

University of Memphis

University of Memphis Digital Commons

25-Year Transportation Policy

Department of Transportation

1-1-2016

TDOT 25-Year Long-Range Transportation Policy Plan, 10-Year Strategic Investment Plan

Tennessee. Department of Transportation.

Follow this and additional works at: <https://digitalcommons.memphis.edu/govpubs-tn-dept-transportation-25-year-transportation-policy>

Recommended Citation

Tennessee. Department of Transportation., "TDOT 25-Year Long-Range Transportation Policy Plan, 10-Year Strategic Investment Plan" (2016). *25-Year Transportation Policy*. 11.
<https://digitalcommons.memphis.edu/govpubs-tn-dept-transportation-25-year-transportation-policy/11>

This Report is brought to you for free and open access by the Department of Transportation at University of Memphis Digital Commons. It has been accepted for inclusion in 25-Year Transportation Policy by an authorized administrator of University of Memphis Digital Commons. For more information, please contact khggerty@memphis.edu.



TDOT 25-YEAR LONG-RANGE TRANSPORTATION POLICY PLAN

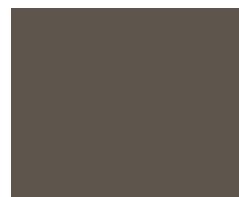


10-YEAR STRATEGIC INVESTMENT PLAN

TN TDOT
Department of
Transportation



table of contents



section 1

introduction..4



section 2

funding levels and
program needs5



section 3

emphasis areas.....19



section 4

proposed plan.....23

List of Tables

Table 1 TDOT’s Current FY 2015 Budget & 10-Year Historic Allocation Budget (Millions of \$)	3
Table 2 TDOT 10-Year (2017-2026) State Revenues Forecast (Millions of \$)	5
Table 3 TDOT 10-Year (2017-2026) Federal, State, and Other Revenues Forecast (Millions of \$)	5
Table 4 Projected Needs for TDOT Programs	14
Table 5 Results of Deficiency Assessment	18
Table 6 10-Year Strategic Investment Targets	20

List of Figures

Figure 1 Summary of Tennessee Funding (% of Total Receipts)	2
Figure 2 TDOT Historic Funding Over a 10-Year Horizon (FY 2006 – 2015) by Funding Area	3
Figure 3 TDOT’s Highway Construction Budget (FY 2005 – 2014)	6
Figure 4 TDOT’s Maintenance Budget (FY 2005 – 2014)	7
Figure 5 TDOT’s Bridge Budget (FY 2005 – 2014)	7
Figure 6 TDOT’s Pavement Budget (FY 2005 – 2014)	8
Figure 7 TDOT’s TSMO Budget (FY 2000 – 2011)	9
Figure 8 TDOT’s Budget for Transit, TDM, & Non-Motorized Accommodations (FY 2005 – 2014) ..	9
Figure 9 TDOT’s Aviation Budget Components	10
Figure 10 Projected Needs and Revenues.....	19

1.0 INTRODUCTION

As part of the development of the 25-Year Policy Plan, the Tennessee Department of Transportation (TDOT) took a unique approach to examining investments separate from policy. The 25-Year Policy Plan consists of two main elements, a 25-Year Policy Plan and a 10-Year Strategic Investment Plan. The 25-Year Policy Plan is built on the foundation of eight policy papers, which are intended to guide the Department's direction over the next 25 years; however, this policy plan does not address where, when, and how to invest in the transportation system.

It is well-known that funding for transportation at the federal level has been unpredictable for some time with the future still unknown. As such, the investments and programs laid out in this document are intended to be for a shorter horizon and be fiscally-constrained, meaning that sufficient funds are reasonably expected to be available for the proposed programs. For these reasons, the investment portion of the 25-Year Policy Plan was developed separate from the policy document as a 10-Year Strategic Investment Plan. The 10-Year Strategic Investment Plan outlined throughout this document builds on the direction established in the 25-Year Policy Plan, which was ultimately crafted to align with the Department's vision, mission, and guiding principles.

2.0 FUNDING LEVELS AND PROGRAM NEEDS

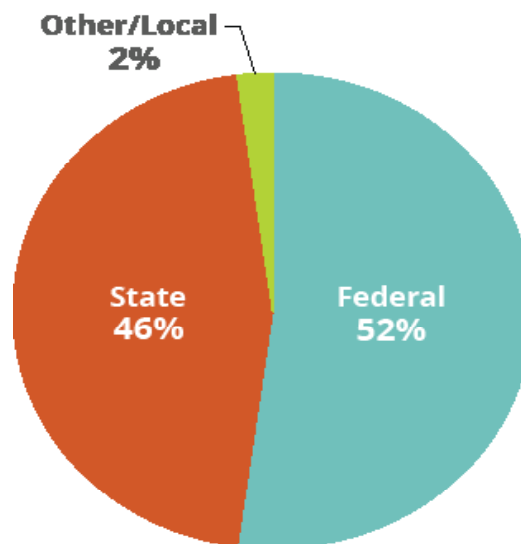
This section provides a review and forecast of transportation funding in Tennessee at the state level with an evaluation of past TDOT budgets, predicted funding levels based on recent research, a review of historic program funding levels, and the quantification of projected program needs over the next 10 years.

2.1 HISTORIC LOOK AT TDOT'S BUDGET

TDOT plans, designs, constructs, operates, and maintains the state's highway, aeronautic, public transit, railroad, and waterway networks in some shape, form, or fashion. Funding for transportation in Tennessee is primarily supported by state and federal funds and has historically come from a number of sources, including:

- Intergovernmental transfers, which include payments from the federal government to TDOT;
- Highway users fees, which include state motor fuel taxes and state motor vehicle fees;
- Other state funding; and
- Miscellaneous state sources.

Over the last ten years, about half (52 percent) of TDOT's budget has come from federal sources. Forty-six percent came from state revenues, and the remaining 2 percent consisted of matching funds local governments are required to pay to receive state highway funds.



Source: TDOT Annual Budgets, 2015

Figure 1 Summary of Tennessee Funding (% of Total Receipts) 2006-2015 Ten-Year Average

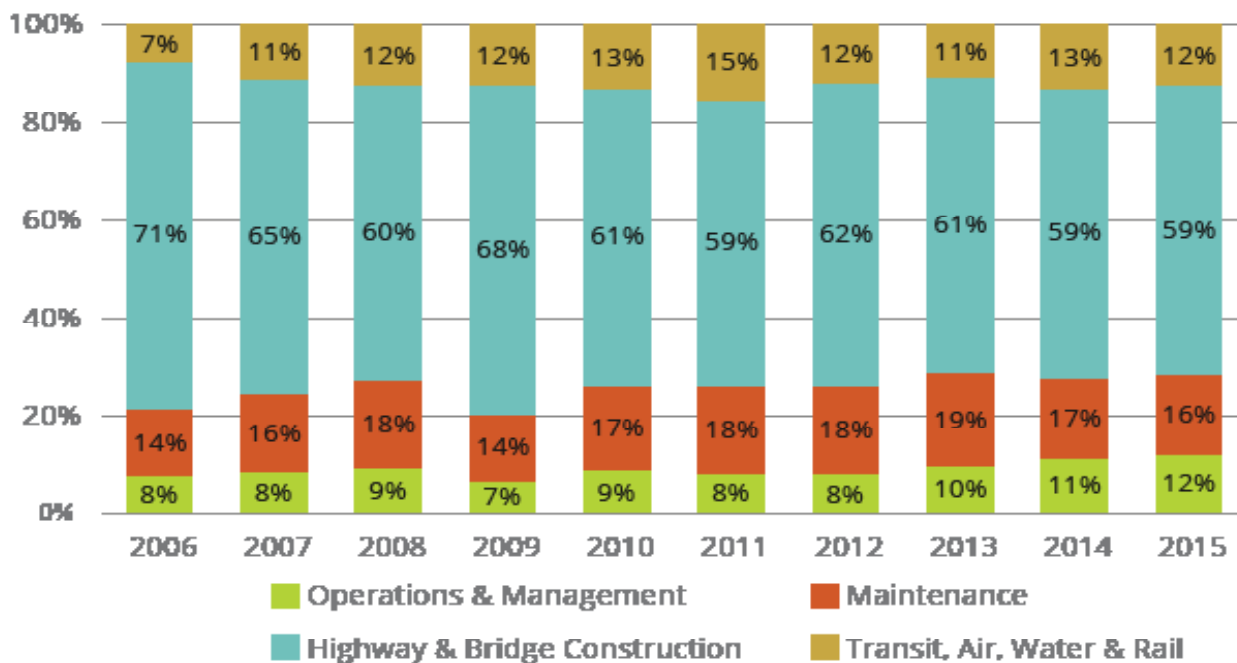
For the 2014-15 fiscal year (FY), beginning July 1 and ending June 30, the Department has a budget of \$1.84 billion. Over the last ten years, TDOT's budget accounted for \$18.7 billion over the last ten year horizon. Table 1 summarizes TDOT's current and historic budget by funding source.

