



NORTH CAROLINA

Department of Transportation



NCDOT Finance Overview

NC FIRST Commission

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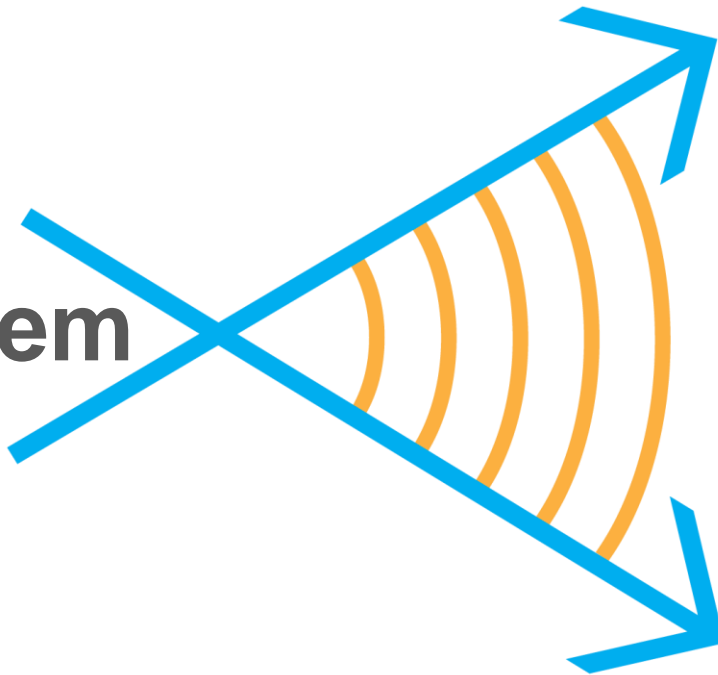
July 12, 2019

Agenda

- Why are we here?
 - Problem and Transportation Disruptors
- The User Pay Principle
- NC Transportation Milestones
- NC Transportation Revenues
 - Federal
 - State
 - Variables and Sources
- Trends
- Driving Forces Transforming All of Mobility

Why are we Here

Problem



Growing

population wanting safe, affordable, eco-friendly logical mobility that is seamless

Transportation Disruptors

Automation, Connectivity Shared mobility, CAFÉ* standards, Demographics, Electric/Hybrids

Declining Revenues

Motor fuel, highway use and driver and vehicle fees

*CAFÉ – Corporate Average Fuel Efficiency

Transportation Disruptors



- Electrics/Hybrids
- Ride Sharing
- Micro-Mobility
- Population
- Automation
- Connectivity

