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The Future of Roadway Funding in Tennessee

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Current Roadway Funding Mechanisms

On a per-capita or per-vehicle-mile-traveled (VMT) basis, Tennessee spends less than almost any other state on its highways and roads. Fuel tax rates are among the lowest in the nation and transportation-related debt is nonexistent. Compared to other states, roadway dollars have been far less plentiful. Nonetheless, in spite of this austerity, Tennessee has planned, built, and continues to maintain a roadway network that has better pavement, better bridges, and less congestion than most other comparable state systems. However, concerns are mounting that these outcomes are at risk due to a funding outlook that continues to deteriorate.

In 2013, considering all revenue from all sources (both federal and state), TDOT (Tennessee Department of Transportation) had roughly \$312 per person to spend on highway planning, construction, maintenance, and operations, placing the state third lowest in the nation by that measure.¹ This equates to slightly less than three cents per VMT. Of the roughly \$2 billion in total available revenues in 2013, 47 percent came from federal sources, while the remainder was comprised of state funds. The gasoline and motor fuel (diesel) taxes are most important, together accounting for nearly 60 percent of state highway fund revenues. Additional revenues come from motor vehicle registration fees, and the gross receipts, beer and sales taxes. Currently, Tennessee's combined gasoline tax of 21.4 cents per gallon ranks 12th lowest in the U.S., while its combined motor fuels tax rate of 18.4 cents is the sixth lowest.² Finally, Tennessee is one of only five states that are free of highway-related debt.³

Gasoline and diesel tax revenues not only support state roadways, but are shared with cities and counties across the state. Revenue sharing is based on formulas that account for local population and land area, since these are prime determinants of roadway need and use at the local level.

¹ These calculations were based on Federal Highway Administration revenue values, combined with 2012 Census Bureau population estimates. South Carolina and Georgia had lower highway revenue per capita estimates, \$299 and \$256 respectively. See *FHWA Highway Statistics -2013*, Table SF-1.

² Tennessee's base gasoline tax is 20 cents per gallon and its motor fuels tax is 17 cents per gallon. However, a 1.0 cent per gallon special petroleum tax and 0.4 cent per gallon environmental assurance fee are added to both to form the totals reflected here. Rankings are based on data provided through the American Petroleum Institute as of October 1, 2015. Among southeastern states, Alabama, Louisiana, Mississippi, and South Carolina have lower total gasoline taxes, while only South Carolina has a diesel tax that yields less than Tennessee's.

³ Other states in this grouping include, Iowa, Nebraska, South Dakota, and Wyoming. Notably, however, each of these states has recently increased excise tax amounts levied against gasoline and diesel. See *FHWA Highway Statistics - 2013*, Table SB-1.

These state shared revenues must be used for road and mass transit projects and cannot be diverted to alternative uses.

One might worry that Tennessee's frugal highway spending has resulted in comparatively poor or overly-congested roadways, but this doesn't seem to be the case. To the contrary, by most available measures, Tennessee's highways are in better-than-average physical condition and are generally adequate to meet user needs. To capture and compare physical conditions, the Federal Highway Administration (FHWA) has traditionally measured roadway surface smoothness and bridge integrity and obsolescence. Based on these measures, Tennessee roadways are in good condition. The state's bridges are better than average in three of four categories and almost exactly average in the remaining one. Moreover, the state ranks third best in terms of pavement quality as measured by the share of roadways falling within the two best groupings.⁴ Congestion, while inevitable, also appears to be less of a problem in Tennessee than elsewhere. Using the benchmark measure of vehicle miles traveled per roadway lane mile, Tennessee is entirely average in available capacity.⁵ More disaggregated measures, like those provided through the Texas Transportation Institute's *Urban Mobility Scorecard*, indicate that Nashville and Memphis are neither among the best nor the worst. Instead, they consistently score in the middle third of the nation's 101 largest metro areas for highway transit times, transit time reliability, driver stress, and other measures of urban roadway performance.⁶

It is somewhat ironic that TDOT's seemingly exemplary performance is one of the key factors cited by those who oppose increasing state highway revenues. Still, the opponents' argument is straight forward – TDOT has demonstrated an ability to meet current demands with currently available resources. Coupled with slower growth in demand (as measured by highway use), the conclusion is that there is no need for additional roadway resources.