Table 1 TDOT's Current FY 2015 Budget & 10-Year Historic Allocation Budget (Millions of \$)

Funding Source	FY 2015 Budget	10-Year Historic Budget Allocation
Federal	\$ 975.7	\$ 9,792.1
State	\$ 826.6	\$ 8,557.5
Other/Local	\$ 37.5	\$ 413.3
Total DOT	\$ 1,839.8	\$ 18,762.9

Source: TDOT Annual Budgets, 2015

TDOT's budget can be categorized into four general areas, Operation & Management, Maintenance, Highway & Bridge Construction, and Transit, Air, Water, & Rail covering all modes of transportation in Tennessee as part of the state highway system and/or as part of programs that TDOT administers. Figure 2 illustrates historic funding allocations by category. As can be seen by the figure, the relative share of the budget has shrunk for Highway & Bridge Construction whereas the Operations & Management and Maintenance categories have increased over time.



Source: TDOT Annual Budgets, 2015

Figure 2 TDOT Historic Funding Over a 10-Year Horizon (FY 2006 - 2015) by Funding Area

2.2 PREDICTED FUNDING LEVELS BASED ON UT'S RESEARCH

In the last several years there have been a number of reports and studies conducted within Tennessee that examine the transportation revenues of the State. The general consensus among these studies is that transportation funding nationally and within Tennessee has at best been flat, and when compared to growth rates in the state relative to population, the economy, and personal income per capita, transportation revenues have fallen behind.

There are a number of factors impacting Tennessee's transportation revenues:

- Reduced growth in vehicle miles traveled
- Structural issues with fixed-rate excise taxes
- Increased fuel efficiency of vehicles
- Emergence of alternative fuel vehicles
- Eroding purchasing power of fuel taxes

In support of TDOT's 25-Year Policy Plan, the Department asked the University of Tennessee's Center for Business and Economic Research (UTCBER) and Center for Transportation Research (UTCTR) to provide projections of future revenues expected through the principal user fees that currently fund state transportation infrastructure expenditures. These instruments include the state's gasoline excise tax, motor fuel (diesel) tax, and motor vehicle registration fees. Together these sources represent the lion's share of revenues supporting the state highway fund.

Forecasts were developed through statistical estimation of structural economic models that reflect both Tennessee-specific economic and demographic relationships as well as the influence of national policies and economic trends. Several key points on these projections include:

- All forecast results are reported in nominal dollars that do not account for the effects of probable inflation. Thus, while the forecast estimates predict very modest overall revenue growth in most years, typical inflation over the same forecast period is likely to offset nominal revenue growth. As a result the real purchasing power of the predicted revenues is expected to decline significantly over time.
- In the case of Tennessee's gasoline excise tax, the forecasted results are measurably influenced by the inclusion of US Energy Information Administration (EIA) estimates of projected national gasoline consumption. The EIA estimates, in turn, reflect the anticipated influence of existing and planned corporate average fuel economy (CAFE) standards. Since the CAFE standards reflect currently binding federal policy, they are an important building block of the Tennessee gasoline tax projections presented here. Any additional standards beyond those currently in place can be expected to further dampen the performance of the gasoline tax.
- Unlike the case of gasoline, nominal motor fuel (diesel) tax revenues exhibit positive growth throughout the forecast period, though the rate of growth does slow.
- Motor vehicle registration revenues are very highly correlated with population, so the projections capture stable growth arising from the state's anticipated steady growth in population.

Table 2 reflects a 10-year revenue forecast of state transportation funds projected to be available for TDOT based on UT revenue forecasts.

Table 2 TDOT 10-Year (2017-2026) State Revenues Forecast (Millions of \$)

	Gasoline & Petroleum Special Products	Motor Vehicle Fuel (Diesel)	Motor Vehicle Registration	Total Highway Fund Revenue
2017	\$425.5	\$127.1	\$217.3	\$769.9
2018	\$426.6	\$130.9	\$220.2	\$777.7
2019	\$427.6	\$134.5	\$222.8	\$784.9
2020	\$428.1	\$137.9	\$225.5	\$791.6
2021	\$428.3	\$141.0	\$228.2	\$797.5
2022	\$428.2	\$144.1	\$230.6	\$802.8
2023	\$427.5	\$147.1	\$232.9	\$807.6
2024	\$426.8	\$150.0	\$235.2	\$812.0
2025	\$425.6	\$152.8	\$237.9	\$816.2
2026	\$422.3	\$155.2	\$240.7	\$818.1
Total	\$4,266.5	\$1,420.6	\$2,291.3	\$7,978.3

Source: UTCBER and UTCTR TDOT, 2015

As it relates to federal transportation revenues, given the uncertainty of the Highway Trust Fund and the lack of consensus on federal transportation funding at the national level, revenue forecasts for federal transportation funds to Tennessee are projected to remain at the same average annual levels as the State has historically received over the last 10 years (2006-2015). Additionally, Other/Local revenues are also projected at the same historic 10-year average annual levels for comparison purposes.

Table 3 reflects anticipated revenues available to TDOT over the next 10-years (2017-2026) from both federal and state revenues. As seen in the table, available revenues to TDOT over the next 10 years are projected to be over half a billion less than the Department received in the prior 10 years. This shortfall is largely associated with projected assumptions of state revenues.

Table 3 TDOT 10-Year (2017-2026) Federal, State, and Other Revenues Forecast (Millions of \$)

Funding Source	10-Year Revenue Forecast
Federal	\$ 9,792.1
State	\$ 7,978.3
Other/Local	\$ 413.3
Total TDOT	\$ 18,183.7

2.3 PUBLIC TRANSIT

To begin the process of determining needs statewide in the transportation system, a historical look at funding for various program areas was undertaken. This consisted of first gathering information on past fiscal year budgets for the Department and then examining historic trends of these funds. The following sections detail each program that was examined in this analysis.

Highways

Though TDOT does not have an explicit division with the sole responsibility of highways, many divisions work together to design and construct the state's highway system. As indicated by the quality of the transportation system, highways consume a large portion of the Department's budget. Over the past decade, approximately \$840 million annually has been put towards the development of the highway system (roadway widenings, new roadways, major highway capacity improvements, etc.) as seen in Figure 3 below. The large spike seen in 2009 shows the effects of the American Recovery and Reinvestment Act (ARRA) funds that were given to states to reinvest in the infrastructure upon which the economy is based.