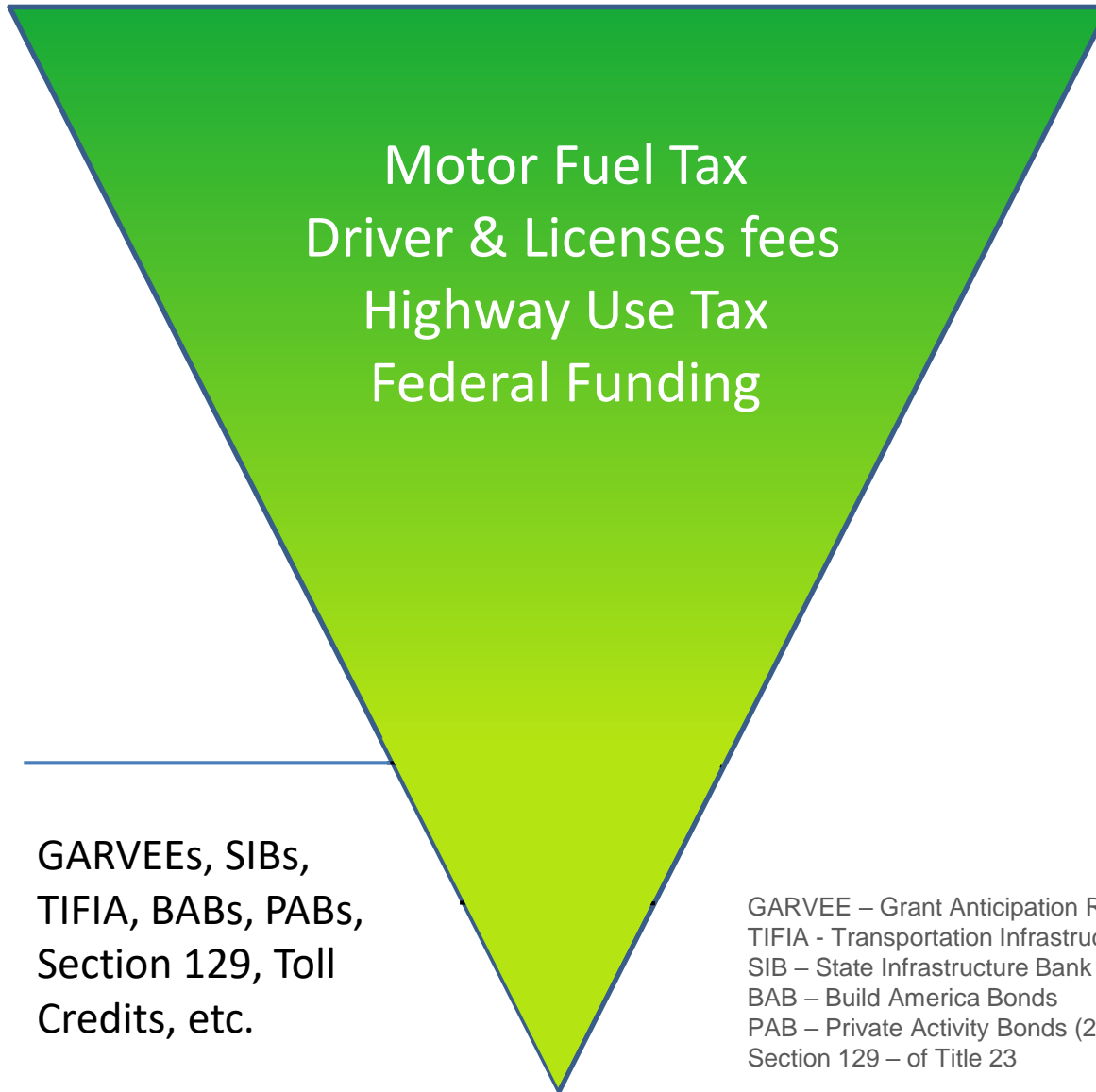


- Federal Funding
- CAFÉ Standards
- Car Ownership
- Commuter Preferences

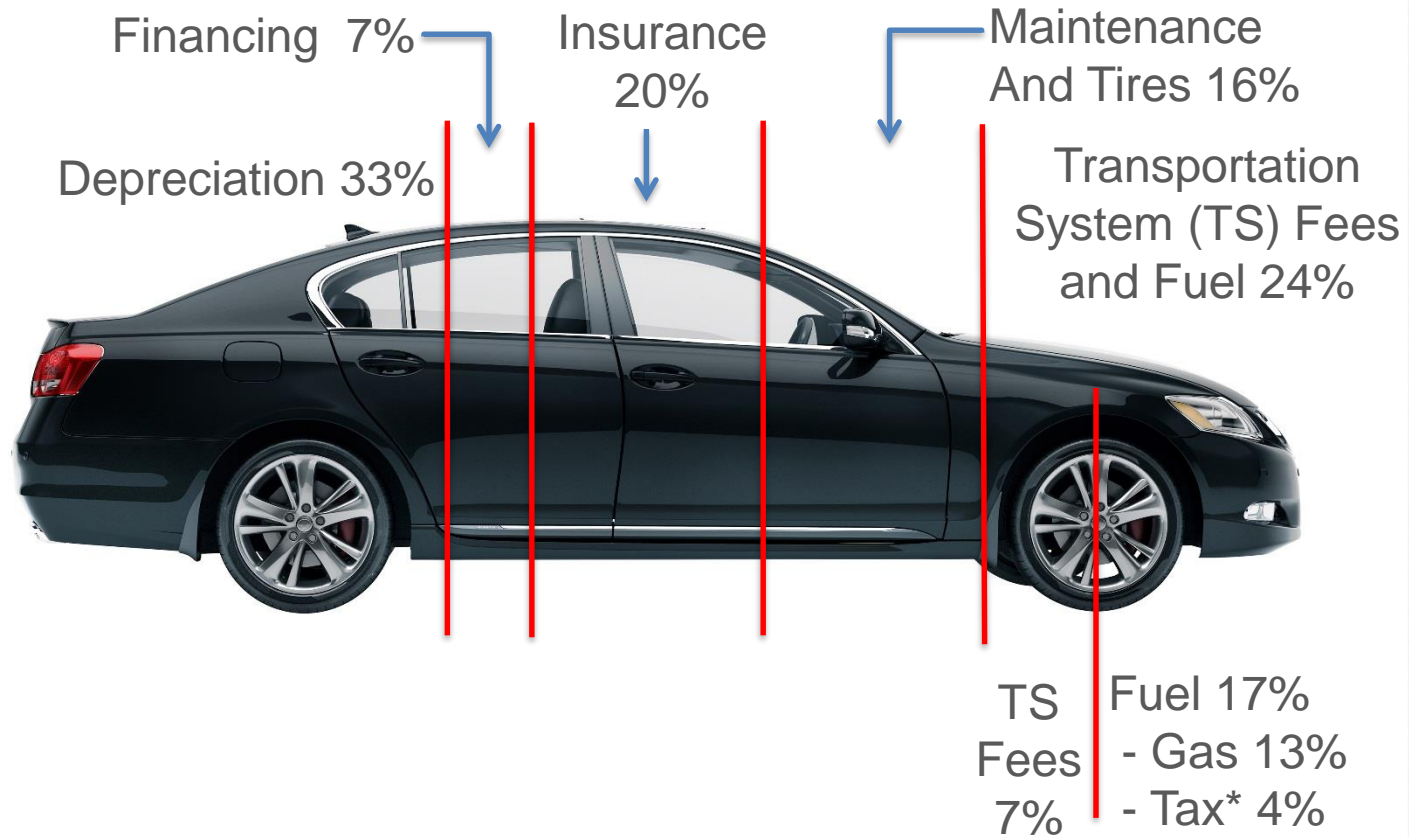


Miles Driven

User Pay Principle



Vehicle Ownership - \$7,000/year



AAA 46.7 ¢/mile
IRS 54.5 ¢/mile

Transportation System Fee + Fuel Tax = 11% (\$770)

* Federal and State motor fuel taxes

North Carolina – Funding Milestones

Private Investors

- Turnpikes
- Plan Roads

Vehicles and Needs

- NC Highway Commission (1901 & 1915)
- Highway Fund
- Motor Fuel Tax** (1921/1907?)
- Present DMV Fees**
- Bonding (1921, 1923, 1925, 1927 - Total \$115M)

Building Progress

- NC Department of Transportation
- Local Funding (Powell Bill)
- Motor Fuel Tax (Indexed)
- Increased DMV Fees
- More Bonding
- First TIP

Before 1900s

1900 to 1949

1950 to 1988

- 1st Federal Road
- The National Road – (1806)

- 1st Federal Aid (1916)
- Federal Motor Fuel Tax (1932 for deficit reduction)

- Trust Fund – Highway Account
- Trust Fund – Mass Transit Account
- Federal Diesel Tax ≠ Gas Tax

North Carolina – Funding Milestones (Cont)

Population & Growth

- NC Highway Trust Fund
- **Highway Use Tax** (1989)
- More Bonding
- Project Cash Flow
