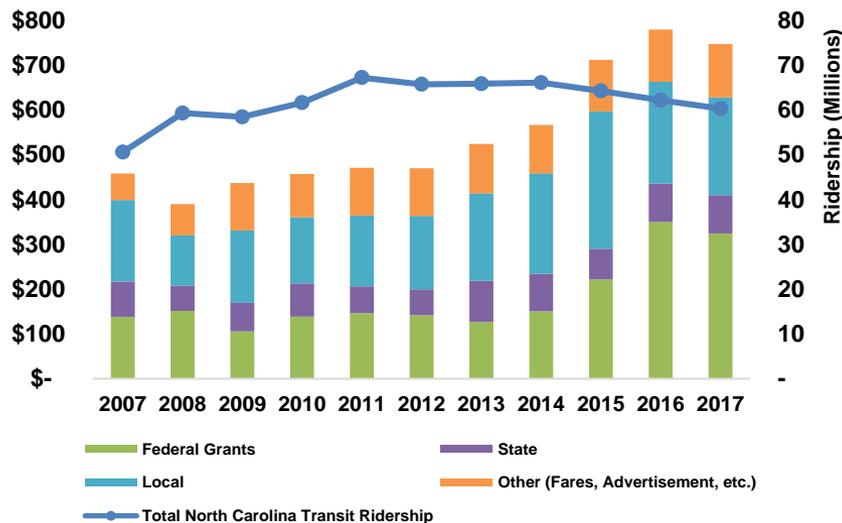
Investment in North Carolina public transit systems increased from \$458 million in 2007 to \$747 in 2017, which is a 5% CAGR above the U.S. and Southeast average.¹⁴

Federal grants and local funds on average represent 32% and 35% of overall funds. State funds only represent 14% of overall funding, which is below the national average of 22% from 2007-2017.

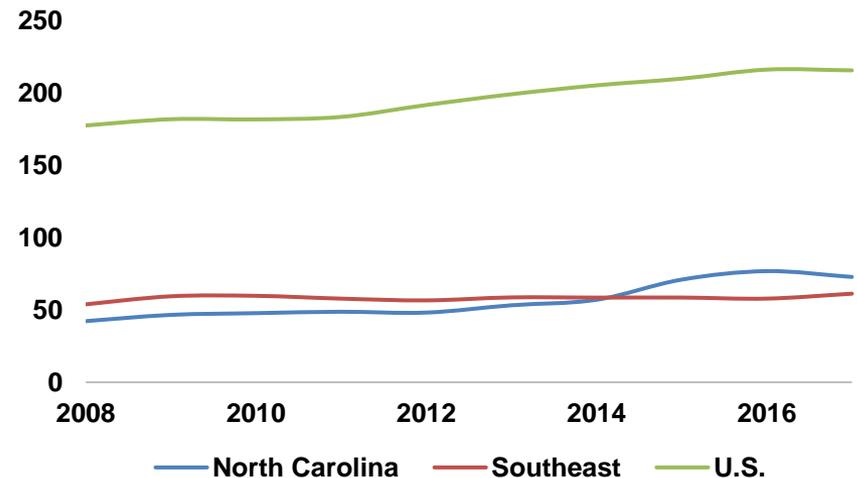
North Carolina passenger miles traveled increased from 223 million to 276 million at a 2.2% CAGR, which is above the U.S. and Southeast average of 0.6% and 0.1%, respectively.¹⁴

The increase in urban travel, reliance on public transit in urban areas, and major improvements to existing transit networks in all 100 North Carolina counties is projected to improve overall transit ridership, which demands additional capital and operating funding.