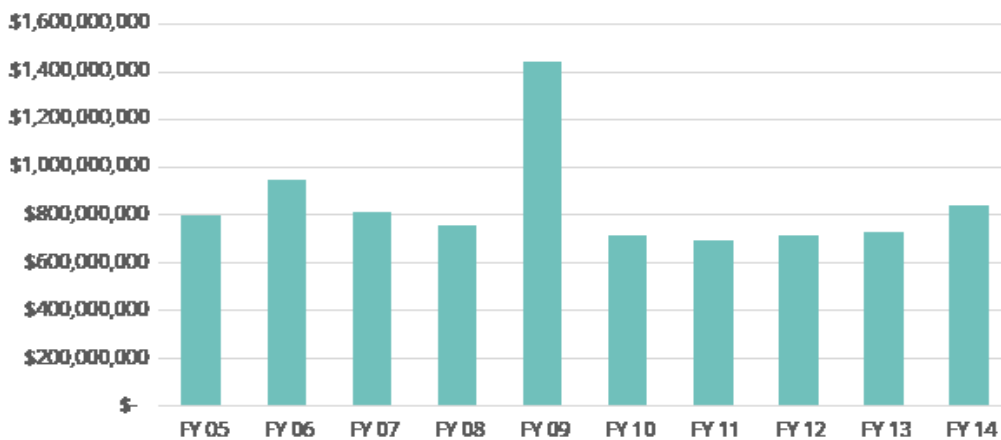


Figure 3 TDOT's Highway Construction Budget (FY 2005 - 2014)

Maintenance

TDOT has always been a ‘fix it first’ organization and places a great amount of emphasis on its ability to identify problem areas that arise in various portions of their infrastructure and respond with a maintenance solution that is often more cost-effective than a complete replacement. As the transportation infrastructure continues to age across the country and in Tennessee, the maintenance needs of roadways, bridges, and other infrastructure continue to grow. As such, the portion of TDOT’s budget allocated to maintenance activities continues to be a significant amount year after year.

As seen in Figure 4, the portion of the Department’s budget allocated for maintenance activities is on an upward trend, but averages approximately \$207 million each fiscal year. This allotment covers all roadway maintenance activities including activities such as snow removal, mowing, guardrail replacement, landscaping, rest area maintenance, etc.

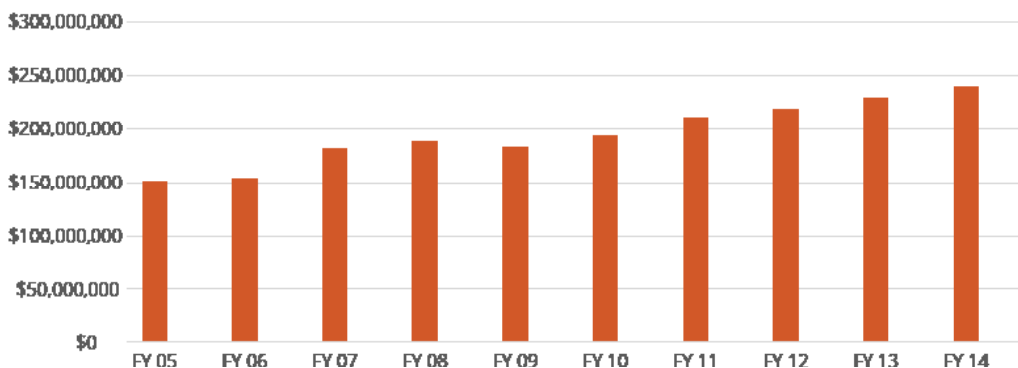


Figure 4 TDOT’s Maintenance Budget (FY 2005 – 2014)

Bridges

TDOT has made a strong commitment to keeping the state’s bridges in a state of good repair. This is accomplished by fulfilling the federal requirement of inspecting all state-maintained bridges on a 24-month cycle. TDOT consistently meets and exceeds their target of examining 95% of all bridges, which helps to determine where investments need to be made in the repair or replacement of deficient bridges. Funds used to do this are pulled from both the state and federal State of Good Repair Program. Figure 5 below shows historic funding levels for TDOT’s bridge program from fiscal years 2005 to 2014.

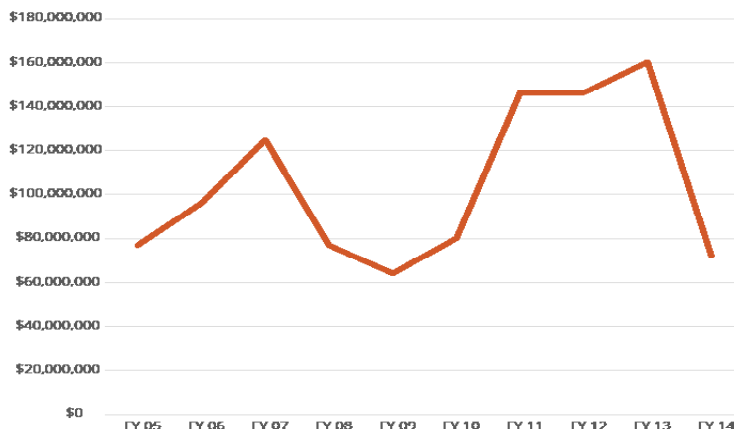


Figure 5 TDOT’s Bridge Budget (FY 2005 – 2014)

Pavement

The roadways are TDOT's largest asset and, thereby, one of the most expensive portions of the transportation infrastructure. Each year, approximately \$150 million is spent on average on the pavement systems across the state. These dollars are put towards activities such as hot-mix asphalt resurfacing, which can add an additional 11 to 12 years to the life of a roadway. Other pavement activities include microsurfacing, surface seals, and crack/joint sealing. As seen in Figure 6 below, the budget for pavement activities has generally been trending upward over the past decade as the roadways continue to age. The pavement activities on state routes occupy a larger percentage of this budget item compared the Interstate system due to the relative mileage of state routes compared to Interstates.

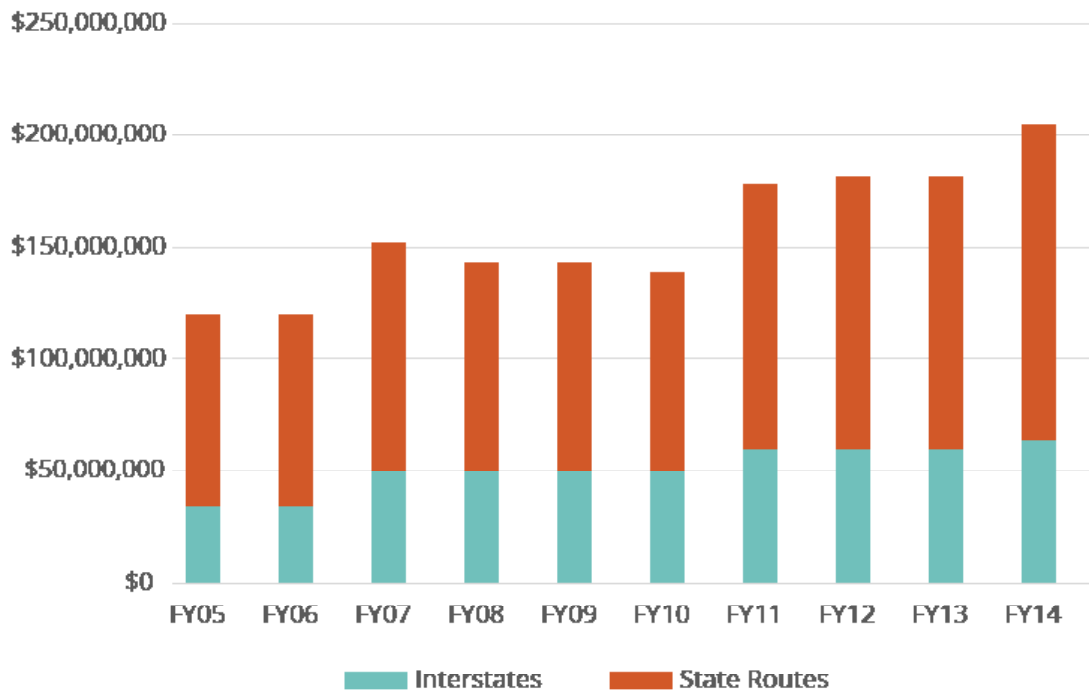


Figure 6 TDOT's Pavement Budget (FY 2005 - 2014)