- Motor Fuel Tax Collection at Distribution Pt

Building Progress

- Cash Management Policy
- Increased DMV Fees
- Debt Limit
- Turnpike
- 10 Year Work Plan
- STI
- SL 2015-2 & SL 2015-241
- SL 2018-16

1989 to 1999

- Multi-year Authorization Bills
- Last Federal Gas Tax Increase
- Project Cash Flow
- State Infrastructure Bank
- GARVEE
- TIFIA

2000 to Present

- SAFETEA-LU, MAP-21 Expired
- FAST Enacted
- Federal Trust Fund Bailouts
- Federal Gas Tax renewed
- CAFÉ Standards

NC Transportation Revenues



75%

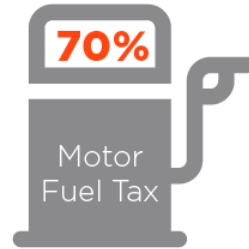
Overall

25%

Overall

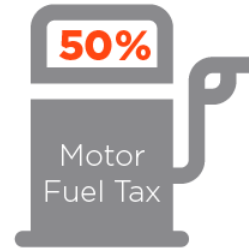


Federal Aid Revenue Sources



Motor Fuel Tax:	<ul style="list-style-type: none"> Gasoline 18.4 cents/gallon Diesel 24.4 cents/gallon
Truck Sales:	12% of retail price for trucks over 33,000 lbs. or trailers over 26,000 lbs. GVW
Truck Use:	<ul style="list-style-type: none"> Up to 55,000 lbs. No Tax Over 55,000 lbs. \$100 + \$22/1,000 lbs. over 55,000 lbs. (\$550 maximum)
Tires:	<ul style="list-style-type: none"> 9.45 cents/10 pounds over 3,500 lbs. maximum rated load capacity 4.725 cents for bias-ply or super single tire
General Fund Transfers:	\$143.6 billion since 2008 (through 1/2016)