Public Transit Funding and Ridership



Public Transit Funding per Capita



Travel Statistics Trends

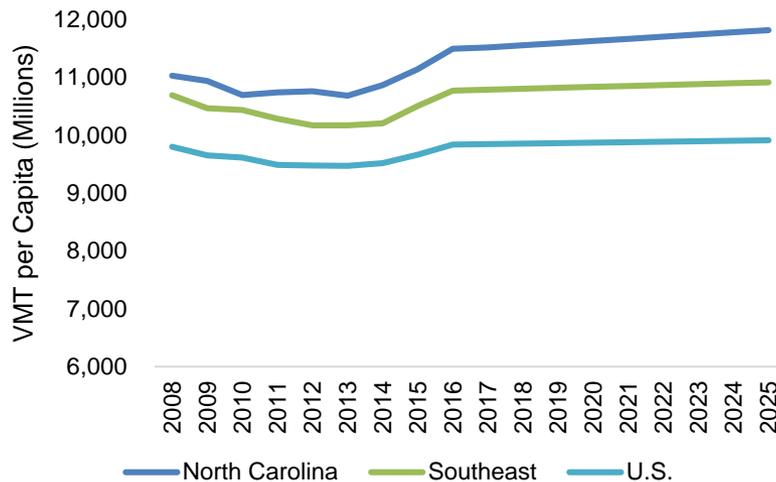
North Carolina VMT increased at a 1.3% CAGR in the post-Great Recession period. This was faster than U.S. average of 0.8% and on par with the Southeast average of 1.4%.

VMT per capita growth is projected to surpass the U.S and Southeast averages, and combined with population growth, will mean significant demand on an already over-burdened roadway network.

North Carolina VMT per lane-miles is consistently higher than national averages. It is anticipated that due to population and employment growth VMT will increase in the long-term.¹⁵

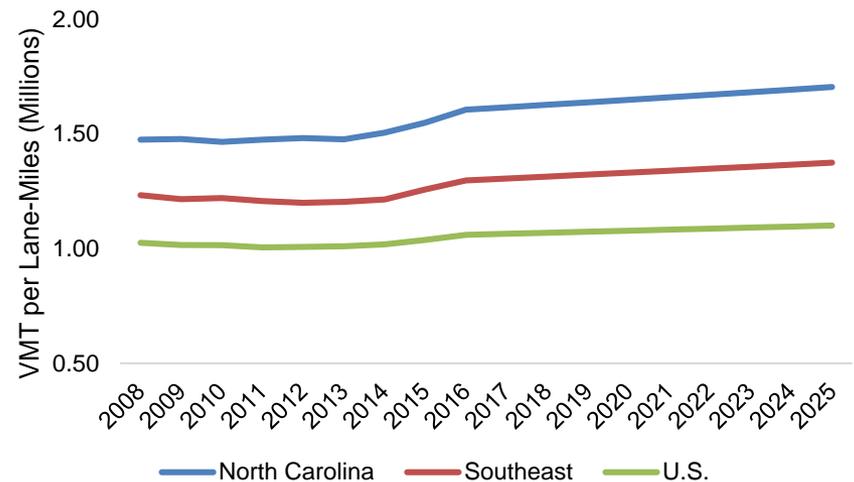
The VMT per lane-mile growth will have direct impacts on state-of-good-repair expenditures and is likely to be a key driving force for transportation spending.

VMT per Capita



Source: Federal Highway Administration Highway Statistics Series

VMT per Lane-Miles of Roads



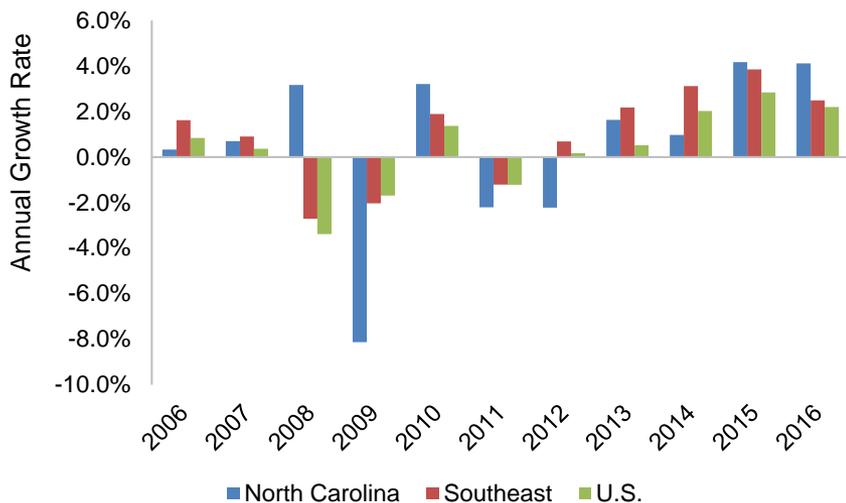
Source: Federal Highway Administration Highway Statistics Series