Transportation Systems Management and Operations (TSMO)

Realizing that roadway widening is not always a feasible solution to congestion, TDOT created a new division called the Traffic Operations Division. The purpose of this Division is to investigate, plan for, and fund projects and technologies that help to maximize the capacity and safety of the existing infrastructure. This occurs through the use of technological innovations, standardized traffic management procedures and practices, and strategic partnerships with local and state agencies. TDOT's TSMO budget primarily includes the maintenance and operational costs for the Intelligent Transportation Systems (ITS) across the state. However, it also includes the operation of the HELP truck program in Tennessee's four largest urban areas, which was created to minimize traffic congestion, promote the safe movement of people and products, and improve the travel environment through incident management procedures. Figure 7 shows the breakout between investments in ITS infrastructure and the HELP Program. The average budget for these items is approximately \$24 million annually. In addition to these investment items, annual maintenance and operation demands require approximately \$11 million annually.

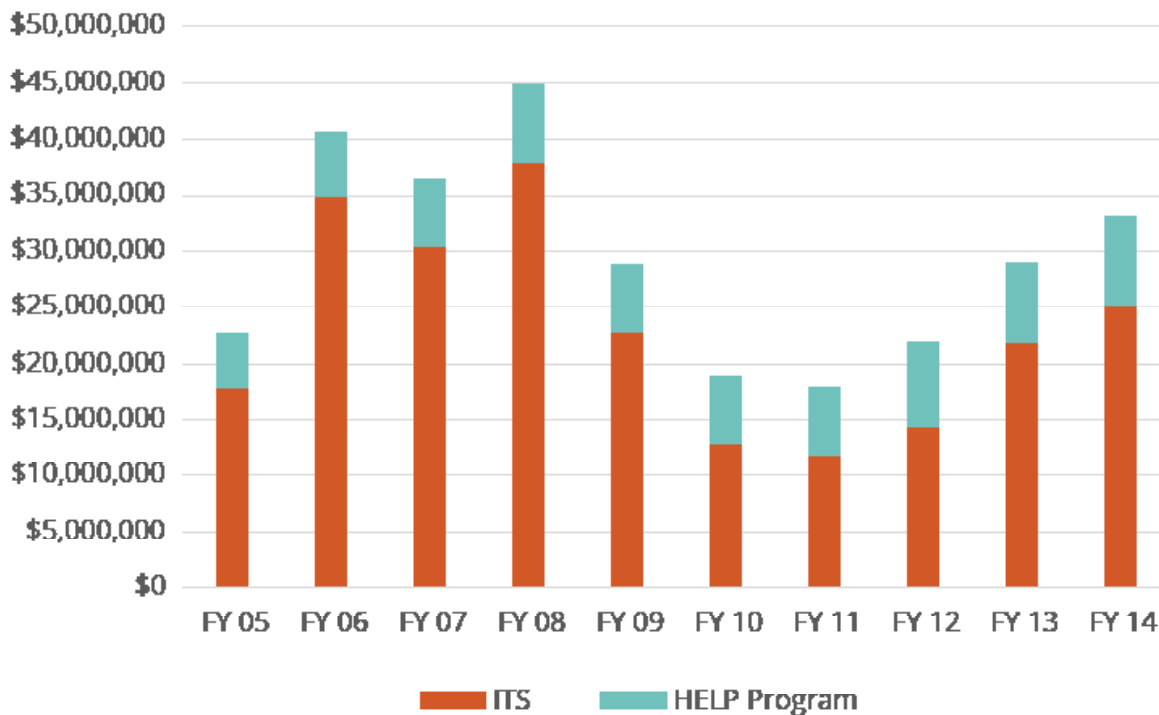


Figure 7 TDOT’s TSMO Budget (FY 2000 – 2011)

Transit, Travel Demand Management, and Bicycle & Pedestrian

TDOT’s transit, Travel Demand Management (TDM), and bicycle and pedestrian programs are housed within the Division of Multimodal Transportation Resources. Combined, these programs receive approximately \$132 million annually to provide matches for federal transit funding, provide non-motorized accommodations, distribute grant funds to local municipalities, and fund TDM programs across the state. Figure 8 shows the combined historic funding levels for these programs. It is important to note that the spike seen in 2009 was a result of the American Recovery and Reinvestment Act (ARRA) funds, portions of which were added to these budgets. Additionally, this budget does not entirely reflect the TDM and non-motorized programs as they are oftentimes funded through the administration of grants such as the Transportation Alternatives Program, Congestion Mitigation and Air Quality Improvement Act (CMAQ) program, and the Multimodal Access Grant, recently initiated by the Department.

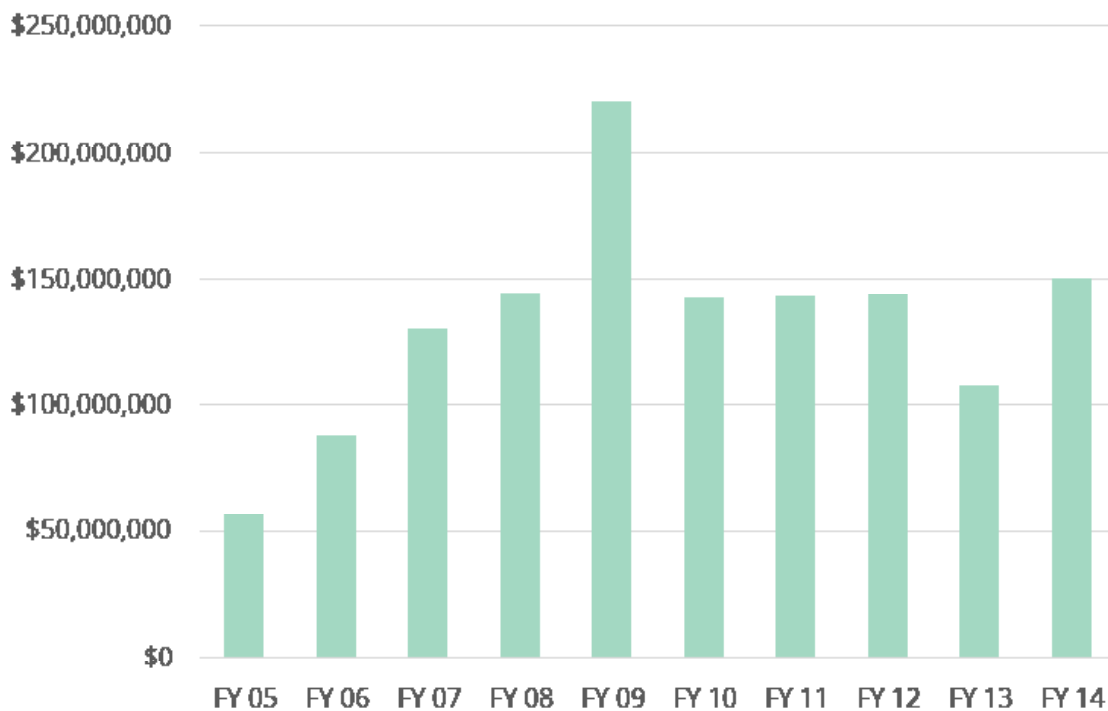


Figure 8 TDOT's Budget for Transit, TDM, and Non-Motorized Accommodations (FY 2005 - 2015)

Aviation, Rail, and Waterways

The aviation, rail, and waterways budgets represent the portion of the Department's budget allocated to multimodal freight transportation. Though they are not all under the same division within TDOT, their budgets are generally examined together.