State Revenue Sources

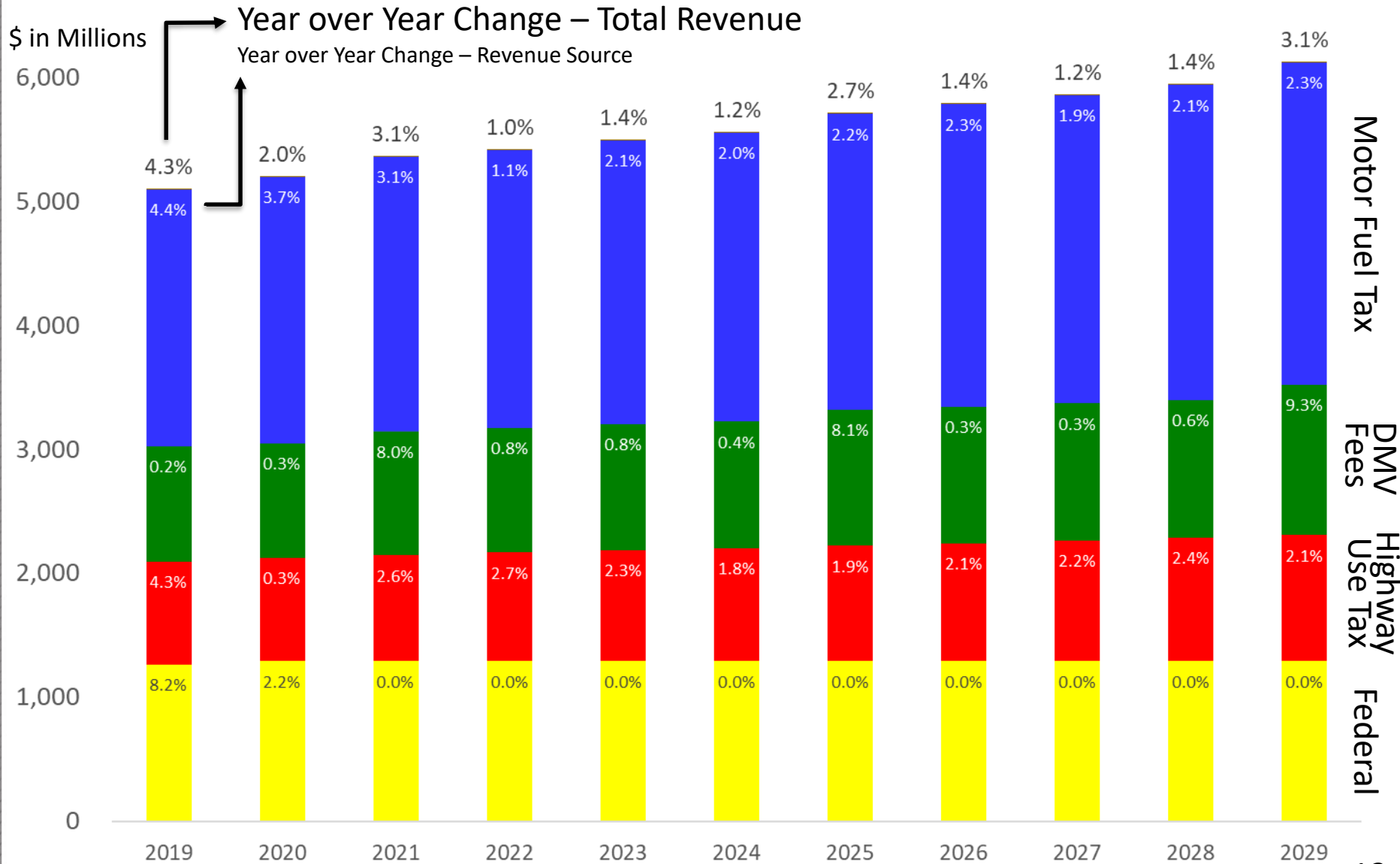


Motor Fuel Tax	Gasoline and Diesel 36.2 cents/gallon (effective 1/1/2019) $\text{Rate}_x = \text{Rate}_{x-1} \times \frac{75\% \Delta(\text{Population}_{x \text{ and } x-1})}{25\% \Delta(\text{CPI}-E_{x \text{ and } x-1})}$
DMV Fees	20+ Driver and Vehicle fees Most fees adjusted Quadrennially based on CPI
Highway Use Tax	3% of vehicle sale transaction net of trade-in
General Fund Transfers	None