In response, TDOT argues that the efficiencies that have allowed it to create and maintain good roadways with ever-fewer inflation-adjusted dollars are fully exhausted. Even now, TDOT contends that insufficient revenues are making it impossible to undertake the current improvements necessary to ensure uninterrupted future mobility. Indeed, FHWA data do document the absence of significant new roadway construction and the addition of very few new lane-miles to existing roadways since 2011. These data seem to corroborate the project "backlog" often referenced by TDOT in revenue discussions.⁷

⁴ Bridge data can be found in *FHWA Highway Statistics - 2013*, Table BR-8. Pavement data were last collected in 2011 and are available in *FHWA Highway Statistics - 2012*, Table I-4.

⁵ Annual VMT Values can be found in *FHWA Highway Statistics* in Table VM-2 or VM-202 which is available from 1980 forward. Lane-Miles are available through the same series in Table HM-60 or HM-260.

⁶ Findings in the *2015 Urban Mobility Scorecard* are drawn from traffic speed data collected by INRIX on 1.3 million miles of urban streets and highways, along with highway performance data from FHWA. See <http://mobility.tamu.edu/ums/>

⁷ Evaluating the necessity of proposed highway projects and the corresponding need to fund their construction is made measurably more difficult by the length of time that elapses between project inception and delivery.

Inflation and Fuel Economy Erode Highway Funds

Tennessee's gasoline and motor fuel taxes are per unit levies, (i.e. a fixed number of cents per gallon) that do not increase when inflation reduces the amount of road work that can be purchased for a dollar. The state's gasoline tax was last raised over 25 years ago in 1989, from \$0.16/gallon to \$0.20/gallon.⁸ Adjusting for inflation, in today's dollars \$0.20 of fuel tax revenue buys only \$0.12 worth of highway maintenance and construction.⁹ This erosion in purchasing power is illustrated in Figure 1.

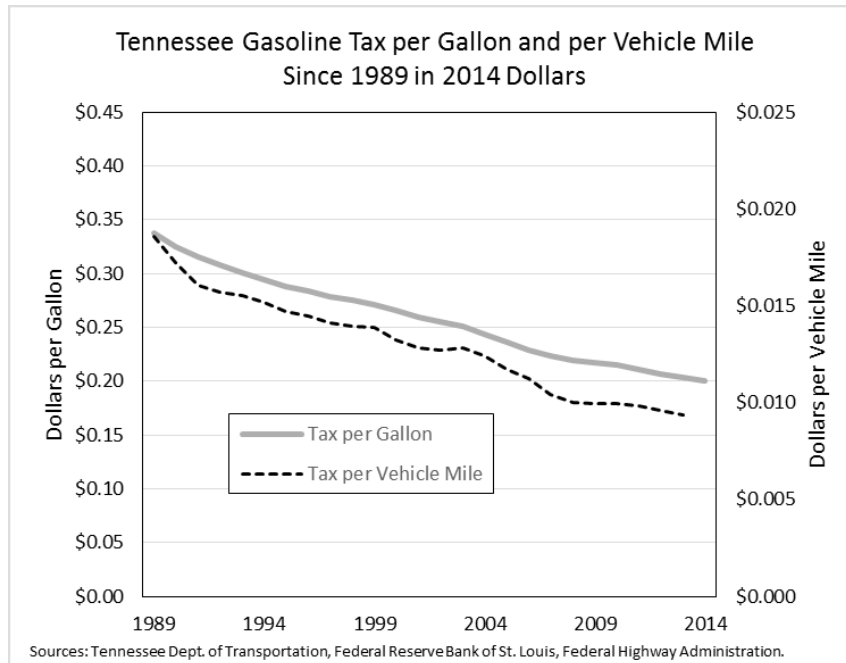


Figure 1. Tennessee Gasoline Tax per Gallon and per Vehicle Mile since 1989 (2014 \$)

Better fuel economy benefits Tennessee's drivers but more miles per gallon further erodes the user fee linkage between highway use and the revenues needed to pay for roads and bridges. From 1989 to 2013 (the most recent year available), passenger car and light truck miles per gallon increased by 20 percent.¹⁰ From the perspective of state revenue collections, things are about to get much worse. Existing fuel economy (i.e. CAFE - Corporate Average Fuel Economy) standards will increase car and light truck miles per gallon by more than 50 percent over the next two decades, reducing revenue per mile by one-third.¹¹

⁸ Tennessee Department of Transportation, 2015. "Transportation History", accessed at <http://www.tn.gov/tdot/topic/transportation-history> on 10/12/2015.