The composition of the aviation portion of TDOT's budget is shown in Figure 9. It can be seen that the vast majority of funds (78%) are provided through the Tennessee Equity Fund (TEF), which supports the statewide aviation programs and activities at the air carrier and general aviation airports. These programs receive approximately 5% and 73% of the budget, respectively. Additionally, a little over \$9 million, or 15% of the overall budget, is typically awarded through the Federal Airport Improvement Program (AIP) as Non-Primary Entitlement (NPE); this portion of the budget gets distributed to the 62 federally-eligible general aviation airports and requires a 10% match from the local airport. The remaining 7%, or \$4 million, is also part of the Federal AIP and is distributed as state apportionment to be used in airports at TDOT's discretion.

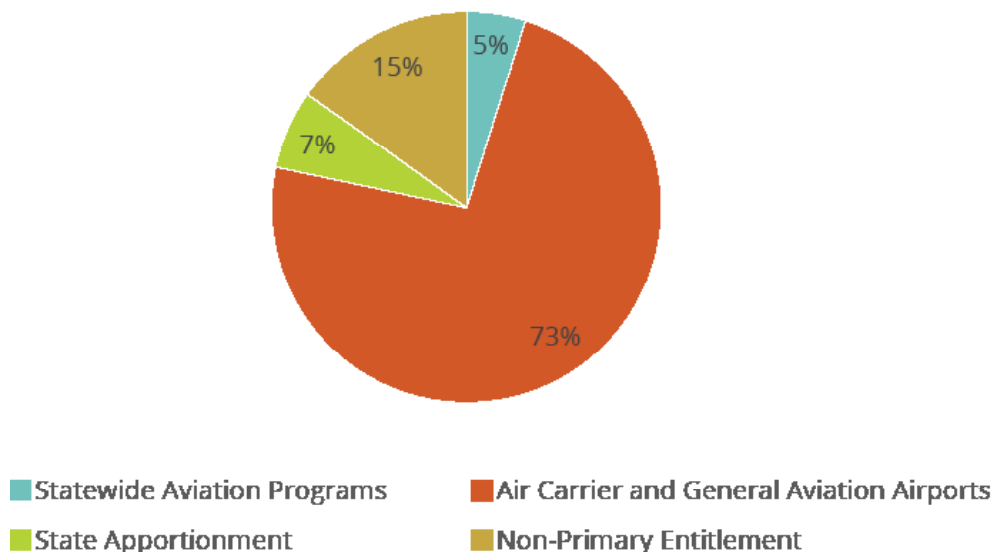


Figure 9 TDOT's Aviation Budget Components

Since rail infrastructure is owned and operated by private entities, TDOT does not allocate a large percentage of its overall budget to Tennessee's rail system. The Division of Multimodal Transportation Resources does not generally provide monies to the Class I rail lines, but it does provide grants for track and bridge rehabilitation for Shortline Railroad Authorities who have been accepted into the Shortline Railroad program. TDOT also allocates a portion of its budget to rail inspection and the promotion of rail safety through its railroad-highway grade crossing program (Section 130). TDOT's rail program has traditionally received an average of \$4.3 million annually to fund the Section 130 program over the past five years. The shortline funding program typically contributed an average of \$13.4 million to railroad authorities over the past 10 years. However, it is important to note that beginning in the 2013 fiscal year, funding for shortline transportation was put on hold pending litigation against the state.

With regard to waterways, TDOT does not currently take an active role in the funding of waterway improvements. However, this program still receives a small portion of the TEF to fund minor programmatic improvements. Historically, the waterways program within TDOT is allocated approximately \$76,000 annually.

2.3 PROJECTED PROGRAM NEEDS

In an attempt to examine the future needs of each of the above mentioned programs, various TDOT divisions provided information regarding the projected needs and any financial analysis conducted internally. Additionally, information was pulled from various planning efforts to supplement the information available from TDOT divisions. The following sections represent a summary of the information collected on projected needs in these programs.

Highways

Though the majority of the transportation system is already constructed, there will still be needs in the future for additional capacity through expansion projects, new roadway connections, etc. It is difficult to anticipate the projected needs of the highway system as they will change with the

growth in population and employment in certain areas, natural disasters, and other issues that arise over the course of the next 10 years. While TDOT's statewide travel demand model and deficiency analysis tool (described later in this document) can be used to predict the location of future highway-related needs, they do not identify possible solutions to meet those needs or address system deficiencies. As such, their applicability in quantifying projected monetary needs is limited, though they can be used later in the process to test the effectiveness of various investments as it pertains to how well they address the need or deficiency. After a review of Metropolitan Planning Organization (MPO) long-range transportation plans, it was found that urban areas alone have more highway needs than can be met with the current TDOT budget, which doesn't include needs in the rural areas of the state. In fact, these plans identify just under \$1 billion in annual highway needs in the urban areas. While highway needs in the urban areas oftentimes are investments in additional capacity, the rural areas of the state have different highway needs such as the modernization of the Interstate system and improved accessibility through the state route system. If the Department continues to fund highway construction at similar levels to current funding, it would mean a projected annual need of approximately \$840 million annually, which equates to \$8.4 billion over the next 10 years. If projected needs were met in urban areas, it would likely require approximately \$160 million annually in additional funding to accommodate urban roadway needs. Accommodating rural highway needs would require approximately \$131 million annually in additional revenues.

Maintenance

As long as traffic continues to increase on the state's transportation system there will always be maintenance needs. Moreover, those needs will continue to increase in the coming years as the infrastructure continues to age. The Maintenance Division is currently in the process of determining the needed funding to keep the system maintained at a specified target condition. However, with the current budget allocation the Maintenance Rating Index (MRI), which is a performance measure used to evaluate the condition of the roads, currently meets or exceeds its target each year. This indicates that, at a minimum, the current budget of approximately \$210 million annually will be needed to continue maintaining the transportation system in a state of good repair over the next 10 years. However, this budget does not account for inflation that will likely impact the cost of maintenance activities over the horizon. Over the last 5 years, TDOT has experienced an average annual increase of 2.6 percent per year associated with the Department's maintenance budget.

Bridges

The needs within TDOT's bridge program can be ascertained from data documenting the deficiency rating for bridges across the state. The bridge inspection program, as mentioned previously, is the process by which bridges are scored based on a variety of physical conditions such as scour and deck conditions. The results of this process paint a picture of the number of structurally deficient bridges in the state. The Department is committed to minimizing the structurally deficient deck area on state-maintained bridges to present levels or lower. This would include all state-maintained structures, regardless of whether they lie on the National Highway System (NHS) or not. TDOT is also interested in maintaining those structurally deficient bridges that are not owned by the state, but rather fall under the responsibility of local municipalities and counties. In order to keep these levels similar to their current state, TDOT's budget for the bridge programs would need to be approximately \$81 million annually, which has been the average annual budget allocation to the bridge program over the past 25 years. However, this amount does not include proactively planning for the increased deterioration of bridges as they continue to age nor does this amount allow for

increased investment in off-system (non-state maintained) bridges owned by local municipalities.