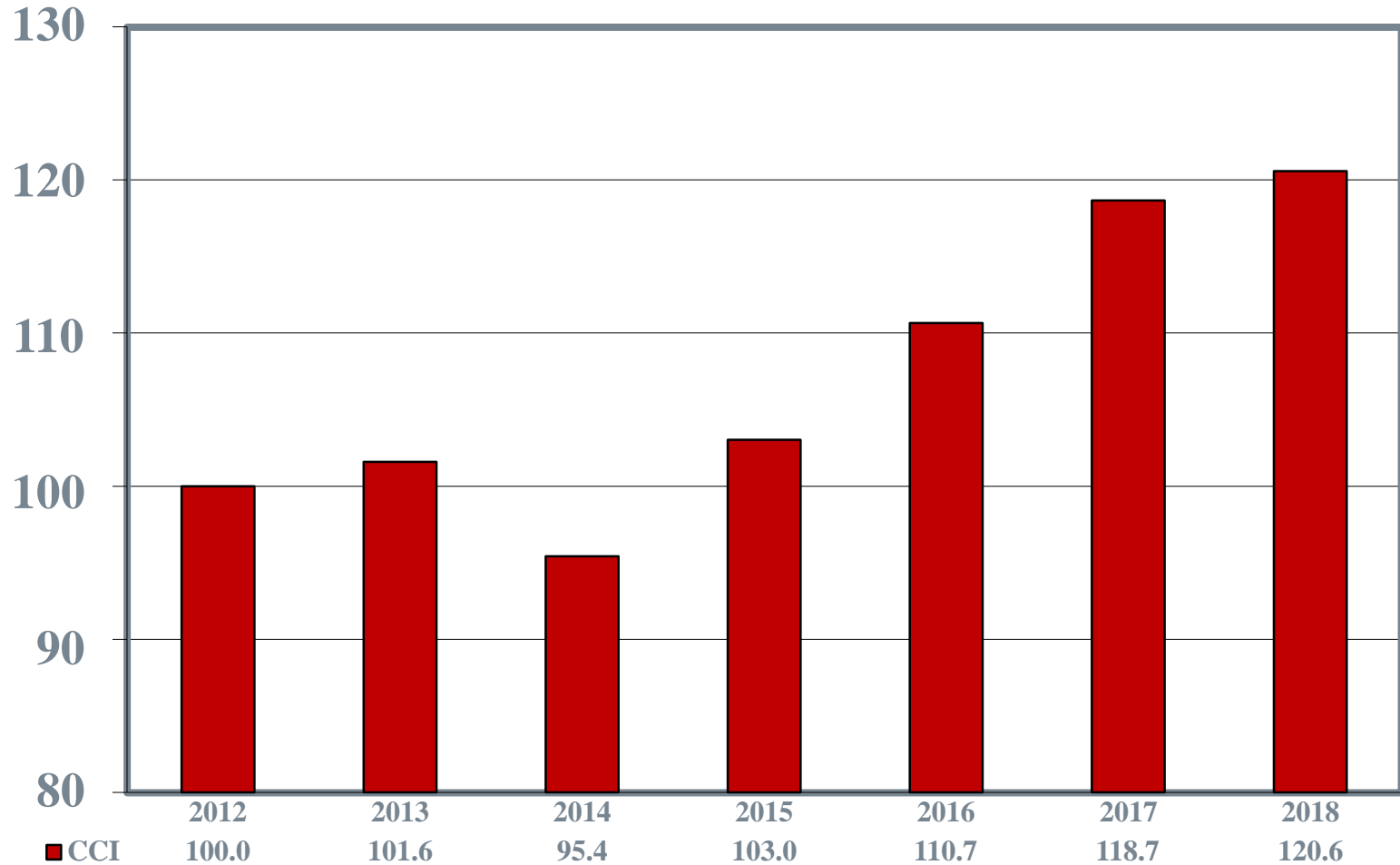
Revenue Variable and Data Sources

Source	Variables	Data Sources
Motor Fuel Tax	Rate	<ul style="list-style-type: none"> Population – OSBM Demographics CPI-Energy – Global Insight Legislative
	Fuel Consumption	<ul style="list-style-type: none"> In-House Model (SAS)
DMV Fees	Rate	<ul style="list-style-type: none"> General Statute
	Transactions	<ul style="list-style-type: none"> CPI – Global Insight Regression Analysis NC Population Growth
Highway Use Tax	Rate	<ul style="list-style-type: none"> General Statute
	Vehicle Pricing	<ul style="list-style-type: none"> In-House Mode (SAS)
Federal	Revenue	<ul style="list-style-type: none"> Congressional Budget Office

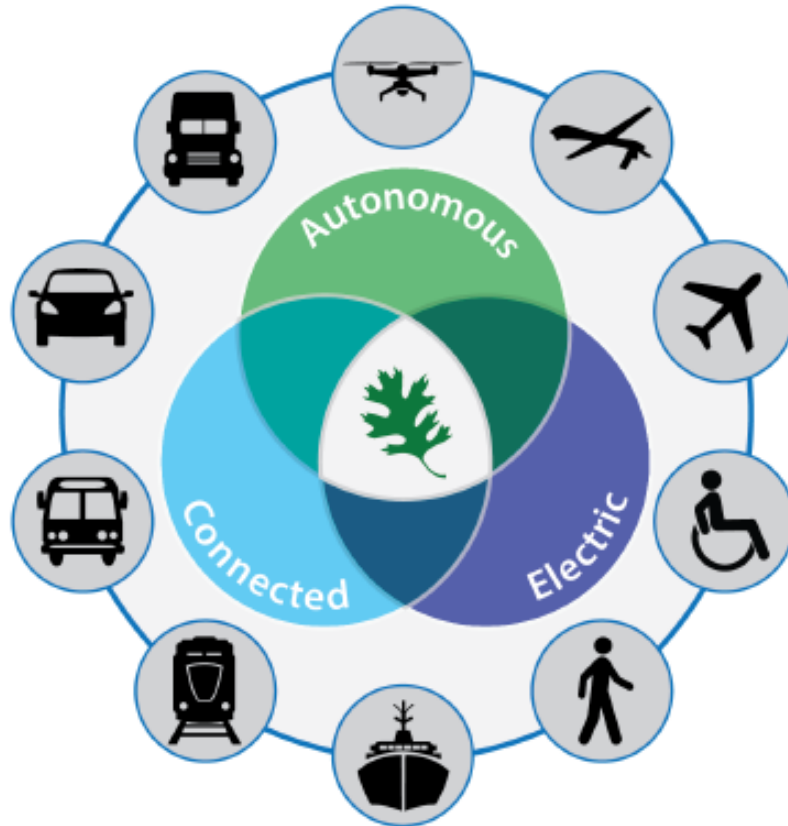
10 Year Revenue Forecast – State & Federal Sources



NCDOT Annual Highway Composite Construction Cost Index by Calendar Year (2012 is base year)