⁹ Federal Reserve Bank of St. Louis, 2015. "Gross Domestic Product: Implicit Price Deflator", accessed at <https://research.stlouisfed.org/fred2/series/GDPDEF/downloaddata> on 10/12/2015.

¹⁰ U.S. Department of Transportation, Federal Highway Administration, 2015. *Highway Statistics 2013*, Table VM-1, accessed at <https://www.fhwa.dot.gov/policyinformation/statistics/2013/pdf/vm1.pdf> on 10/12/2015.

¹¹ U.S. Department of Energy, Energy Information Administration, 2015. *Annual Energy Outlook 2015*, table 7, accessed at http://www.eia.gov/forecasts/aeo/tables_ref.cfm on 10/12/2015.

The poor performance of the gasoline tax has often been attributed to the growth in electric vehicle (EV) sales. However, the impacts of inflation and fuel economy on highway funds have been 300 times that of EVs which currently pay no gasoline tax. Home of the Nissan Leaf, Tennessee ranks 9th among states in EV sales yet electric vehicles account for only 0.2 percent of vehicles sold in Tennessee.¹² Nationwide, 373,000 EVs have been sold since 2008, 0.15 percent of the over 250 million vehicles on US roads.

Roadway Revenue Outlook

It is difficult to envision a scenario that would lead to robust growth in the revenue sources that are used to finance roadways in Tennessee. Congress appears to be poised to provide some near-term stability through the passage of a federal transportation bill that will provide six years of funding. Unfortunately, there are concerns over the adequacy of the proposed funding streams from the federal government that will flow to the states.

Diesel tax revenues will continue to grow in the years ahead, though growth rates will decline as heavy trucks become more fuel efficient. Heavy trucks are the major source of wear and tear on the state's transportation infrastructure.

The greatest threat to roadway finances is the gasoline tax which alone accounts for nearly 50 percent of all highway trust fund revenues in Tennessee. Improved fuel economy from higher CAFE standards will lead to outright reductions in gasoline tax collections sometime in the early 2020s. In the meantime, the rate of revenue growth will slow yielding ever-slower growth in highway trust fund revenues. These trends will transpire in the face of a growing state population. Between 2015 and 2025, Tennessee's population is expected to grow by 11.1 percent.¹³

Historical and projected growth in inflation-adjusted gasoline and petroleum special products tax revenue is shown in Figure 2. The increase in collections due to the rate increase in 1989 is clearly shown in the figure. In the near term, there is an expectation of slightly rising inflation-adjusted revenues as the economy continues to rebound from the deep losses associated with the Great Recession. However, by 2017, revenues are expected to revert to trend and then continue to decline into the foreseeable future. A status quo approach to policy would allow this trend to continue unabated and threaten the integrity of Tennessee's system of roadways.

The state has a variety of options to enhance gasoline and diesel tax collections. Figure 2 illustrates three of these options for the state gasoline tax: a hypothetical \$0.05 increase in the gasoline tax rate, indexing the current gasoline tax rate to inflation and a combination of a higher per unit tax rate and indexing.¹⁴

¹² "Plug-in electric vehicles in the United States", accessed at https://en.wikipedia.org/wiki/Plug-in_electric_vehicles_in_the_United_States#Markets_and_sales on 10/12/2015.

¹³ See *Annual Population Projections for Tennessee by Age, Sex and Race/Ethnicity: 2011-2064*, accessed at <http://cber.bus.utk.edu/popproj.htm> on 11/19/15.

¹⁴ The forecasting model accounts for national and state influences that affect consumer purchases, including levels of employment, income, gross domestic product, unemployment rates and vehicle fuel economy. The forecasts that include policy changes

A five cent increase in the rate restores the purchasing power of the gasoline tax to levels seen in the early 2000s. However, this rate increase is then eroded over time due to inflation and ultimately reductions in the volume of gasoline consumed as well. Indexing the current tax rate to inflation helps sustain revenue levels until 2023 when gasoline consumption is projected to decline. A combination of a higher tax rate and indexing provides for significant revenue gains and slower revenue erosion over time. Indexing the rate to vehicle fuel economy would stem this erosion.