Pavement

Pavement needs over the next 10 years can be broken into needs for the Interstate system and those on the state route system, and as seen above, an average of \$150 million has been spent on these systems each year for the past decade. TDOT tracks the condition of the pavement using a performance metric called Pavement Quality Index (PQI) which is housed in its pavement management system. This system can be used to predict the necessary funding levels needed to keep the pavement conditions across the state at a given level, or PQI. For the Interstate system, the data shows that current funding levels (approximately \$64 million) will be adequate to meet the resurfacing needs across the state and, therefore, keep the Interstate system at an acceptable PQI across the state. However, when it comes to state routes, the system shows that the current budget (approximately \$141 million) will fall short of the needs over the next 10 years due to the increasing age of such a vast system. In fact, it was estimated that approximately \$260 million would be needed annually to keep up the current state of good repair in pavements on state-maintained roadways as measured by the PQI.

TSMO

The Traffic Operations Division, while being a relatively new division, plays an important role in maximizing the capacity of the transportation system. To attain this, various ITS and operational elements need to be deployed in the state's most populated areas that, in turn, experience the most congestion. Based on the input from this division, a list of ITS and operational needs totaling just over \$48 million is needed over an assumed 5-year horizon period. These funds are anticipated for use in installing CCTV cameras, expanding fiber optic communication along key corridors, implementing a statewide ramp metering program, installing additional dynamic and variable message signs, and many other activities. Additionally, the TSMO program will require approximately \$11 million each year for annual operations and maintenance needs. Making the assumption that the \$48 million of needs could be doubled to account for a 10-year horizon, the annual need for the TSMO program would be approximately \$21 million annually or \$210 million over 10 years, not accounting for inflation costs associated with construction as well as operations and maintenance.

Transit, Travel Demand Management, and Bicycle & Pedestrian

Though TDOT currently doesn't take an active role in the provision of transit service across the state, the Department realizes its value in terms of congestion relief, health benefits, and accessibility options for many different population groups. Transit needs can be broken into urban and rural needs as their systems differ between circulation routes, fixed route, and demand-response service. To define urban needs, MPO plans were examined; these plans identify \$7.7 billion in urban transit needs with the overwhelming majority found in Memphis, Nashville, and Chattanooga. This ultimately equates to an annual need of ap

proximately \$310 million. Rural transit needs were primarily associated with the operations and capital expenses planned for each rural transit system as found in TDOT's 2010 Multimodal Annual Report. Since the rural transit systems primarily provide service to elderly populations who need transportation access to goods and services, the projected senior population in these rural areas was also factored into determining the rural transit needs. This process resulted in approximately \$19.3 million in needs over the course of 25 years, which translates into approximately \$770,000 in annual need. Therefore, the annual need for transit across the state is approximately \$311 million

annually. However, given the local and non-federal match requirements, the state's contribution to transit needs is difficult to predict.

In terms of TDM costs, they have traditionally been funded from the Congestion Mitigation and Air Quality Improvement (CMAQ) program. Annual costs in the past have equated to approximately \$2.5 million annually based on historic project awards. Research currently underway at the Department has proposed an annual need of \$5 million to fund not only specific projects, but also statewide TDM initiatives. This would indicate that TDOT's TDM program needs approximately \$50 million over the course of the next 10 years.

As expected, most non-motorized needs occur within urban areas. As such, needs for bicycle and pedestrian improvements within MPO plans were examined. Looking at the 11 MPO areas, it was determined that approximately \$490 million in non-motorized needs were identified for a 25-year horizon, which equates to approximately \$20 million annually. These needs include programs and policies for bicycle and pedestrian mobility as well as investments in sidewalk infrastructure, greenway trails, and bicycle accommodations, for example. For rural non-motorized needs, this analysis relied on the previous allocations for the Department's Multimodal Access Grant, which totals approximately \$10 million per year. Thus, the non-motorized needs across the state total approximately \$30 million annually and \$300 million over the course of the next 10 years.

Aviation, Rail, and Waterways

Based on the growing number of enplanements at key airports in the state such as Memphis and Nashville, it can be assumed that the state's aviation needs will continue to grow over the next 10 years. The Airport Capital Improvement Plan for general aviation airports identifies extensive project-level needs projected to 2022; beyond this year, the plan identifies minimal needs, but approximations for airport needs were made. In total, the general aviation airports are expected to have approximately \$67 million in needs annually. Approximately \$3 million is needed to fund statewide programs and the five air carrier airports are projected to have approximately \$25 million in needs annually. Therefore, the aviation program funding totals approximately \$95 million annually, or \$950 million over 10 years, to meet their needs. It is important to note that recent legislation in Tennessee will cap the contributions of any one airline to the TEF, which is expected to drastically decrease the portion of the budget allocated from TEF sources.

For rail and waterway investments, unless the Department is anticipating a larger role in the provision of rail and waterway freight movement, the needs can be estimated based on historic uses of funding. For rail, the program funding consists of approximately \$4.4 million annually for the Section 130 program and approximately \$13.4 million annually for the shortline rail program, which is currently in flux. Additionally, TDOT's Statewide Multimodal Freight Plan identifies approximately \$230 million worth of rail project-level needs over the course of the next 25 years. Therefore, it can be anticipated that the annual need for the rail program is approximately \$27 million, totaling approximately \$270 million over the course of 10 years.

Similarly for waterways, historic needs show that approximately \$80,000 is used to fund the waterway program for the Department annually. TDOT's Statewide Multimodal Freight Plan identifies 25 years' worth of needs totaling \$116 million in feasible project-level needs such as statewide studies of waterway freight movement and increasing the operating schedule at various locks and dams. This equates to approximately \$4.6 million each year in project costs. Therefore it can be anticipated that the annual need for the waterway program is approximately \$4.6 million annually, which translates into \$46 million over the next 10 years.

Summary

The above sections explain, at a high level, what the needs are for various program areas within the Department. Summarized in Table 4, these needs are derived from a variety of assumptions based on a variety of sources such as historic funding levels, project-level needs from various TDOT divisions, and MPO long-range transportation plans, to name a few. Fiscally-constrained needs are shown on both an annual basis as well as for a 10-year horizon; these values do not account for an inflation in project costs or labor expenses. As such, a column is included to show projected needs accounting for a conservative annual inflation rate of 2%.

Table 4 Projected Needs for TDOT Programs

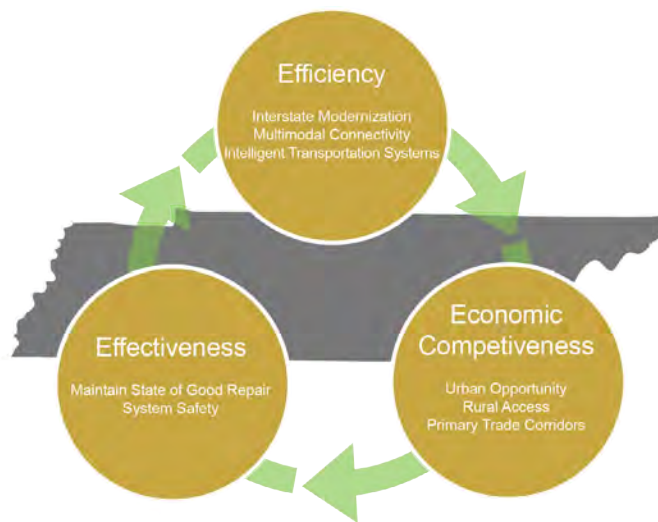
Program	Projected Average Annual Needs	Fiscally-Constrained Annual Allocations	Fiscally-Constrained 10-Year Allocations
Pavement	\$ 357,399,000	\$ 200,000,000	\$ 2,000,000,000
Maintenance	\$ 234,543,000	\$ 210,000,000	\$ 2,100,000,000
Bridge	\$ 91,025,000	\$ 81,500,000	\$ 815,000,000
TDM	\$ 5,584,000	\$ 5,000,000	\$ 50,000,000
Non-Motorized	\$ 33,506,000	\$ 30,000,000	\$ 300,000,000
Transit	\$ 201,037,000	\$ 132,000,000	\$ 1,320,000,000
Aviation	\$ 106,103,000	\$ 95,000,000	\$ 950,000,000
Rail	\$ 30,155,000	\$ 27,000,000	\$ 270,000,000
Waterway	\$ 5,138,000	\$ 4,600,000	\$ 46,000,000
TSMO	\$ 23,454,000	\$ 21,000,000	\$ 210,000,000
Highways	\$ 1,263,182,000	\$ 840,000,000	\$ 8,400,000,000
Admin	\$ 189,868,000	\$ 170,000,000	\$ 1,700,000,000
Total	\$ 2,540,994,000	\$ 1,816,100,000	\$ 18,161,000,000