Future Driving Forces Transforming All of Mobility



Automated Vehicles

Navigate and travel without the need for human guidance

Connected vehicles

Communicate with other vehicles, surrounding infrastructure, and traffic controllers

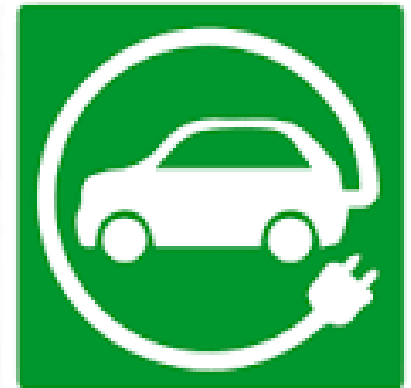
Electric vehicles

Propelled using batteries and electric motors or hybrid gasoline-electric

Historical – Vehicle Technology Deployment

Vehicle Technology	Deployment Cycle	Typical Cost Premium	Market Saturation Share
Air bags	25 years (1973-98)	A few hundred dollars	100%, due to federal mandate
Automatic transmissions	50 years (1940s-90s)	\$1,500	90% U.S. 50% worldwide
Navigation systems	30+ years (1985-2015+)	\$500 and rapidly declining	Uncertain; probably over 80%
Optional GPS Services	15 years	\$250 annual and rapidly declining	Uncertain - 10+%
Hybrid vehicles	25+ years (1990s-2015+)	\$5,000	Uncertain - Currently about 4%