Fuel Efficiency Trends

Motor fuel consumption growth rate declined in North Carolina during the Great Recession. However, consumption has increased recently after the economic recovery.¹⁶

Motor fuel consumption is anticipated to grow in the short-term. In the long-term, the shift toward electric vehicles and shared-economy forces along with fuel efficiency improvements are expected to flatten the growth rates.

Motor Fuel Consumption Growth Rate

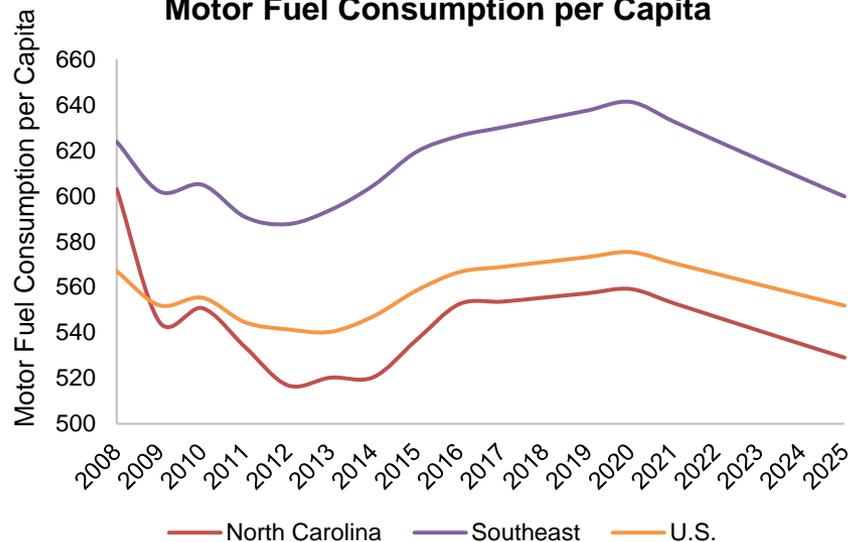


Source: Federal Highway Administration Highway Statistics Series

North Carolina average annual motor fuel consumption per capita is 542 gallons, which is below the U.S. and Southeast average at 550 and 606 gallons. While population growth surpasses national and regional averages, motor fuel consumption growth per capita is projected to plateau post 2020.

Although North Carolina fuel tax revenues are indexed to inflation and population, market forces will significantly diminish fuel tax revenue.

Motor Fuel Consumption per Capita



Source: Federal Highway Administration Highway Statistics Series

Highway User Revenue Trends

Federal Funding: It is expected to grow at a rate of 2.2% per year mainly through general fund transfers. However the long-term sustainability of this practice is at risk given the projected decline in federal gas tax revenues and lack of long-term funding solutions at the federal level.