Overall, the monetary needs of the transportation system are not decreasing; in fact, they are only increasing. Inflation alone will increase project costs, and as the infrastructure expands and ages, more maintenance will be required. It can be seen from the table above that on average the Department's budget will not be able to accommodate the projected transportation needs of the state. This shortfall initially begins in 2017 at approximately \$500 million and continues to grow over the next 10 years, which equates to an annual average shortfall of approximately \$725 million, due to the increased costs of maintaining a growing transportation system and responding to future travel demands.

3.0 EMPHASIS AREAS

The primary goal of the 10-Year Strategic Investment Plan is to outline TDOT's direction for investment over the next 10 years. This direction largely aligns with the 25-Year Policy Plan and its recommendations, but it also incorporates the numerous community inputs gathered throughout the public and stakeholder involvement process as well as engagement with various divisions within the Department. Each of these input opportunities, contributed to the development of high-level strategic emphasis areas, which guide the overall programmatic approach to investing desired by the Department.

The culmination of public input, engagement of directors across TDOT divisions, and the policy directives outlined in the 25-Year Policy Plan all manifested themselves in the development of three distinct strategic emphasis areas: Efficiency, Effectiveness, and Economic Competitiveness.



3.1 EFFICIENCY

Efficiency can generally be defined as the ability to accomplish a task with the minimum expenditure of time and effort. As it relates to TDOT, efficiency relates to ways in which the Department can impact the reliability, availability, and accessibility of the transportation system through the delivery of services as well as the management of the system as a whole. How efficiently TDOT provides and manages the transportation system to its users directly impacts how people and goods are able to move throughout the state as well as within urban cities and rural communities.

The three program areas of Efficiency include:

- **Interstate Modernization** – The Interstate highway system provides the backbone of Tennessee's transportation system. As such, improving travel time reliability, reducing travel delay, and addressing capacity deficiencies on this system are sound decisions that promote economic vitality, quality of life, and system optimization. This program area of efficiency uses targeted investments to address recurring and non-recurring congestion, to improve access, and to expedite trips through solutions rooted in capacity improvements.
- **Multimodal Connectivity** – Multimodal transportation options and connections are a growing necessity to improve person throughput within and across Tennessee. Changing demands, demographics, and other trends all point to the need to increase investments in mobility choices and connectivity. Infrastructure and service investments in multimodal mobility increase access to people, places, and goods and services within and throughout the State.

- Intelligent Transportation Systems - Improving the efficiency of the roadway system can be achieved through a variety of ways beyond traditional capacity improvements. New ways to optimize traffic flow in highly congested corridors in urban and rural environments are being used to maximize the capacity of the existing network. Implementation of Intelligent Transportation Systems, dynamic traffic operations, and other innovative technologies can aid in reducing congestion, minimizing problems caused by congestion, and improving operational efficiency, effectiveness, and safety on Tennessee's transportation system.

3.2 EFFECTIVENESS

Effectiveness can generally be defined as adequacy in accomplishing a purpose, which produces the intended or expected result. As it relates to TDOT, effectiveness can be related to how successful the Department's investments are; this pertains mainly to spending the limited funding available on transportation system improvements that provide the largest return on investment.

The two program areas of Effectiveness include:

- Maintain State of Good Repair – Maintaining and preserving the public's investment in multimodal transportation assets is essential to the long-term sustainability and prosperity of Tennessee. The state has become known as having one of the best maintained transportation systems in the country, a system that residents, businesses, and visitors have come to know and expect. Establishing adequate system condition standards that maximize the State's return on investment is the key emphasis of this program. These critical assets include bridges on state routes and rural roads, the Interstate and state route system, and other multimodal facilities that support rail, water, air, transit, and non-motorized transportation.
- System Safety – The first priority for TDOT is ensuring, promoting, and advancing the safest transportation system in the country. System safety spans all modes and all users. Strategic safety initiatives work not only to address known safety problems, but seek to proactively target investments that preemptively address potential safety and vulnerability risks.

3.3 ECONOMIC COMPETITIVENESS

Competitiveness describes the ability and performance of an entity in comparison to other entities. As it relates to the economics of a state, competitiveness is indicative of how productively a state can sell and supply goods and services relative to other states. TDOT plays a significant role in determining the economic competitiveness of Tennessee as transportation infrastructure and services are directly linked to how efficiently people and freight can move throughout the state.

The three program areas of Economic Competitiveness include:

- Urban Opportunity – Tennessee's urban, multimodal transportation system includes vital corridors that are strategically important, not only to the state, but also to the regions and communities these corridors serve. These corridors connect communities and commerce in rural and urban areas and play an important role in the movement of people and goods. Additionally, they function as catalysts to economic sustainability and development within and across the state and serve as important trade corridors.
- Rural Access - Accessibility can be considered one of the major factors influencing the economic vitality and quality of life in rural areas of the state. Multimodal improvements to rural accessibility can lead to savings in travel time and cost, more direct means of transporting goods to urban markets, and increased investment in rural areas of the state.

- Primary Trade Corridors – Tennessee has a diverse and well-connected multimodal transportation system. The geographic location of Tennessee within the Southeast and nationally, as well as strong local and regional economies, demonstrate continued growth in freight movements within and across Tennessee. Responding to these demands and supporting multimodal and intermodal opportunities are key elements of investment in Tennessee’s multimodal transportation freight system which are essential to the movement of freight and goods along the State’s critical trade corridors.

3.4 DEFICIENCY ASSESSMENT

One step in ascertaining the program areas needs of the transportation system was determining exactly how a ‘need’ is defined. To do this, TDOT initially looked to the Department’s project selection process. For the past 3 years, TDOT has utilized a software package called Decision Lens (DL) to prioritize projects for inclusion in its 3-Year Work Program. This process generally involves the collection of various data related to the transportation system, which helps to define the deficiencies along the roadway segment considered for programming. This process served as the inspiration behind the deficiency analysis tool used to determine the areas of greatest need in the state for development of the 10-Year Strategic Investment Plan.

Simply put, the deficiency analysis tool breaks the state’s network of roadways, functionally-classified as collectors and above, into thousands of roadway segments defined by physical termini and then attributes various data to them based on their spatial location. Once all of the data is attributed to the network, segments are examined for their deficiencies relative to all other segments.

This tool uses data from a combination of sources (i.e. TRIMS, TDOT’s statewide travel demand model, US Census, etc.) with an overall goal of combining information on structural deficiencies, roadway conditions, bicycle and pedestrian conditions, freight infrastructure, economic development, safety issues, and environmental impacts to determine the areas in most need of investment. To define deficiencies within these areas, data was collected from various divisions within the Department as well as from external partners (i.e. TDEC, National Parks Services, TWRA, etc.).

Once the collected data was attributed to roadway segments, each segment was given a numeric score based on the relative importance of different types of deficiencies. For instance, the number of fatal crashes on a segment was valued as more important than congestion on a roadway segment in terms of a deficiency that needs to be addressed. These scales of relative importance were also based on the Department’s allocation when scoring project-level investments using DL to provide a larger degree of continuity between planning efforts and project selection.