Evolving – Vehicle Fuel

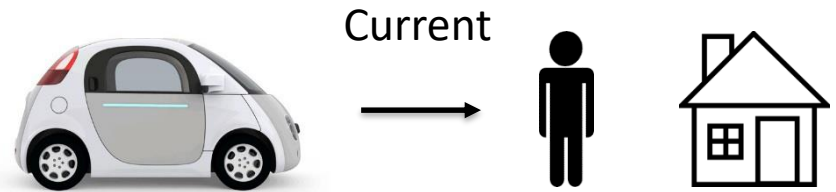


Projection – Autonomous Vehicle Deployment

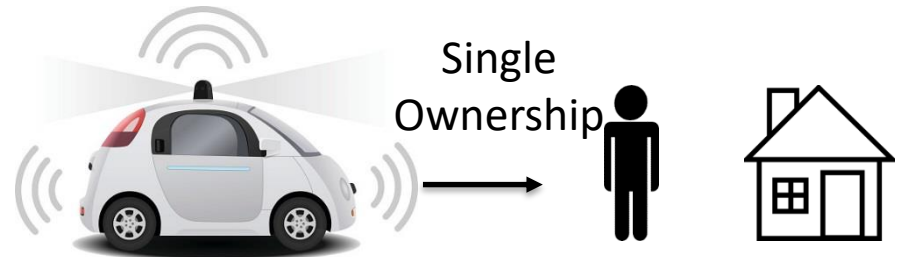
Stage	Decade	Vehicle Sales	Vehicle Fleet	Vehicle Travel
Available – large price premium	2020s	2-5%	1-2%	1-4%
Available - moderate price premium	2030s	20-40%	10-20%	10-30%
Available – minimal price premium	2040s	40-60%	20-40%	30-50%
Standard - included on most new vehicles	2050s	80-100%	40-60%	50-80%
Saturation (everybody who wants it has it)	2060s	?	?	?
Required – on all new and operating vehicles	???	100%	100%	100%

Projection – Autonomous/Vehicle Ownership

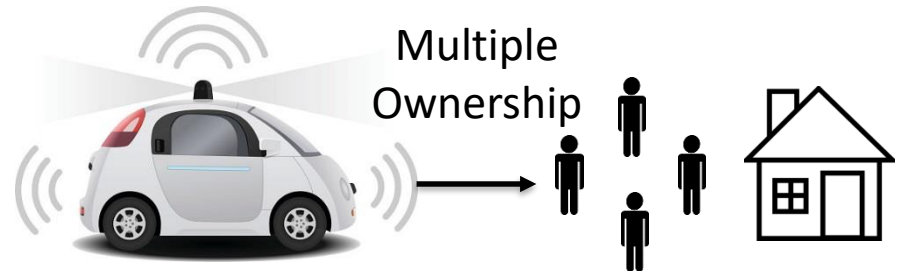
The Car - will grow smarter and more efficient, with high-efficient engines, lighter materials and autonomous driving vehicles



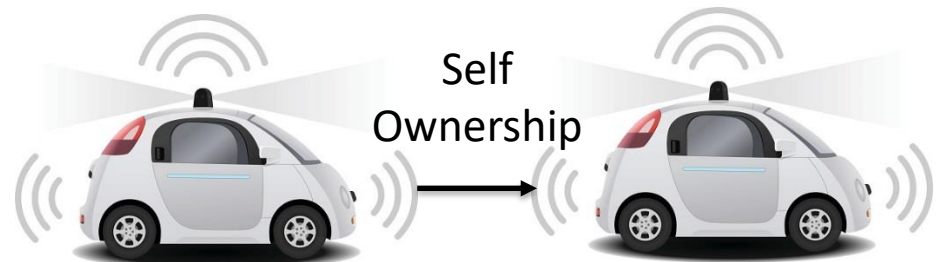
The Industry – will evolve with new competition from tech companies, and suppliers capable of producing high-tech parts at low prices



The Driver – will look at cars differently sharing cars and using them as a space to consume media and make calls



Transportation Funding Model – will have to evolve in anticipation of the change



Questions?