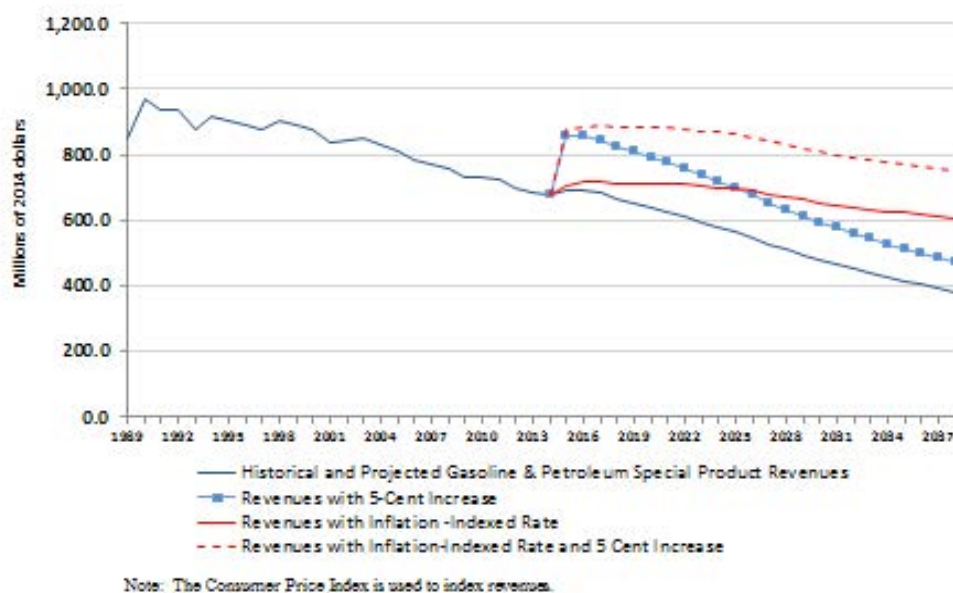


Figure 2. Inflation-Adjusted Gasoline and Petroleum Special Products Revenues

Potential Policy Responses

The evidence presented here indicates that, absent additional funds, Tennessee will confront increasing challenges in maintaining the quality of its roadways.

The simplest and most commonly discussed policy response would be an increase in gasoline and diesel tax rates. The purchasing power of user fee revenues could be sustained through periodic inflation adjustments and indexing of the rate to the ratio of VMT to total fuel use. These options are especially attractive because they rely on the current system of finance that wholesalers, retailers and consumers are familiar with and they can be implemented quickly with fairly certain results.

There are other options as well. For example, Tennessee, like some other states, could apply a sales tax to gasoline purchases. This would generate additional revenues. However, one weakness of this approach is that the resulting revenues can be unstable due to price changes like

account for reductions in consumer purchases due to higher gasoline prices.

those that have taken place over the last year. At least some of the states that embraced this approach only a few years ago are now abandoning it.

Another option would be to divert a larger share of the state's general fund to transportation finance in recognition of the broad benefits that accrue to the state. But revenues could still suffer through variations in overall revenue collections and the possible diversion of transportation funds to alternative uses.

Finally, there are a number of more ambitious, forward-looking fiscal tools that could be used to meet the projected revenue shortfall and simultaneously address other transportation-related policy goals. For example, the state could tax roadway users based on VMT and, like an excise tax, VMT fees could be indexed to inflation to assure stable purchasing power. However, unlike excise taxes, VMT fees eventually could be adapted to address issues of air quality, congestion and the challenge that might someday be posed by alternatively-fueled vehicles. Unfortunately, while the technology exists to implement a VMT tax, the transition costs today would be rather high. Moreover, there is public opposition to a VMT tax due to privacy concerns.

Final Thoughts

Ultimately, we conclude with two cautions. First, the decision to do nothing and just accept whatever the status quo delivers, while seemingly easy, is probably a bad choice. Right now, the quality and performance of Tennessee's roadway network provides us with a distinct advantage over other states. However, if current trends continue and if Tennessee does not respond by raising additional money to expand and maintain its highway network, that advantage will be lost.

Second, the degradation of existing highway performance is a very gradual process and not directly perceived by the eye or by one's driving experience. This reality, coupled with the long lead time needed to build (or significantly expand) roads, suggests that, by the time we actually observe failing roadway capacity, the opportunity for a timely response will have long since passed