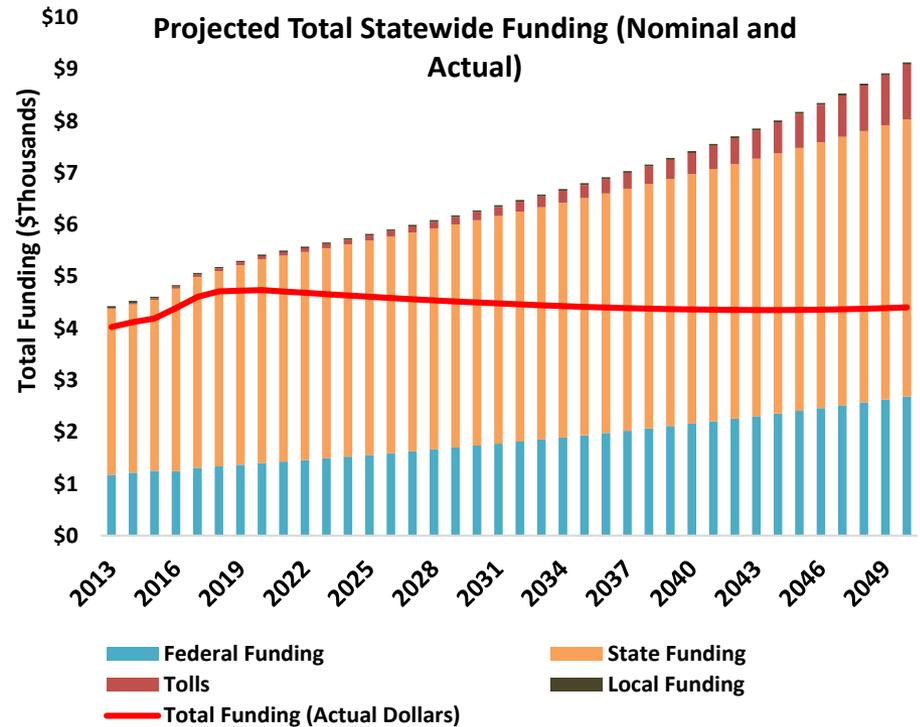
State Motor Fuel Taxes: Although state fuel taxes are indexed to inflation and population growth, the increases in VMT and fuel consumption are anticipated to neutralize due to the improvements in fuel efficiency.

State Highway Use Taxes & Fees: The projected growth in population and employment are anticipated to drive increased funding in the short-term. However, these effects are expected to neutralize over time due to shifts in shared-economy, potential economic downturns, and overall urbanization.

Tolls: Recent increases in toll revenue signals a reliable revenue source. With more NCTA projects under development, toll revenues are expected to become a potentially sustainable funding source.

Statewide transportation funding is projected to increase from \$5.1 billion in 2018 to \$9.1 billion in 2050 at a 1.8% CAGR.

Adjusted for inflation, total funding is anticipated to decrease to \$4.8 billion by 2050 (in 2018 dollars).



Disruptions and Volatility

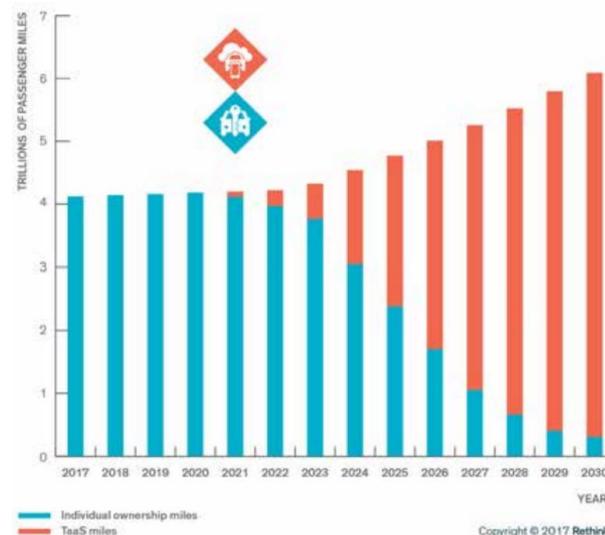
Predicting the Future is Hard. While the various trends included here are based on historical trends and official forecasts, there are several potential disruptions that could create major shifts in the funding picture:

- Speed of adoption for electric, automated vehicles
- Predominant ownership model of automated vehicles – shared fleets or individual owners
- Population and employment changes
- Economic recessions and fundamental shifts in the economy
- Political ability to respond to changes

These, along with many other factors, will change the funding picture in North Carolina and contribute to **volatility** in actual transportation-related revenues compared to forecasts.