Overall, the deficiency analysis tool classifies deficiencies on the transportation system based on various Departmental goals, which align with the Guiding Principles, as well as by objectives that align with the DL project prioritization process. This was done in order that this long-range planning process would align with the short-term project planning process. This linkage ultimately allows for an ongoing connection between these two separate efforts, even after the completion of the 25-Year Long-Range Transportation Plan.

3.5 PROGRAM TARGETS

Using the deficiency analysis tool, the various assessment criteria were aligned with the six programs that support the strategic emphasis areas of Efficiency, Effectiveness, and Economic Competitiveness. As seen in Table 5 below, the deficiency analysis resulted in the following numeric distribution of needs by category. Each percentage represents a portion of the greatest needs within Tennessee’s multimodal transportation system. While these targets may vary across the state in urban and rural areas, they are indicative of a statewide perspective on need.

Table 5 Results of Deficiency Assessment

Efficiency (Reliability-Availability-Accessibility)			Effectiveness (Return on Investment)		Economic Competitiveness (Communities-Commerce)		
Interstate Modernization	Multimodal Connectivity	ITS	Maintain State of Good Repair	System Safety	Urban Opportunity	Rural Access	Primary Trade Corridors
36%			42%		22%		

Ultimately, it is envisioned that TDOT will work towards investments aligned with these categories and their relative importance based on the outcomes of the deficiency assessment over the next 10 years. Their use and application is envisioned to support TDOT’s annual 3-Year Work Program development process. To fully achieve this 10-year strategy, TDOT will need to continually refine this processes by tracking budgetary activities and how they align with these strategic emphasis areas.

4.0 PROPOSED STRATEGIC INVESTMENT PLAN

Funding levels for transportation in Tennessee over the last decade at best have allowed the State to maintain what it has. Current and projected revenues simply cannot keep up with the transportation-related demands resulting from growth in population and the economy. As shown below in Figure 10, TDOT is expected to have an annual shortfall of approximately \$500 million by 2017. This deficit will only continue to grow with inflation over the next 10 years assuming TDOT's current annual budget of \$1.8 billion does not increase. This means the overall quality of the transportation system will continually degrade unless adequate funding is secured.

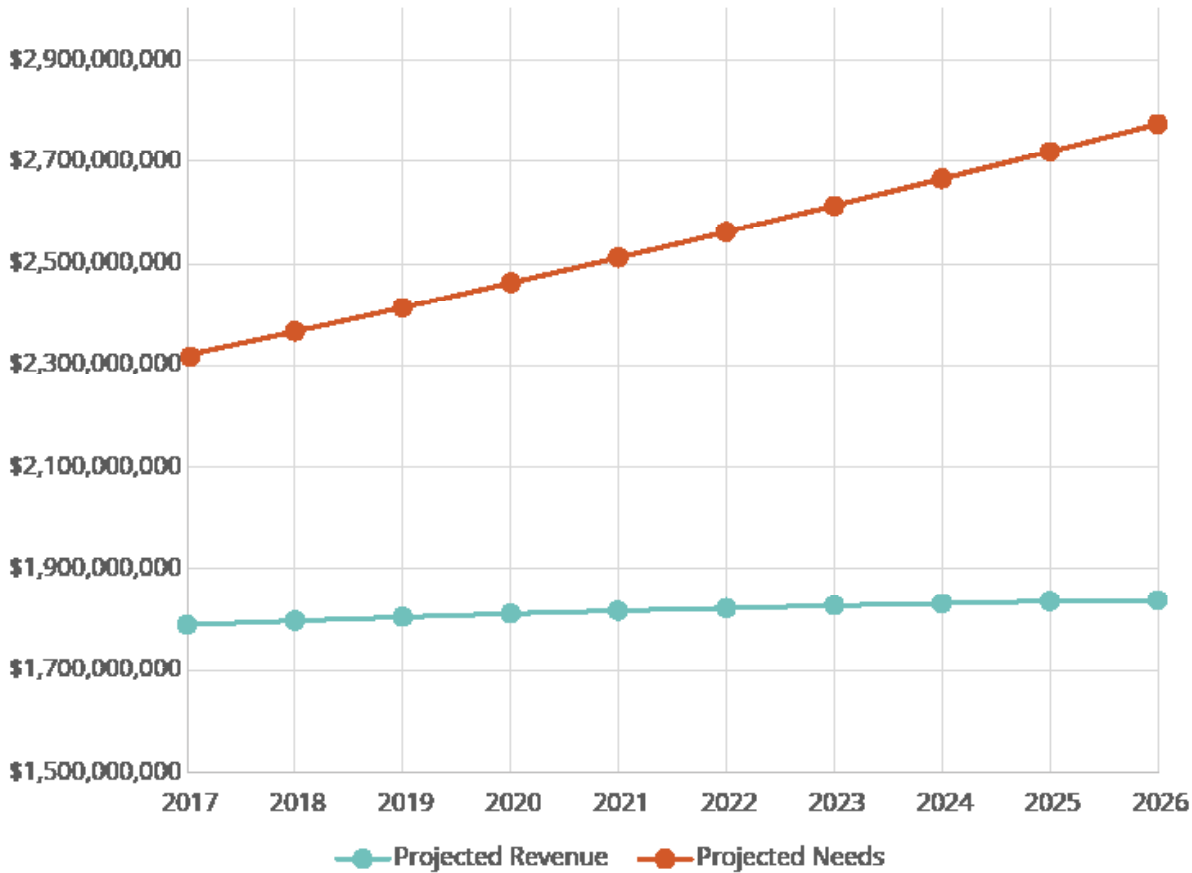


Figure 10 Projected Needs and Revenues

Despite the financial outlook, the 10-Year Strategic Investment Plan will be based on three core concepts: Efficiency, Effectiveness, and Economic Competitiveness. These strategic emphasis areas, which support TDOT's guiding principles, will ultimately guide investments with whatever dollars are available to serve the public by providing the best multimodal transportation system in the nation. Table 6 illustrates the 10-Year Strategic Investment Plan targets derived through the deficiency assessment and based on fiscally-constrained revenue assumptions.

Table 6 10-Year Strategic Investment Targets

	Efficiency (Reliability-Availability-Accessibility)			Effectiveness (Return on Investment)		Economic Competitiveness (Communities-Commerce)		
	Interstate Modernization	Multimodal Connectivity	ITS	Maintain State of Good Repair	System Safety	Urban Opportunity	Rural Access	Primary Trade Corridors
Target	36%			42%		22%		
Annual	\$654 million			\$763 million		\$399 million		
10-Year	\$6,540 million			\$7,630 million		\$3,990 million		

As previously stated, it is envisioned that TDOT will work towards investments in the above categories over the next 10 years. To fully achieve this 10-year strategy, TDOT will need to align the Department's budgetary activities with these strategic emphasis areas and, over time, track investment performance within each of these categories. Due to the nature of funding activities and programs, many investments may span across multiple emphasis areas resulting in a process whereby projects may be funded under a number of categories. As such, this is somewhat of a dynamic process, which, when coupled with performance measures, would ultimately result in a more holistic and performance-based decision-making process. Tennessee is at the forefront of economic prosperity, quality of life, and financial stability.

Over the past 100 years, TDOT has continued to serve the State by providing a safe, reliable, and convenient transportation system. Managing, maintaining, and providing this quality transportation system is not only a challenge today, but will continue to be one in the future. This Plan provides the next steps in supporting and responding to future growth and development in the State and provides the necessary foundation for long-term mobility for Tennessee residents, businesses, and visitors.