One example of potential transportation industry change in the coming years is a report by RethinkX, which predicts the collapse of the internal-combustion vehicle and oil industry due to the rapid adoption of electric, shared, autonomous vehicles. Most research is still inconclusive as to the exact timing and level of such disruption however incorporating dramatic change and possibilities into scenario planning will help policymakers respond in more robust ways.

RethinkX Forecast of AV Adoption



Source: RethinkX - Rethinking Transportation 2020-2030

FINDINGS AND FUTURE DIRECTION FOR NORTH CAROLINA

Systems Planning Opportunities

Population and Employment Trends: North Carolina shows signs of improvement following an economic recovery that surpasses national averages. Travel demand is expected to increase, especially in urban areas, due to growth in employment and population driven by robust growth in the health care, technology, pharmaceutical, manufacturing, and tourism sectors. Public transit funding is needed to support the state's aging population.

Fuel Efficiency and Gas Tax Revenues: Motor fuel consumption growth rate in North Carolina is signaling a declining trend, consistent with national and Southeast averages. Motor fuel consumption per capita is smaller than national and Southeast averages. Considering the decline in fuel consumption at the national level, it is projected that fuel efficiency standards will neutralize the potential impacts of inflation-adjusted tax revenues.

Highway User Revenues: Considering the declining value of fuel taxes and potential impacts of shared-economy on vehicle ownership, overall highway user revenues are projected to increase at a smaller rate after larger increases in the short-term. Adjusted for inflation, overall funding is anticipated to stay relatively flat for the plan duration.

VMT Growth: North Carolina has the nation's second largest state-owned roadway network that has historically been underfunded and over-utilized. VMT per capita and VMT per lane-mile estimates show high travel demand in comparison with U.S. and Southeast averages. However, due to the shared-economy impacts and other market forces, this increased VMT may not result in increased highway use taxes and fees.

Systems Planning Opportunities

Matching Taxes and Fees to Shifting

Market Dynamics: Various states have tailored initiatives to raise new funding for both capital and O&M expenditures. State and local governments are increasingly considering new ballot initiatives to raise new funding in light of a potential decline in fuel consumption and shared-economy trends, as well as growth in overall travel demand.

Mileage-Based User Fees: More states are considering mileage-based user fees to limit the impacts of declining fuel taxes and to tie the actual travel on the highway system to revenues generated. Several states have implemented trials for mileage-based user fees, which may become a potential new funding source.

Public-Private Partnerships (P3s) and Tolling Existing Facilities:

P3s offer flexibility for use of various financing mechanisms. They involve the private sector in O&M activities that are consistent with national trends toward performance-based infrastructure. However, P3s may not result in a complete funding solution, thus more states are considering the use of tolling for existing facilities either through leasing or other P3 mechanisms. Tolling helps states offset the declining tax revenue impacts.

Local and Regional Partnerships for

Multimodal Investments: To address much needed multimodal investments, local and regional partnerships for specific funding solutions tailored to transit are necessary. Use of mechanisms, such as value capture revenue or local/regional ballot initiatives for transit investment, requires sustained partnerships at the local level supported by state policies that are supportive of a multimodal funding approach.

APPENDICES

End Note Sources

1. Congressional Budget Office (CBO) The Budget and Economic Outlook: 2018 to 2028
2. 2040 North Carolina Transportation Plan (<https://www.ncdot.gov/initiatives-policies/Transportation/plan/Pages/default.aspx>)
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4. Congressional Budget Office (CBO) The Budget and Economic Outlook: 2018 to 2028
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12. U.S. Census Bureau Database (<https://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml>)
13. North Carolina Statewide Strategic Plan Summit, 2018 (<https://www.ncdot.gov/divisions/public-transit/statewide-strategic-plan/Pages/march-2018-summit.aspx>)
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17. RethinkX Rethinking Transportation 2020-2030: The Disruption of Transportation and the Collapse of the Internal-Combustion Vehicle and Oil Industries, May 2017 (<https://www.ncdot.gov/about-us/how-we-operate/finance-budget/nc-first/Documents/rethinking-transportation.pdf>)